Impacts of Vocational Education and Training on Employment and Wages in India Manufacturing Industries

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Impacts of Vocational Education and Training on Employment and Wages in Indian Manufacturing Industries– Variation across Social Groups: Empirical Evidences from 68th Round NSSO Data

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Abstract[2]

Vocational education and training (VET) plays important role in developing skilled manpower in a country. Realizing the importance of VET, India has been putting emphasis on offering easy access to VET along with general education for meeting the increasing demand for skilled workers in the economy. However, in a third world nation like India where various administrative and institutional factors play pivotal role in the determination of employment and wages, people from all social groups may not get equally benefited from VET. How the impacts of VET on employment and wage income vary across social groups in India has been analysed in this study, and for this purpose, focus has been restricted only to the manufacturing sector of the nation. The main data source for this study is the employment and unemployment survey in India (10th Schedule) of 68th NSS (National Sample Survey) quinquennial round (2011-12). To tackle the sample selection bias problem, Heckman's Sample Selection Model (1979) with two steps estimation technique (Heckit) has been used in this study.

The study reveals that VET significantly enhances participation in the manufacturing sector of India across all social groups. But, the impact of VET on employment varies across manufacturing industries to some extent. Moreover, for OBCs and SCs, VET (inclusive of VET in any form) and formal VET, respectively, increase participation by significantly lesser extent than for General Caste people in Indian manufacturing sector as wage labourers. VET is found to be also helpful in enhancing wages of workers in the manufacturing sector at aggregate level. Nevertheless, at individual industry level, VET is found to be ineffective in certain manufacturing industries. On the other hand, the impact formal VET on wages is found to be more intense in the manufacturing sector as

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a whole as well as at individual industry level. The study also reveals that in certain cases, the impacts of VET on wages vary across workers belonging to different caste or ethnicity in Indian manufacturing sector.

1. Introduction

Vocational education and training (VET) is very important for developing skilled manpower and improving industrial productivity. At individual level, VET offers greater access to labor markets (Arum and Shavit, 1995) and generates the ability to earn more (Neuman and Ziderman, 1989). The definition adopted by UNESCO and International Labour Organization for technical vocational education and training is as follows (Badawi, 2013):

> *"A comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (p. 284).*

To meet the demand for skilled workers in the economy, India has already started to focus on offering easy access to technical and vocational education along with general education (Goel, n.d). More interestingly, as a part of the inclusive growth strategy, India has been trying to ensure that individuals from all sections of the society irrespective of their gender, age, race, caste, ethnicity and religion get equal opportunity to receive VET and build necessary skills to meet the demand of employers and get quality jobs (Goel, n.d).

However, a unique feature of labour market is that the employers are often influenced not only by the nature and quality of the workers while hiring, but also by some socio-cultural attributes of the workers (Papola, 2012; Leontaridi, 1998; Becker, 1957). Particularly, in a less developed country like India where labour market is not perfectly developed, wage could not be determined through perfect interaction of supply and demand; rather various administrative and institutional factors play crucial role in the determination of wage rates. Hence, it would not be appropriate to use the demand-supply analysis technique in a competitive market framework in order to understand the process of wages and employment determination in the Indian labour market (Das 2007a).

We can also find that the employment rate in terms of usual status employment is the highest among illiterate people or people having education up to primary level, while it is the lowest among people with higher secondary level of education both in rural and urban sectors of the country irrespective of gender in India (Statement 5.5, *NSS Report No. 537: Employment and Unemployment Situation in India, 2009-10*). This finding clearly indicates the dominance of informal activities and lack of availability of formal

sector jobs for people with higher education. In this context, it will be really interesting to find out whether VET is at all effective in enhancing the likeliness to enter the labour market and wage rate in Indian labour market.

Various empirical studies have reported the presence of caste/ethnicity disparities or even discrimination in employment and wages in rural as well as urban India where equally qualified people from lower castes get lower wages and get segregated into lower-paid jobs than upper caste people (Agarwal, 2013; Thorat *et.al.* 2009; Madheswaran and Attewell, 2007; Banerjee, *et al.* 2009; Chakravarty and Somanathan, 2008).

In the presence of such discriminatory practices in India, it will be interesting to investigate whether people from different social groups with equivalent level of skills developed through similar VET programs are equally likely to get a job and receive similar wages. There is, however, lack of studies on this issue and the present study wants to contribute towards fulfilling this research gap. This study will, however, restrict its focus to the manufacturing sector only. Employment growth in manufacturing, particularly in the registered sector has been critical in India since the early 1980s. While manufacturing is treated conventionally as an engine of growth in Kaldor's (1966) sense, the manufacturing sector in India fails to contribute to economic growth sufficiently even during the high growth phase in the second half of the 1980s or the 1990s by transforming the workforce from land based activities to high productive manufacturing industries (Das, 2007). Thus, an in depth empirical study on different aspects of employment and wages in manufacturing assumes significance. In this context, an investigation into the role of VET in the determination of employment and wages in manufacturing sector becomes very important as manufacturing jobs often require certain types of skills and knowledge that can not be obtained through general education. Hence, the present study aims at answering the following research question:

How do the impacts of VET on employment and wage income vary across social groups in Indian manufacturing sector?

Given this main research question, the present paper attempts to answer the following sub-questions:

- How does VET influence the act of participation in various manufacturing Industries in India?

- How does caste/ethnicity influence the impact of VET on the act of participation in various manufacturing industries in India?

- How does VET influence wages/salaries in various manufacturing Industries in India?

- How does caste/ethnicity influence the impact of VET on wages/salaries in various manufacturing industries in India?

2. Methodology and Database

2.1 Methodological Issues

Neo-classical or human capital version of the theories of labor market simply assumes that individuals can make a selection among a wide range of jobs freely on the basis of their own individual tastes and preferences, capabilities and skills, and consequently get rewards based on their human capital endowments (Mincer, 1974; Leontaridi, 1998). Based on this theory, it can be assumed that VET will have positive impact on the probability of getting job and wages as it enhances their skills and improves their human capital endowments.

However, workers are differentiated not only on the basis of its own attributes such as age, education, skill, and experience, but also on the basis of the perception and prejudices of its buyer (Beker, 1957). According to the theory of taste for discrimination proposed by Becker (1957), employers often poses a taste of discrimination against the socially excluded groups and/or use race/caste as a proxy of unobserved variables of job seekers where lower productivity is perceived to be a feature of minorities in the society. Thus, rewards to human capital vary on account of the presence of institutional barriers for which all individuals do not get equally benefited from education and skills (Leontaridi, 1998). Thus, in the presence of discriminatory practices in the labour market, the impact of VET on employment and wages may vary across social groups.

Based on the conventional model of labour supply and human capital theories, the labour force participation can be presented as follows (Mincer, 1974):

$$Y = f (X_1.....Xn)..(1)$$

Where Y represents labour market participation, Y = 1 when an individual participates in labour market and Y = 0 when an individual does not participate in the labour market. $X_1.....Xn$ presents various socio-economic factors such as expected wage, age, gender, race, education, skills, marital status, non-labour income, etc.

