Informalization of Industrial Labour in India: Are labour market rigidities and growing import competition to blame?

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Abstract: Since the 1980s, there has been increasing informalization of industrial labour in India. It has taken two forms: rising share of the unorganized sector in manufacturing employment and informalization of the organized manufacturing sector itself through subcontracting and use of temporary and contract workers. The paper investigates whether and how far labour market rigidities and increasing import competition are responsible for the increasing informalization on industrial labour in India. An econometric model is estimated for this purpose using unit level data of the NSS 61st round employment-unemployment survey for 2004-05. The estimated model explains the casual worker – regular worker dichotomy in manufacturing. The results show that labour market reforms tend to increase the creation of regular jobs, while import competition tends to raise casual employment among workers with education above primary. The results also show that education enhances the probability of getting a regular job.

November 2010

[To be presented at the 6th Annual Conference on Economic Growth and Development, December 16-18, 2010, Indian Statistical Institute, New Delhi]

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1. Introduction

Since the 1980s, there has been growing informalization of industrial labor in India. This has taken the form of a rising share of the unorganized sector in total manufacturing employment, and informalization of the organized manufacturing sector itself with greater use of subcontracting and increasing employment of contract and temporary workers. The share of unorganized manufacturing in total manufacturing employment has increased from 80.7% in 1983, to 83.2% in 1993-94, and further to 85.0% in 2004-05. Workers employed through contractor (hereafter, contract workers) as percentage of total workers employed in organized manufacturing has increased from 14% in 1995-96 to 29% in 2005-06 (Goldar, 2010).[1] There has probably been a similar increase in the share of temporary workers in employment in organized manufacturing, though from the available data it is not possible to make a proper assessment. Maiti and Mitra (2010) have presented estimates of informal employment in manufacturing for 1999-00 and 2004-05. [2] According to their estimates, the share of informal sector in the manufacturing workforce increased from 78% in 1999-00 to 85% in 2004-05. The implication of these changes is that the bulk of the new jobs created in the formal sector of Indian manufacturing in the period 1995 to 2005 (if not over a longer period) were low quality, informal jobs. Thus, in terms of creation of decent jobs, India's organized manufacturing has not been doing well. According to the estimates made by NCEUS (2009), employment in the formal sector of Indian industry increased from 20.27 million in 1999-00 to 25.38 million in 2004-05. Bulk of this increase in employment was the increase in informal workers employed in the formal sector of Indian industry – from 12.13 million to 16.71 million

[1] This estimate is based on *Annual Survey of Industries* (ASI) data. The ratio of contract workers to total persons engaged in organized manufacturing has increased from 11% in 1995-96 to 22% in 2005-06.

[2] They first estimate the total number of UPSS (usual principal and subsidiary status) workers in different activities for 1999-00 and 2004-05 using NSSO (National Sample Survey Organization) employment-unemployment surveys for these two years along with estimates of population, and then split the estimates of workers into formal and informal workers using NSSO results of the survey on informal sector workers in non-agricultural activities.

(NCEUS, 2009, p. 135). The increase in formal workers employed in the formal sector of Indian industry was from 8.14 million to 8.67 million. According to the NCEUS estimates, the proportion of informal workers in the formal sector of Indian industry in 2004-05 was about 66%, up from about 60% in 1999-00.[3]

The phenomenon of increasing informalization of industrial labour is a serious issue of concern because if industrialization does not create many good jobs for people to shift from low productivity occupations, it cannot make a big contribution to economic development. Available data show that wages and employment benefits received by casual workers are much lower than those of regular salaried/wage workers[4] and the incidence of poverty is much greater among casual workers than the regular salaried/wage workers (hereafter shortened as regular wage workers). Estimates made from unit-level data of National Sample Survey (NSS) 61st round employment-unemployment survey reveal that in 2004-05, the average wage earned per day by regular wage workers in organized manufacturing was about Rs 169 while that earned by casual workers was only about Rs 55.[5] In unorganized manufacturing, the average wages earned per day by regular wage workers and casual workers, in 2004-05, were Rs 83 and 54 respectively. According to the estimates presented by Sundaram (2008), about 5 to 7 per cent of adult regular wage workers in various categories of manufacturing enterprises belonged to poor households in 2004-05, while the corresponding figure for adult casual workers was in the range of 17 to 27 percent. The casual workers not only get a significantly lower wage, they are also deprived of various benefits and social security.[6] Papola (2008) notes that organized sector workers employed on a non-regular and

[3] Note that these estimates are for the industrial sector which has greater coverage than manufacturing. In particular, it seems, the construction industry is included in the industrial sector.