Since the present study considers only the manufacturing sector of the labour market, the participation in manufacturing sector and various manufacturing industries within this sector have only been taken into account in this study.

Since equation (1) involves a binary dependent variable, application of simple linear regression model will not be justified. It is necessary to apply some non-linear probability model. Moreover, it is also necessary to estimate a wage equation. Hence,

the exact model of estimation for the proposed study should take into account both these aspects, i.e. a well-defined participation equation and a wage equation.

Mincerian earning/wage equation takes the following form:

$$w_i = X_i^{'} \beta + u_i \text{...(2)}$$

Where, w stands for wage income, X is the vector of independent variables and β is the vector coefficients. Equation (1) and (2) can be estimated separately to find out the impacts of explanatory variables on participation and wage, respectively. However, this kind of estimation may lead to biased estimation due to sample selection error at the time of wage estimation as we need to consider wage information only for those who participate in the manufacturing sector, but the sample would include both participants and non-participants in Indian manufacturing sector.

Hence, the present study has looked for sample selection corrected estimates so that selection biases could be avoided. In this context, Heckman's Sample Selection Model (1979) with two steps estimation technique (Heckit) has been applied in this study. Heckman's Sample Selection model is important to consider here for two reasons. First, this model incorporates a participation equation that has helped to build the participation model for this study. Second, the selection equation has helped in looking in the determinants of wages and findings out how VET determines wages in Indian manufacturing sector. In both the participation/selection and wage equations, dummy variable representing the attainment of VET and interaction dummy variables combining VET dummy with different social group dummies (SCs, STs and General Caste) have been incorporated to figure out the impact of VET on participation and wages along with the variation in the impact of VET across social groups. Moreover, this study has additionally investigated the impact of only formal VET to find out whether impact of formal VET is any different from that of non-formal VET. Thus, this paper has estimated two sets of regression equations using Heckit model, one to investigate the impact of VET (inclusive of VET in any form) on employment and wage, and the other to examine the impact of formal VET on employment and wage in Indian manufacturing sector.

The exact specifications of participation and wage equations for evaluating the impact of VET (inclusive of VET in any form) are as follows:

Participation = $\alpha + \beta_1$ Land Possession + β_2 Age + β_3 Age^2 + β_4 Gender + β_5 Marital Status $+ \beta_6$ ST$_i$ + β_7 SC + β_8 OBC + β_9 Illiterate + β_{10} Primary & Below + β_{11} Middle + β_{12} Secondary + β_{13} Higher Secondary + β_{14} Postgraduate & Above + β_{15} VET + β_{16} (VET * ST) + β_{17} (VET * SC) + β_{18} (VET * OBC) + v...(3.1)

and

Wage = $\alpha + \beta_1$ Age + β_2 Age^2 + β_3 Gender + β_4 ST$_i$ + β_5 SC + β_6 OBC + β_7 Illiterate + β_8 Primary & Below + β_9 Middle + β_{10} Secondary + β_{11} Higher Secondary + β_{12}

Postgraduate & Above + β_{13} VET + β_{14} (VET * ST) + β_{15} (VET * SC) + β_{16} (VET * OBC) + β_{16} Enterprise Type + $\rho\,\sigma_u\,\lambda$ + u...(3.2)

The exact specifications of participation and wage equations for evaluating the impact of formal VET are as follows:

Participation = α_+ β_1 Land Possession + β_2 Age + β_3 Age^2 + β_4 Gender + β_5 Marital Status $_+$ β_6 ST_i + β_7 SC + β_8 OBC + β_9 Illiterate + β_{10} Primary & Below + β_{11} Middle + β_{12} Secondary + β_{13} Higher Secondary + β_{14} Postgraduate & Above + β_{15} Formal VET + β_{16} (Formal VET * ST) + β_{17} (Formal VET * SC) + β_{18} (Formal VET * OBC) + v............... (4.1)

and

Wage = α_+ β_1 Age + β_2 Age^2 + β_3 Gender + β_4 ST_i + β_5 SC + β_6 OBC + β_7 Illiterate + β_8 Primary & Below + β_9 Middle + β_{10} Secondary + β_{11} Higher Secondary + β_{12} Postgraduate & Above + β_{13} Formal VET + β_{14} (Formal VET * ST) + β_{15} (Formal VET * SC) + β_{16} (Formal VET * OBC) + β_{16} Enterprise Type + $\rho\,\sigma_u\,\lambda$ + u... (4.2)

The interpretations of dependent and independent variables in equations 3.1, 3.2, 4.1 and 4.2 are as follows:

Participation = 1 if the respondent is a worker in manufacturing sector when we consider participation in the manufacturing industry as a whole / in a particular manufacturing industry when we consider participation in a specific manufacturing industry, = 0 otherwise

Land Possession = Amount of land possessed by household

Age = Age of respondent

Age^2 = Square of Age of respondent

Gender = 1 if the respondent is male, = 0 otherwise

Marital Status = 1 if the respondent is currently married, = 0 otherwise

ST = 1 if the respondent is a schedule tribe, = 0 otherwise

SC = 1 if the respondent is schedule caste, = 0 otherwise

OBC = 1 if the respondent belongs to other backward caste, = 0 otherwise

(General, i.e. the respondent is a general caste, is taken as the reference category for social group)

Illiterate = 1 if the respondent is illiterate, = 0 otherwise

Primary & Below = 1 if the respondent is primary or below primary educated, = 0 otherwise

Middle = 1 if the respondent is middle educated, = 0 otherwise

Secondary = 1 if the respondent is secondary educated, = 0 otherwise

Higher Secondary = 1 if the respondent is higher secondary educated, = 0 otherwise

Postgraduate & Above = 1 if the respondent is postgraduate or above educated, = 0 otherwise

(Graduate & Diploma, i.e. respondent has graduate or diploma level education, is taken as reference category for education level)

VET = 1 if the respondent possesses VET of any form, = 0 otherwise

Formal VET = 1 if the respondent has formal VET, = 0 otherwise

VET*ST = 1 if the respondent is a schedule tribe and possesses VET of any form, = 0 otherwise

VET*SC = 1 if the respondent is a schedule caste and possesses VET of any form, = 0 otherwise

VET*OBC = 1 if the respondent is a other backward caste and possesses VET of any form, = 0 otherwise

Formal VET*ST = 1 if the respondent is a schedule tribe and possesses formal VET, = 0 otherwise

Formal VET*SC = 1 if the respondent is a schedule caste and possesses formal VET, = 0 otherwise

Formal VET*OBC = 1 if the respondent is a other backward caste and possesses formal VET, = 0 otherwise

Enterprise Type = 1 if the respondent is working in government owned enterprise, = 0 otherwise

λ = inverse Mill's Ratio

2.2 Empirical Database

As the empirical base of the study, the data from employment and unemployment survey in India (10th Schedule) of 68th NSS (National Sample Survey) quinquennial round for 2011-12 has been used. The cross-sectional survey is roughly representative of the national, state, and the so-called "NSS region" level. It gathers information about

demographic characteristics of household members, weekly time disposition, and their main and secondary job activities. The principal job activities are defined for all household members as self-employed, regular salaried worker, casual wage labourer and so on. The usual principal activity status is used to examine employment status of a person[3].

To investigate the impact of VET on employment and wages in Indian manufacturing sector, NIC (National Industrial Classification)-2008 at 2 digit level for manufacturing industry has been taken into account. NSSO used this standard (NIC- 2008) for collecting data on industrial engagement of people. NSSO also offers data on whether individuals surveyed received formal and informal VET.

The 2 digit classifications of industries include 24 manufacturing industries. We have checked the employment and wage structure in each of these manufacturing industries. However, while finding out how significant is the impact of VET (inclusive of VET in any form) and formal VET on employment and wages, the regression analysis has considered, besides the entire manufacturing sector, only five manufacturing industries, namely food products, textiles, wearing apparel, non-metallic mineral products and fabricated metal products manufacturing industries, as these are the major manufacturing industries in terms of absorbing the majority of manufacturing workers. To be more specific, industries absorbing more than 5 percent of total manufacturing workers have been considered here for econometric analysis (percentage distribution of total manufacturing workers across different manufacturing industries is given in the appendix). For our study, we have considered four social groups, namely Scheduled Tribes (STs), Scheduled Castes (SCs), Other Backward Castes (OBC) and General Castes. In this data set, the sample size covering only the individuals engaged in manufacturing industries either as wage labourer or nonwage worker within the age group of 15-59 years is 18654. However, the size of entire sample corresponding to the age group of 15-59 years is 288782 that included wage labourers or non-wage workers in different industries as well as non-workers.

3. Employment structure in Indian manufacturing sector

We will first look at the percentage distribution of manufacturing workers in India across different social groups in the manufacturing sector as a whole during 2011-2012.
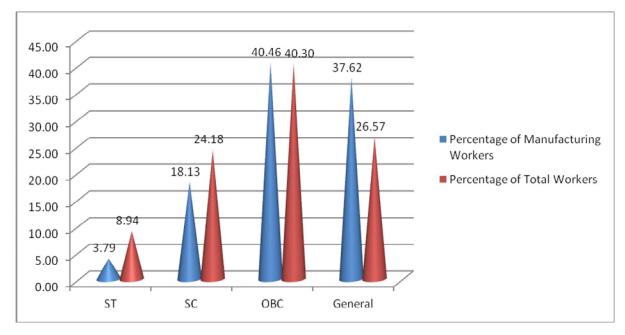
Figure 1.a has plotted the percentage distribution of total manufacturing sector workers across social groups against the percentage distribution of total workers across social groups in India. Figure 1.a shows that the share of OBC workers was the highest in total manufacturing sector workers in India during 2011-12 as it is also found that OBCs are the most likely participants in the labour market as a whole as wage labourers than the

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[3] This is the activity status on which an individual spent relatively longer time during the preceding 365 days prior to the date of survey.

people from any other social group. The presence of ST workers within the group of total manufacturing workers was the lowest among all social groups. The findings from Figure 1.a clearly indicate that the Indian manufacturing sector is mainly dominated by OBC and General Caste workers. Moreover, if the percentage distribution of total manufacturing workers across social groups is compared against the percentage distribution of total workers across social groups, it can be found that the presence of STs and SCs is far less prominent in Indian manufacturing sector than in the Indian labour market as a whole. This finding implies that STs and SCs are less likely to enter manufacturing sector, and this could be on account of lack of necessary skills and/or the presence of discriminatory practices against these social minorities in Indian manufacturing sector.

Figure 1.a: Percentage distribution of total manufacturing sector workers across different social groups: 2011-12
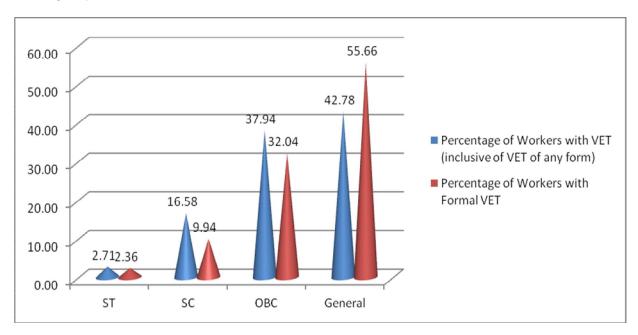

Source: NSSO 68th Round unit level data

Note: Percentage values for workers belonging to different social groups have been calculated using multipliers developed by NSSO.

Figure 1.b, on the other hand, reveals that the group of manufacturing sector workers with VET (inclusive of VET in any form) was mainly dominated by General Caste workers in the Indian manufacturing sector, while the presence of OBC workers (around 38 percent) in this group workers was also prominent. But, the presence of ST and SC workers with VET (inclusive of VET in any form) was quite low in the Indian manufacturing sector; especially it was marginal for the STs. On the other hand, Figure 1.b also shows that the majority of the manufacturing workers (around 56 percent) with

formal VET belonged to the General Caste category; whereas, the presence of SC and ST workers with formal VET was quite lower in comparison to general and OBC workers.

Figure 1.b: Distribution of manufacturing sector workers with VET across different social groups: 2011-2012

Thus, it can be inferred from the findings drawn from Figure 1.a and 1.b that even if the presence of non-General Caste workers is quite prominent in the Indian manufacturing sector, particularly for SCs and OBCs, the group of skilled workers with VET, especially with formal VET, in this sector is mainly dominated by General Caste workers. The employment structure in manufacturing sector of India, thus, clearly reflects some social group based inequality in employment in this sector. The lack of presence of skilled workers having VET from socially backward classes, mainly from the Scheduled Castes and the Scheduled Tribes could be on account of the lack of skill generation among the people belonging to these social groups or on account of having lack of opportunities or incentives to enter manufacturing industries even with VET mainly for the presence of discriminatory practices exercised against these social groups.

4. Wage structure in Indian manufacturing sector

Wage in the labour market is an important factor that plays influential role in making a worker's decision to participate in the labour market or in a specific industry or job. We will now examine how wages of manufacturing workers differ across social groups in manufacturing sector.