[4] NSSO (2006) defines casual wage labour as "A person who was casually engaged in other's farm and non-farm enterprises (both household and non household) and, in return, received wages according to the terms of the daily or periodic work contract." A regular salaried/wage worker on the other hand is defined to be one which receives salary or wages on a regular basis, either time wages or piece wages and full time or part time.

[5] Sen and Dasgupta (2009) have undertaken a survey of industrial units in a large number of clusters in different parts of India (during 2004-05). The wages of casual workers were found to be significantly lower than that of permanent workers. In NOIDA, for instance, the permanent workers' average wage was about Rs 4760 per month while that of casual workers, Rs 2480 per month. In Kolkata, the relevant figures were Rs 4820 and Rs 1970, respectively.

[6] That the working conditions of casual workers in organized manufacturing are inferior to that of regular workers, has been noted by Sundaram (2008, Table 4, p. 94).

contract basis do not enjoy social security cover under different legislative provisions, such as Employees' Provident Fund Act 1952, Employees' State Insurance Act 1948, Workmen's Compensation Act 1923, Maternity Benefit Act 1961, etc. He also observes that "increasing casualisation implies not only increase in vulnerability in terms of employment and earnings, but also means that a larger proportion of workers have neither social protection nor productive resources to fall back upon, as most casual labourers are without assets"(p.16).

What are the reasons for the growing informalization of industrial labour in India? Two possible causes of growing informalization that come to mind are: (1) labour market rigidities and (2) increasing competition, particularly competition from imports. A lot has already been written on the effects of labour market rigidities on industrial employment in India, and there is a view that labour market rigidities are responsible for "jobless growth" in organized manufacturing and increasing use of contract and temporary workers. Many scholars (e.g., Dutta, 2003; Ramaswamy, 2003; Sharma, 2006; Gupta et al., 2008; Ahsan and Pagés, 2008) feel that the use of contact workers provides a means of getting around the labour regulations, particularly the Industrial Disputes Act (IDA), and industrial emprises have actually been adopting this means on a wide scale.[7] There is, however, not much econometric evidence in support of the view that labour market rigidities are the prime cause or an important cause of increasing employment of contract and temporary workers. Maiti et al. (2009) and Sen et al. (2010) present econometric evidence that indicate that stringent labour regulations have led to greater use of contract workers. As a measure of the degree of labour market regulation, they use

[7] Sharma (2006, p. 2081) writes: "..contract labour has been one of the principal methods used by the employers to gain flexibility in the labour market. Thus, employers have been able to find ways to reduce the workforce even with the "restrictive" provisions in place." Similarly, Gupta et al. (2008, p.7) write, "… hiring contract workers can enable firms to get around many of the regulatory restrictions on adjusting employment levels, productions tasks, and others." Ahsan and Pagés (2008) note that contract labour has become a common way to deal with the problems posed by the labour regulation arising from the Industrial Disputes Act. The use of contract labour is found to have a favourable effect on employment in the econometric analysis undertaken by them. However, from the results obtained, they conclude that contract labor may be more effective at ameliorating the effects of regulations on output than on employment. At the same time, Ahsan and Pagés (2008) point out that while firms hire contract labor as a way to reduce wage and adjustment costs, the fact that contract workers are not covered by industrial dispute laws is probably an additional source of interest for employers. See also Bhattacharjea (2009) and Bhandari and Heshmati (2005, 2006) in this context.

the index of Besley and Burgess (2004), and find that this variable has a significant positive effect on the proportion of contract workers out of total workers. The Besley-Burgess index has, however, come under severe criticism from Bhattacharjea (2006, 2009) who has elaborated it flaws, and therefore it seems, one has to be cautious in interpreting econometric evidence based on the Besley-Burgess index.[8]

On the issue of increased competition (particularly international competition) leading to informalization of industrial labour, this seems to be a strong possibility since the lower wages of informal workers and saving of expenditure on worker benefits when such workers are employed help in reducing cost and thus improving competitiveness. Papola (2008) writes: "Apprehensions have also been raised about the likelihood of an increasing number of workers getting employed in relatively poor conditions of work, on low wages and without social security, as a result of the employers 'pursuit of cost reduction' in order to remain competitive, thus leading to what is often termed as the 'race to the bottom' in respect of labour standards. The problem has thus assumed global dimensions and tackling it would require international action." Similar view on the effect of competition on labour standards has been expressed by other researchers (see, for example, Schmidt, 2005).[9] Econometric evidence for India on the issue under discussion is, however, rather limited, and the scantly evidence available is mixed. Sen et al. (2010) have analyzed econometrically the effect of trade on use of contract labour and have found a significant positive effect of import penetration. They have used state-industry-year panel data for the period 1998-99 to 2004-05. Pradhan (2006), on the other hand, finds a negative effect of import penetration on use of contract labour. He has estimated a multiple regression equation to explain the ratio of contract workers to regular workers in

[8] Bhattacharjea (2009) has examined the effects of tightening and loosening of employment protection legislation on the share of contract workers out of total workers employed in organized manufacturing in Indian states. He finds that in one state the share of contract workers rose substantially after a tightening event (consistent with the hypothesis that increasing use of contact workers is a result of rigid labour regulations). But, it also rose in two other states, in one case even more substantially, after a loosening event. Thus, the results are mixed and one cannot conclusively say that tightening of employment protection legislation induces greater use of contract workers.