Table 1.a reveals that the mean wage of manufacturing workers belonging to the General Caste category was higher than the mean wage of the manufacturing sector workers as a whole and that of ST, SC and OBC workers working in this sector during 2011-12. The mean wage was the lowest for SC manufacturing workers. Table 1.a further shows that in case of manufacturing sector workers with VET (inclusive of VET in any form) as well, the mean wage was the highest for General Caste workers and the lowest for SC workers. It is further interesting to note from the mean wage values in Table 1.a that the mean wage of the group of manufacturing workers with formal VET was higher than the mean wage of the group consisting of manufacturing workers with VET (inclusive of VET in any form) in case of all workers as well as ST, SC, OBC and General Caste workers. Interestingly, the mean wage of manufacturing workers with formal VET was the highest for ST workers and the lowest for OBC workers. Another interesting thing note from Table 1.a is that workers working in public enterprises irrespective of which social group they belong to receive lower wages on average implying that private manufacturing sector in India offers higher wages on average than the government owned section of the manufacturing industry.

Table 1.a: Mean wages of manufacturing workers across social groups

Group	Mean Wage_All Workers	Mean Wage_All Workers_Public Sector	Mean Wage_Workers with VET	Mean Wage_Workers with VET_Public Sector	Mean Wage_Wokers with formal VET	Mean Wage_Wokers with formal VET_Public_Sector
All	1786.40	760.66	1885.88	853.56	3633.04	-
ST	1323.36	601.94	1772.09	770.00	5214.41	-
SC	1255.91	826.00	1307.11	653.20	2754.22	-
OBC	1499.99	718.43	1570.37	879.75	2527.37	-
General	2396.99	1124.00	2397.79	1375.00	4359.27	-

Source: Author's calculation using NSSO 68th Round unit level data

Note 1: There is no observation of wage income for workers with formal vocational training working in government enterprises in Indian in manufacturing sector.

Table 1.b presents mean wage gaps calculated using classical *t* test to compare mean values of a variable, here wage, of two groups, here two social groups. Here, mean wage gaps between ST and General Caste workers, SC and General Caste Workers, and OBC and General Caste workers have been estimated. The mean wage gaps presented in Table 1.b reveal that they are all negative implying lower earning potential of ST, SC and OBC workers in comparison to General Caste workers within the groups of manufacturing workers as a whole, manufacturing workers with VET (inclusive of VET in any form) and manufacturing workers with formal VET, and that the they are all statistically significant except in case of the wage gap between ST and General Caste workers with formal VET. Thus, it can be inferred that in most of the occasions General Caste manufacturing workers earned significantly higher than ST, SC and OBC workers in Indian manufacturing sector during 2011-12. Nevertheless, mean wage gaps were lower

in magnitude in public sector in most of the occasions as can be seen from Table 1.b, and this could be on account of the existing affirmative actions for socially backward classes in Indian labour market, such as reservation policies in government sector that lowers the presence as well as the impact of discriminatory practices against these groups in public sector.

It is, however, noteworthy to mention that the strength of the statistical significance of the mean wage gaps appear to be lower within the groups of manufacturing workers with VET (inclusive of VET in any form) and formal VET, thus it can be inferred that the mean wage gaps were less intense in these two groups than among the group consisting of all workers in manufacturing sector, except in case of the mean wage gap between OBC and General Caste workers. The fall in social group-wise wage gap seems to be the most prominent in case of the wage gap between ST and General Caste workers. Thus, it can be inferred that the presence VET might play an important role in lowering social group or caste/ethnicity-based wage gap in Indian manufacturing sector.

Table 1.b: Mean wage gaps among manufacturing workers across social groups

Group Combination	Mean Wage Gap_All	Mean Wage Gap_All_ Public Sector	Mean Wage Gap_ Workers with Vocational Training	Mean Wage Gap_ Workers with Vocational Training_ Public Sector	Mean Wage Gap_ Workers with Formal Vocational Training	Mean Wage Gap_ Workers with Formal Vocational Training_ Public Sector
ST - General	-913.52***	-522.06***	-476.79**	-605*	-134.24	-
SC - General	-1108.87***	-298**	-973.63**	-721.8**	-1626.08**	-
OBC - General	-893.06***	-405.5714***	-717.08***	-495.25	-1791.27***	-

Source: As for Table.1.a
Note 1: *** significant at 1 % level, ** significant at 5 % level, and * significant at 10 % level
Note 2: There is no observation for workers with formal vocational training working in government enterprises in Indian in manufacturing sector. Hence, there is no value for mean wage gap for workers with formal vocational training in public sector.

From the findings that emerged from Table 1.a and 1.b, it can be deduced that even if VET increases wages on average across all social groups, it is not capable of bringing in equality in average wages of SC, ST, OBC and General Caste manufacturing workers with VET. Some other factors might have played crucial role in having caste/ethnicity-based wage gaps even within the group of skilled manufacturing workers, such as gap in other human capital endowments, such as general education level, technical education, experience, etc., and/or the presence discriminatory treatments exercised against socially backward classes like SC, ST and OBC.

We will now look into mean wage gaps between ST and General Caste workers, SC and General Caste workers, and OBC and General Caste workers in various manufacturing

industries to find out how social group-based mean wage gaps vary across different manufacturing industries.

It can be found from Table 2.a that the mean wage gap between ST and General Caste workers within the group of total manufacturing sector workers was negative in the majority of the industries, but in many manufacturing industries, the mean wage gaps were statistically insignificant. More interestingly, Table 2.a reveals that the mean wage gap between ST and General Caste workers is statistically insignificant in the majority of the manufacturing industries within the group of manufacturing sector workers with VET (inclusive of VET in any form) and in all the manufacturing industries within the group of manufacturing sector workers with formal VET.

Table 2.a: Mean wage gap between ST and General Caste manufacturing workers in different manufacturing industries

Industry	ST-General (All Workers)	ST-General (Workers with VET)	ST-General (Workers with Formal VET)
Food products	-904.76**	-1658.17	-4367.33
Beverages	-1765.55**	.	.
Tobacco products	-351.83	-746.15	.
Textiles	321.31	755.59	1406.21
Wearing apparel	-373.62	-497.54	.
Leather and related products	-758.25	.	.
Wood and products of wood	-352.56	116.33	6230.00
Paper and paper products	915.14	-628.36	.
Printing	-847.28	-203.49	-1400.00
Coke and refined petroleum products	-1639.39	2415.89	2399.60
Chemicals and chemical products	-1010.11**	-855.81*	-967.57
Pharmaceuticals	-1290.37	-1882.14	.
Rubber and plastics products	-366.02	129.87	1384.55
Non-metallic mineral products	-739.73***	-1408.09**	-2982.50
Basic metals	-1075.27**	635.89	1629.04
Fabricated metal products	-964.50*	-981.72**	.
Computer, electronic and optical products	-3487.43	-2827.44	.
Electrical equipment	-2298.95**	-2143.46	-3474.67
Machinery and equipment	-196.94	4446.97	4581.25
Motor vehicles	-560.88	.	.
Transport equipment	1552.29	3594.28	3530.42
Furniture	-144.22	-571.42	70.00
Other manufacturing	-653.61	-898.38	.
Repair and installation of machinery and equipment	-1521.42	-2813.33	-2475.00

Source: As for Table.1.a

Table 2.b, on the other hand, shows that the mean wage gaps between SC and General Caste workers in various manufacturing industries were mostly negative as well as statistically significant mainly within the groups of total manufacturing workers and manufacturing workers with VET (inclusive of VET in any form). In the majority of the industries, the mean wage gaps between SC and General Caste workers were deepened in the group of workers with VET (inclusive of VET in any form) and remained statistically significant as well. It could be for the reason that VET enhances wages for General workers more than that for SC workers.