[9] Sen et al. (2010) observe that while import competition may force firms to seek short-run efficiency by resorting to low-wage employment, firms mindful of long-run efficiency or concerned about quality improvement (a key issue for exporting firms) may invest in productivity improvement of the regular workers.

India's organized manufacturing using pooled cross-industry data for three years, 1999-00 to 2001-02. Clearly, the estimates obtained in these two studies point in opposite directions.

The aim of this paper is to assess whether, and how far, the labour market rigidities and import competition have caused informalization of industrial labour in India. The unit level data of the 61st round NSS employment-unemployment survey, 2004-05 have been used for the analysis. From the survey data, it is possible to segregate the workers into (a) self-employed, (b) regular wage workers and (c) casual workers. Since the individuals with informal jobs and those with formal jobs cannot easily be segregated in the unit records, the analysis focuses on the regular worker – casual worker dichotomy. An econometric model is estimated for the analysis, which aims at assessing the influence of individual characteristics such as education and experience, and the influence of import competition and labour market reforms on the probability of an individual being in a casual worker's job rather than a regular wage worker's job.

The rest of the paper is organized as follows. Section 2 examines the share of casual workers in different segments and industries of Indian manufacturing, followed by a comparative study of the characteristics of casual workers and regular wage workers in organized and unorganized manufacturing. Section 3 discusses the econometric model and the construction of variables. Section 4 presents and discusses the estimates of the model. Finally, Section 5 summarizes and concludes.

2. Causal labour in Manufacturing – relative share and characteristics

A detailed analysis of Casual labour in manufacturing in 2004-05 shows that while a little over one third (35%) of casual labour is in the organized manufacturing sector, around two- thirds are in the unorganized manufacturing sector. Thus it may be deemed to be more of an unorganized sector phenomenon. It is also seen that it is mainly concentrated in rural areas (64%) and among males (74%). Most (71.5%) of the casual workers in manufacturing are also found to be educated only up to the primary class as compared to 37% of the regular wage workers. This is discussed further later in this section.

The distribution of employment in manufacturing sector reveals (Table 1) that while self-employed are hardly 5% in the organized manufacturing sector, their share is more than two-thirds in the unorganized manufacturing sector. The reverse is the case for regular wage workers who dominate the organized manufacturing. Though the share of casual labour in total employment is relatively higher in organized manufacturing, the absolute number of casual workers employed in unorganized sector far exceeds that in the organized sector. While the casual workers are only 2.9 million in organized manufacturing, their number is 5.2 million in unorganized manufacturing. It may be pointed out that while the number of regular workers is three times that of casual workers in organized manufacturing, the absolute number of regular workers in organized manufacturing is almost equal to that in unorganized manufacturing.

Table 1: Percentage Distribution of Employment in the Manufacturing Sector in 2004-05

Status	Organized	Unorganized	Total (Org. and Unorg. Combined)
Self-Employed	5.59	67.64	50.52
Regular Wage worker	70.76	16.23	31.18
Casual labour	23.64	16.13	18.31
Total	100	100	100

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data

The distribution of casual workers is not uniform across all industries of the manufacturing sector. This may seen from Table 2, which shows the status wise distribution of workers in various two-digit NIC (national industrial classification) groups of manufacturing, separately for organized and unorganized manufacturing.

Table 2: Status wise distribution of workers by industry in organized and unorganized manufacturing, 2004-05