Table 2.b: Mean Wage Gap between SC and General Class Manufacturing Workers in Different Manufacturing Industries

Industry	SC-General (All Workers)	SC-General (Workers with VET)	SC-General (Workers with Formal VET)
Food products	-881.91***	-1437.89**	-3707.33
Beverages	-997.75*	-1229.44	270.50
Tobacco products	-9.37	-21.15	.
Textiles	-261.38**	-363.18**	-1215.46
Wearing apparel	-309.64**	-289.89**	-1092.91
Leather and related products	-747.58***	-1034.08***	.
Wood and products of wood	-464.96**	-655.68**	-370.00
Paper and paper products	-265.07	-672.20	.
Printing	-922.92**	-267.46	-2200.00
Coke and refined petroleum products	-7766.45	-4692.11*	.
Chemicals and chemical products	-1382.92***	-660.83	479.68
Pharmaceuticals,	-1712.79***	-2160.97***	-3559.33
Rubber and plastics products	-609.17*	-1029.67**	-1757.46
Non-metallic mineral products	-578.98***	-1011.50**	-2282.50
Basic metals	-1556.15***	-1108.76**	-354.29
Fabricated metal products	-997.79***	-392.04*	-2380.50*
Computer, electronic and optical products	-2910.20***	-3547.44**	-5503.89**
Electrical equipment	-1672.89***	-2145.87**	-2347.83
Machinery and equipment	-1879.47**	-697.03	-88.75
Motor vehicles	-2999.65**	-3545.48**	-4894.45
Transport equipment	-916.90	622.37	2022.12
Furniture	-3.46	-356.78*	500.00
Other manufacturing	-298.56*	-318.86	.
Repair and installation of machinery and equipment	-2423.91**	-2284.64**	-925.00

Source: As for Table.1.a

However, Table 2.b reveals that the mean wage gaps between SC and General Caste workers become statistically insignificant in most of the manufacturing industries within the group of manufacturing workers with formal VET. One explanation of having this result could be that the rate of increase in wage earning potential on account of having formal VET becomes higher for SC than General Caste workers in many Indian manufacturing industries.

Finally, it can be noted from Table 2.c that the mean wage gaps between OBC and General Caste workers within the group of total manufacturing sector workers in various manufacturing industries were negative and statistically significant in most of the industries. The findings are quite similar for the group of manufacturing workers with VET (inclusive of VET in any form). Further, the mean wage gaps between OBC and General Caste workers remained statistically significant and even enhanced in many manufacturing industries within the group of manufacturing workers with VET (inclusive of VET in any form) than within the group of total manufacturing workers. Moreover, within the group of manufacturing workers with formal VET, the mean wage gaps between OBC and General Caste workers remained statistically significant in a number of industries. In fact, in many manufacturing industries the mean wage gaps were the most severe within the group of manufacturing workers with formal VET. It thus seems that VET increase the wage earning potential of OBC workers far less than General Caste workers in Indian manufacturing sector.

Table 2.c: Mean Wage Gap between OBC and General Class Manufacturing Workers in Different Manufacturing Industries

Industry	OBC-General (All Workers)	OBC-General (Workers with VET)	OBC-General (Workers with Formal VET)
Food products	-635.21***	-1461.02***	-3133.63*
Beverages	-977.20**	337.72	2887.00
Tobacco products	-6.51	-344.82	.
Textiles	-283.48***	-345.29***	-345.43
Wearing apparel	-88.79	-118.68	-1231.29**
Leather and related products	-603.13***	-767.84*	-1212.67
Wood and products of wood	-290.14*	-3.50	-1278.25
Paper and paper products	-716.55**	-677.51*	-2440.00
Printing	-9.45	1390.33	1457.86
Coke and refined petroleum products	-6938.09*	-2658.78	-4408.40
Chemicals and chemical products	-1283.32***	-684.81*	453.43
Pharmaceuticals,	-1207.94***	-256.02	-1691.73
Rubber and plastics products	-384.05**	-242.29	-1111.46*
Non-metallic mineral products	-464.07***	-1203.39***	-3244.38***

Industry	OBC-General (All Workers)	OBC-General (Workers with VET)	OBC-General (Workers with Formal VET)
Basic metals	-1207.01***	-1269.08***	-1600.69*
Fabricated metal products	-959.54***	-543.54***	-2675.46**
Computer, electronic and optical products	-842.60	383.98	-2072.22
Electrical equipment	-1085.92**	-1107.16*	-2987.17**
Machinery and equipment	-672.91	-149.96	1176.63
Motor vehicles	-2526.77***	-2606.24**	-4746.30**
Transport equipment	-2487.15**	-1013.10	-1173.18
Furniture	466.87	-79.55	-50.00
Other manufacturing	-242.22*	-297.47*	-1284.42
Repair and installation of machinery and equipment	-2215.91***	-2037.25**	229.67

Source: As for Table.1.a

Table 2.a, 2.b and 2.c, thus, give some idea about how mean wage gaps among General and non-General caste workers change with the acquisition of VET in Indian manufacturing industries. However, to get more accurate picture about the influence of VET on employment and wage for different social groups in Indian manufacturing industries, regression analysis has been conducted. The next section discusses the results of Heckit regression estimation.

5. Influence of Vocational Education on employment in Indian Manufacturing Sector

This section examines the influence of VET on employment for the entire manufacturing sector as well as for a few manufacturing industries, mainly those with the highest level of concentration of manufacturing workers, i.e. food products, textiles, wearing apparel, non-metallic mineral products and fabricated metal products manufacturing industries.

Table 3.a shows the impact of VET (inclusive of VET in any form) on the probability of entering into the manufacturing sector. According to human capital theories (Becker, 1964; Mincer, 1974; Schultz, 1971), we get expected results for the coefficient of the VET (inclusive of VET in any form) dummy (positive and statistically significant) in case of the entire manufacturing sector, textiles, wearing apparel and fabricated metal products manufacturing industries in India. Thus, we can infer that VET (inclusive of VET in any form) can enhance the probability of participation as wage labourers in the manufacturing sector as a whole as well as in textiles, wearing apparel and fabricated metal products manufacturing industries in India. In other words to say, manufacturing sector offers more job opportunities for skilled workers who possess VET. However, in food products and non-metallic mineral products manufacturing industries, the possession of VET does not significantly help to increase the probability of participation as wage labourers. It may be on account of lack of the requirement of skilled workers in these industries.

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The results (Table 3.a) further indicates that the impact of VET (inclusive of VET in any form) on employment in the manufacturing sector as a whole is significantly lower for OBC workers than General Caste workers (coefficients corresponding to VET (inclusive of VET in any form) * OBC are negative and significant). On the contrary, the degree of impact on employment for ST workers is found to be significantly higher than that for General Caste workers in food products manufacturing industry (coefficients corresponding to VET (inclusive of VET in any form) * ST is positive and significant). However, in rest of the cases, the coefficient terms of interaction dummies are statistically insignificant implying no significant difference in impact of VET on participation across social groups (Table 3.a).

As for the control variables, Table 3.a reveals that land possession, age, sex, social group, and general education levels significantly influence participation in the manufacturing industry as wage labourers in India. The sign of the coefficient of land possession is negative implying that a respondent whose household possesses higher amount of land is less likely to participate as wage labourer in manufacturing sector as they could be more interested in earning through utilisation of their land, such as various farm and/or non-farm activities. We get expected sign for the coefficient of age (positive for Age and negative for Age Square) implying that the probability of participation increases with age but increases with a declining rate after certain point, and finally falls after certain age reflecting an inverted U-shaped relationship of participation with age within the age group of 15-59 years. It is in keeping with the proposition of human capital theories (Becker, 1964; Mincer, 1974) that postulate that with age people gather experience that in turn enhances their productivity, and consequently their chance to get recruited. Given the existing social structure, women are less likely to participate in labour market (Amsden, 1990) and the present empirical finding also support this view as males are found to be more likely to participate as wage labourers in Indian manufacturing sector than their female counterparts. Interestingly, currently married people are significantly less likely to take part in the manufacturing sector of the labour market. The findings for age, sex and marital status are more or less similar for all the five chosen manufacturing industries as well.

Regression results (Table 3.a) also suggest that compared to the people belonging to the General Caste category, STs are significantly less likely to participate as wage labourers in the manufacturing sector as a whole and this may be on account of their more concentration in farming activities (Madheswaran and Attewell, 2007). Nevertheless, compared to General Caste Category, the participation of SCs are not significantly different in the manufacturing sector as a whole, but some differences can be observed at individual industry level, while in the manufacturing sector as a whole as well as in a few chosen industries, OBCs are a little more likely to participate as wage labourers in the manufacturing sector than the people belonging to the General Caste category. On the other hand, compared to the graduates and/or people with diploma, not literates and people with primary, middle education level are significantly more likely to enter

the manufacturing sector of India, while participation for people with secondary, higher secondary, and postgraduate and above level of education are significantly less in this sector. It is in keeping with the report published by National Sample Survey Organisation on employment and unemployment situation in India during 2009-10 (Statement 5.5, *NSS Report No. 537: Employment and Unemployment Situation in India, 2009-10*) that indicates towards the lack of creation of formal sector jobs for highly educated and skilled workers in India.

Table 3.a Impact of VET on employment in Indian manufacturing sector

Variables	All	Food products	Textiles	Wearing apparel	Non-metallic mineral products	Fabricated metal products
Land Possession	-0.0002***	-0.0001***	-0.0003***	-0.0005***	-0.0001***	-0.0007***
Age	0.07***	0.06***	0.05***	0.07***	0.02**	0.06***
Age square	-0.0009***	-0.0007***	-0.0007***	-0.001***	-0.0004***	-0.0008***
Marital status	-0.10***	-0.06*	-0.10***	-0.16***	0.12**	-0.11**
Sex	0.79***	0.60***	0.50***	0.29***	0.72***	0.89***
ST	-0.34***	-0.46***	-0.25***	-0.30***	0.02	-0.12
SC	-0.02	-0.04	-0.15***	-0.18**	0.30***	0.04
OBC	0.02*	0.03	-0.01	0.06	0.14***	0.12**
Not Literate	0.05**	0.09**	0.30***	0.17**	0.63***	0.10
Primary and below primary education	0.10***	0.14***	0.42***	0.46***	0.37***	0.14**
Middle education	0.04**	0.15***	0.29***	0.34***	0.18**	0.13**
Secondary Education	-0.03	-0.02	0.20***	0.26***	0.05	0.06
Higher secondary education	-0.16***	0.02	0.04	0.05	-0.07	-0.07
Postgraduate and above	-0.12***	-0.09	-0.11	-0.14	-0.20	-0.40**
VET (inclusive of VET in any form)	0.51***	0.03	0.46***	0.61***	-0.08	0.42***
VET (inclusive of VET in any form)*ST	0.01	0.32**	-0.02	-0.08	0.14	-0.02
VET (inclusive of VET in any form)*SC	0.01	0.11	-0.04	0.13	-0.01	-0.01
VET (inclusive of VET in any form)*OBC	-0.11***	-0.02	-0.05	-0.10	0.03	0.01
Constant	-3.48***	-4.09***	-3.86***	-4.15***	-3.87***	-4.57***

Source: As for Table.1.a

Table 3.b shows the impact of formal VET on the probability of entering into the manufacturing sector. The result (positive and significant coefficient) indicates that formal VET increases the probability of participation as wage labourers in the manufacturing sector as a whole as well as in textiles manufacturing industries in India. However, in the rest of the chosen manufacturing industries, formal VET can not significantly increase the probability of participation as wage labourers, and it may be on account of the lack of jobs in these industries that require formal VET.

Moreover, the degree of influence of formal VET on employment in manufacturing sector is not found to be significantly different for General Caste, SC, ST and OBC workers in the manufacturing sector as a whole (coefficients corresponding to interaction dummy variables are statistically insignificant for manufacturing sector as a whole) (Table 3.b).

In case of the control variables, i.e. land possession, age, sex, social group, and general education levels the findings from Table 3.b are more or less similar to those observed in Table 4.a.

Table 3.b Impact of formal VET on employment in Indian manufacturing sector

Variables	ALL	Food products	Textiles	Wearing apparel	Non-metallic mineral products	Fabricated metal products
Land Possession	-0.0002***	-0.0002***	-0.0003***	-0.0005***	-0.0001***	-0.0008***
Age	0.08***	0.06***	0.06***	0.08***	0.02***	0.07***
Age square	-0.001***	-0.0007***	-0.0008***	-0.001***	-0.0004***	-0.001***
Marital status	-0.10***	-0.06	-0.10***	-0.17***	0.12**	-0.13**
Sex	0.82***	0.61***	0.54***	0.36***	0.72***	0.94***
ST	-0.37***	-0.41***	-0.31***	-0.37***	0.04	-0.16***
SC	0.01**	0.02	-0.16***	-0.14***	0.30***	0.03
OBC	0.00	0.03	-0.02	0.00	0.14***	0.13***
Not Literate	0.03*	0.10**	0.27***	0.14**	0.62***	0.04
Primary and below primary education	0.11***	0.14***	0.41***	0.45***	0.36***	0.12**
Middle education	0.05**	0.15***	0.28***	0.33***	0.18***	0.12**
Secondary Education	-0.03**	0.00	0.19***	0.24***	0.04	0.03
Higher secondary education	-0.17***	0.02	0.02	0.03	-0.07	-0.09
Postgraduate and above	-0.15***	-0.10	-0.13	-0.17	-0.19	-0.42**
Formal VET	0.29***	0.12	0.17**	0.13	-0.09	0.03
Formal VET*ST	0.18	0.04	0.59**	-	0.15	-
Formal VET*SC	-0.13	-0.35	-0.16	0.36*	-0.36	0.05
Formal VET*OBC	-0.09	-0.21	-0.13	0.23	0.07	-0.10
constant	-3.53***	-4.10***	-3.89***	-4.22***	-3.86***	-4.64***

Source: As for Table.1.a

6. Influence of Vocational Education on wage income in Indian Manufacturing Sector

This section investigates the influence of VET on wages for the entire manufacturing sector as well as in the selected manufacturing industries.

The regression results presented in Table 4.a reveal that VET (inclusive of VET in any form) increases wages of workers in the manufacturing sector all together as well as in

non-metallic mineral products manufacturing industry at the individual industry level as corresponding coefficients of VET dummy are positive and significant. However, in food products, textiles, wearing apparel and fabricated metal products manufacturing industries, the possession of VET does not significantly help to increase the wage income of the manufacturing workers. Thus, the impact of VET on wages varies across manufacturing industries.

Table 4.a further shows that the impact of VET (inclusive of VET in any form) on wage is significantly lower for OBC workers in comparison to General Caste workers (coefficient of VET (inclusive of VET in any form) * OBC is negative and significant) in the manufacturing sector as a whole and in food products, wearing apparel and non-metallic mineral products manufacturing industries at individual industry level. VET (inclusive of VET in any form) also produces significantly lower impact on wages for SC workers than for General Caste workers in the manufacturing industry as a whole. Similarly, VET (inclusive of VET in any form) produces differing influence on wages of ST and General Caste workers (coefficient of VET (inclusive of VET in any form) * ST is negative and significant) in wearing apparel manufacturing industries. Thus, socially backward classes do not always get equally benefitted in terms of generating higher wage earning potential through possession of VET as upper caste people, i.e. General Caste, in Indian manufacturing sector.

With respect to the impacts of control variables, the results (Table 4.a) indicate that wage earning of workers follows an inverted U shaped path with age (positive coefficient for Age and negative coefficient for Age Square) as postulated by human capital theory (Becker, 1964, Mincer, 1974). The results also suggest that male workers generally get higher wages than female workers, while SC, ST and OBC workers receive lower wages than workers from the General Caste category on average. These findings are in line with the findings of existing relevant empirical studies conducted in Indian labour market (Agarwal, 2013; Madheswaran and Attewell, 2007; Sengupta and Das, 2014; Das and Dutta, 2007). As far as the nature of impact of education levels on wage income is concerned, it is found that compared to the graduates, not literates and people with primary, middle, or higher secondary level of education lower wages on average in the manufacturing sector of India, while the people having postgraduate degrees receive more wages than the graduates on average. Thus, it can be inferred that higher level of education enhances income potential in manufacturing sector of India. This is in keeping with the proposition of human capital theories (Becker, 1964, Mincer, 1974; Schlutz, 1971). Moreover, workers working in government-owned enterprises receive significantly lower wages than the workers working in private manufacturing sector.

Table 4.a Impact of VET on wage income in Indian manufacturing sector

Variables	All	Food products	Textiles	Wearing apparel	Non-metallic mineral products	Fabricated metal products
Age	0.04***	0.02	0.03**	0.05***	0.03**	0.02
Age square	-0.0002***	-0.0001***	-0.0001***	-0.0005***	-0.0003***	-0.0001***
Sex	.51***	0.54***	0.51***	0.39***	0.36**	0.57**
ST	-0.08***	-0.01	0.25**	0.15	-0.25**	0.20
SC	-0.09**	-0.12*	-0.02	0.01	0.05	-0.18*
OBC	-0.10***	-0.01	-0.16***	0.13*	0.01	-0.15*
Not Literate	-1.06***	-1.00***	-0.95***	-0.95***	-0.80***	-0.80***
Primary and below primary education	-0.96***	-0.95***	-0.89***	-0.73***	-0.81***	-0.74***
Middle education	-0.84***	-0.88***	-0.73***	-0.65**	-0.78***	-0.63***
Secondary Education	-0.71***	-0.70***	-0.61***	-0.61***	-0.78***	-0.48***
Higher secondary education	-0.55***	-0.43***	-0.54***	-0.50***	-0.64***	-0.44***
Postgraduate and above	0.49***	0.12	0.55***	0.82***	0.09	1.34***
VET (inclusive of VET in any form)	0.06***	0.13	-0.02	0.06	0.27**	-0.10
VET (inclusive of VET in any form)*ST	-0.08	-0.39	0.06	-0.80**	-0.29	-0.47
VET (inclusive of VET in any form)*SC	-0.08*	-0.04	0.08	-0.11	-0.07	0.06
VET (inclusive of VET in any form)*OBC	-0.07**	-0.21*	0.10	-0.20*	-0.37**	-0.06
Enterprise Type	-0.27***	-0.22	-0.11	-0.46*	-0.15	-1.56**
constant	6.45**	-7.16***	6.23***	5.89***	6.53***	7.19***

Source: As for Table.1.a

Table 4.b shows the impact of formal VET on wages in Indian manufacturing sector. The results presented in this table suggest that formal VET increases wages of manufacturing workers in the manufacturing sector as a whole as well as in some of the chosen manufacturing industries as coefficients of formal VET are positive and significant in all these cases. More interestingly, comparing the findings about VET coefficients in Table 4.a and 4.b, we can infer that the level of impact on wages is higher in case of formal VET (around 28 percent) than in case of VET (inclusive of VET of any form) (around 6 percent) in the manufacturing sector as a whole. Thus, it can be inferred that the potential for increasing wage income is much higher for formal VET than non-formal VET.

Table 4.b also reveals the impact of formal VET on wage income is not always uniform across social groups. For example, the impact of formal VET on wage in manufacturing sector is significantly lower for OBC workers in comparison to General Caste workers in case of the manufacturing sector as a whole. Similarly, for food products and non-metallic mineral products manufacturing industries, the results suggest that the impact of formal VET on ST and OBC workers, respectively, are significantly lower than General Caste workers.

In case of the control variables, i.e. age, sex, social group, general education levels,a nd enterprise types, the findings from Table 4.b are more or less similar to those observed in Table 4.a.

Table 4.b Impact of formal VET on wage income in Indian manufacturing sector

Variables	All	Food products	Textiles	Wearing apparel	Non-metallic mineral products	Fabricated metal products
Age	0.04***	0.02	0.03**	0.06***	0.03**	0.02
Age square	-0.0003***	-0.0001***	-0.0001***	-0.0006***	-0.0004***	-0.0001***
Sex	0.52***	0.54***	0.50***	0.38***	0.35***	0.52**
ST	-0.10***	-0.02	0.27**	-0.14**	-0.27***	0.08
SC	-0.11***	-0.11*	0.01	-0.07	-0.06	-0.15**
OBC	-0.11***	0.04	-0.12**	0.05	-0.04	-0.17***
Not Literate	-1.03***	-0.99***	-0.94***	-0.89***	-0.81***	-0.78***
Primary and below primary education	-0.94***	-0.94***	-0.87***	-0.68***	-0.80***	-0.70***
Middle education	-0.82***	-0.87***	-0.61***	-0.41**	-0.78***	-0.61***
Secondary Education	-0.69***	-0.71***	-0.60***	-0.57***	-0.78***	-0.46***
Higher secondary education	-0.54***	-0.42***	-0.53***	-0.47***	-0.62***	-0.43***
Postgraduate and above	0.50***	0.10	0.54**	0.87***	0.12	1.09***
Formal VET	0.28***	0.33**	0.14	0.11	0.46	0.52**
Formal VET*ST	-0.02	-1.10***	0.02	_	-0.74	_
Formal VET*SC	-0.09	-0.52	0.09	0.14	0.19	-0.15
Formal VET*OBC	-0.32***	-0.17	-0.14	-0.10	-0.78**	-0.24
Enterprise Type	-0.27***	-0.23	-0.12	-0.38	-0.14	-1.53**
constant	6.43**	7.23***	6.24***	5.69***	6.57***	7.20***

Source: As for Table.1.a

7. Summary and Conclusions

We have restricted this study only to the manufacturing sector of India in order to find out the influences of vocational education and training (VET) on employment and wage, and how the influences of VET on employment and wage vary across social groups. The findings of the paper with respect to the first research question clearly show that VET (inclusive of VET of any form) significantly enhances participation in the manufacturing sector of India. Findings are same for formal VET as well. However, the impacts on the probability of participation as wage labourers vary across industries in case of VET (inclusive of VET of any form) as well as formal VET to some extent and this may be happing due to the differences in the level of requirement of skilled workers in manufacturing industries.

Moreover, the empirical analysis presented in this paper also suggests that VET (inclusive of VET in any form) increases participation in Indian manufacturing sector as wage labourers by more or less similar extent among all social groups except OBC. Skilled OBC workers may be concentrated more in other industries than in manufacturing sector or are discriminated against more than other socially disadvantaged groups, such as SCs, STs, in this industrial sector. Interestingly, formal VET more or less similarly enhances the participation as wage labourers in manufacturing sector as a whole among all social groups. Even at individual industry level, impact of VET or formal VET on participation in manufacturing industries, the findings are mainly similar. In this context, it should be noted from the finding about the employment structure in this paper that the presence of skilled General Caste workers in terms of having VET in found to be more profound than their non-General Caste counterparts in Indian manufacturing industries. So, it can be inferred that provision for vocational education and training helps people to augment their skills and enhances their opportunity to enter manufacturing sector as wage labourers. Vocational education and training is being found to be helpful for enhancing manufacturing sector participation as wage labourers among socially backward classes as well, and hence, government may put more effort to offer VET, specifically formal VET, to people belonging to socially backward classes in India, who are historically confined in farming or indigenous low income and low productive industrial activities, in order to facilitating their entry in the manufacturing sector of the labour market.

As far as the impact of VET on wage/salary earning is concerned, both VET (inclusive of VET of any form) and formal VET appear to be capable of significantly increasing wages of workers in the manufacturing sector at aggregate level. However, at individual industry level, VET as well as formal VET is found to be ineffective in certain industries, and this may be for the reason that many of these industries, such as food products, weaning apparel, textile, and fabricated metal products manufacturing industries, are being dominated by non-General Caste workers whose wages increase significantly less than that of General caste workers in many occasions and thus make average increase in wage insignificant in these industries. It is more interesting to find that the impact of formal VET was more intense on wages in the manufacturing sector of India during 2011-12.

However, in certain cases, the impacts of VET (inclusive of VET of any form) as well as formal VET vary across workers belonging to different caste or ethnicity. For example, during 2011-12, the impact of VET on wage in manufacturing sector was significantly lower for OBC workers in comparison to General Caste workers in the manufacturing sector as a whole as well as in non-metallic mineral products manufacturing industries. Some other cases of differing influence on wage for workers belonging to different caste and ethnicity were noted for both VET (inclusive of VET of any form) and formal VET during 2011-12.

Based on the findings of this paper it can also be said in clear terms that skill developed through vocational education and training is not sufficient in eliminating caste/ethnicity based wage inequality in Indian manufacturing sector. Vocational education and training definitely help to improve wages across all social groups in Indian manufacturing sector in most of the occasions, but the possession of VET by a worker belonging to socially marginalized group, mainly SCs or OBCs, does not guarantee that he/she will get similar wage as obtained by a General Caste worker with VET, even in public sector where they can get the benefits of affirmative actions, such as reservation policies. This remains an area that policy makers need to think about and address properly. This kind of incidences happen in Indian manufacturing sector either for lack of possession of other human capital endowments, such as general education, or for the presence of discriminatory practices exercised by employers. So, in our future research endeavour, we will try to figure out the extent to which caste/ethnicity based discrimination contributes to wage inequality in Indian manufacturing sector even among workers with vocational education and training.

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Appendix:

Percentage distribution of total manufacturing workers across different manufacturing industries during 2011-12

Industry	Percentage of Workers
Food products	10.05
Beverages	1.12
Tobacco products	1.21
Textiles	13.94
Wearing apparel	9.57
Leather and related products	3.54
Wood and products of wood	3.24
Paper and paper products	1.28
Printing	1.47
Coke and refined petroleum products	0.50
Chemicals and chemical products	3.04
Pharmaceuticals,	2.84
Rubber and plastics products	3.53
Non-metallic mineral products	11.68
Basic metals	4.68
Fabricated metal products	6.36
Computer, electronic and optical products	1.49
Electrical equipment	3.16
Machinery and equipment	3.04
Motor vehicles	3.11
Transport equipment	1.80
Furniture	2.74
Other manufacturing	5.31
Repair and installation of machinery and equipment	1.28

South Asia Research Network (SARNET): Employment and Social Protection for Inclusive Growth aims to bring together researchers and institutions working on issues of employment and social protection in South Asia. Initiated by the Institute for Human Development (IHD), New Delhi in collaboration with ILO and UN-ESCAP with support from International Development Research Centre (IDRC), Canada, SARNET addresses the ways of achieving the development priorities of inclusive growth or growth that produces good quality employment with increasing access to social protection. Its activities include research and preparation of a data bank relating to labour markets and social protection as well as capacity-building of young scholars in the region through training and methodology courses and organizing workshops through competitive call for papers.

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