	ORGANIZED MANUFACTURING				UNORGANIZED MANUFACTURING			
2 digit NIC code	Self-Employed	Regular Wage worker	Casual labour	Total workers	Self-Employed	Regular Wage worker	Casual labour	Total workers
15	4.28	59.37	36.35	100	67.8	17.1	15.1	100
16	15.31	61.84	22.85	100	90.1	3.9	6.00	100
17	5.14	73.76	21.10	100	70.28	12.77	16.94	100
18	5.65	84.12	10.24	100	78.4	13.75	7.85	100
19	9.76	78.69	11.54	100	55.41	28.35	16.24	100
20	17.8	51.12	31.08	100	83.08	4.89	12.03	100
21	0.82	85.32	13.86	100	67.26	23.95	8.79	100
22	11.47	85.38	3.15	100	41.65	51.95	6.40	100
23	0.62	92.17	7.22	100	48.37	0.86	50.77	100
24	4.07	79.12	16.81	100	47.59	30.43	21.98	100
25	11.45	79.79	8.76	100	23.72	62.99	13.29	100
26	3.52	31.19	65.29	100	47.62	5.92	46.46	100
27	1.51	83.81	14.68	100	44.15	34.16	21.70	100
28	4.06	73.44	22.51	100	48.26	36.58	15.16	100
29	5.19	90.71	4.10	100	46.94	38.17	14.89	100
30	0.52	99.48	0	100	48.32	47.96	3.72	100
31	10.52	82.96	6.52	100	52.06	41.28	6.66	100
32	3.08	88.69	8.23	100	9.02	83.96	7.02	100
33	2.73	94.44	2.83	100	16.34	69.92	13.74	100
34	0.05	89.43	10.51	100	35.59	49.29	15.11	100
35	0.79	94.4	4.81	100	23.98	67.03	8.99	100
36	5.48	54.1	40.42	100	65.54	19.86	14.6	100
37	0	0	100	100	76.91	3.16	19.94	100
Total	5.59	70.76	23.64	100	67.64	16.23	16.13	100

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data

NIC codes: 15-Food products and beverages; 16-Tobacco & related products; 17-Textiles products; 18-Wearing apparel, dressing & dyeing of fur; 19-Leather & related products; 20-Wood and wood products; 21-Paper and paper products; 22-Publishing, printing and related activities; 23-Coke, petroleum products and nuclear fuel; 24-Chemicals and chemical products; 25-Rubber and plastic products; 26-Non-metallic mineral products; 27-Basic metals; 28-Fabricated metal products; 29-Machinery and equipment n.e.c.; 30-Office, accounting and computing machinery; 31-Electrical machinery and apparatus, n.e.c.; 32-Radio, television and communication equipments; 33-Medical, precision and optical instruments; 34-Motor vehicles, trailers and semi-trailers; 35-Other transport equipments; 36-Furniture & other manufacturing n.e.c.; 37-Recycling.

In the organized manufacturing sector, employment of casual labour is relatively high (more than half of the workers) in only two industry groups, namely manufacture of other non-metallic mineral products (26), and recycling (37). On the other hand, regular workers are more than two-thirds of the workers employed in 15 out of 23 two-digit manufacturing groups. These groups are 18, 19, 21-25, 27, 29-35. But in the unorganized manufacturing sector, self-employed dominate in a majority of industry groups, regular wage workers are more than 50% only in 5 out of 23 two-digit manufacturing groups and the proportion of casual labour varies mostly in the range from 3% to 22%. There are two industry groups in unorganized manufacturing, 23 (coke, petroleum products and nuclear fuel) and 26 (non-metallic mineral products) in which the proportion of casual workers is relatively high: 51% and 46% respectively.

Attention may be drawn to the fact that estimates of casual workers obtained for organized manufacturing using NSS data may not properly cover the contract workers. At the aggregate level, based on ASI data, the proportion of contract worker out of the total number of person employed in organized manufacturing is found to be 21% for 2004-05. This is lower than the proportion of casual workers, 24% as shown in Table 2. However, when estimates for two-digit industries are considered, significant differences are found between the proportion of contract workers based on ASI data and the proportion of casual workers based on NSS data. In three industry groups, 26 (non-metallic mineral products), 36 (furniture & other manufacturing not elsewhere classified) and 37 (recycling), the estimated proportion of casual worker exceeds the proportion of contract worker by more than 20 percentage points. In two industry groups, 16 (tobacco & related products) and 23(coke, petroleum products and nuclear fuel), the proportion of contract workers exceeds the estimated proportion of casual worker by more than 20 percentage points. Cross-industry correlation coefficient between the proportion of casual workers and the proportion of contract workers is 0.20. Evidently, there is considerable dissimilarly between the proportion of casual workers and contract workers across

industries.[10] Why such dissimilarities arise between estimates of casual worker and contract worker is unclear. Perhaps, there are differences in definition adopted by data collection agencies. It is also possible that a large number of contract workers getting regular wages get included in the regular wage worker category.

It is evident from the results of 2004-05 that the education level of casual labour is lower than that of regular worker. This applies to some extent also to experience. The differences in respect of experience (proxied by age) are shown in Table 3 from which it is clear that more than 70 percent of the workers - both casual and regular - have relatively less experience (lower age) and as they gain experience there are more chances of being in the organized sector and that too as a regular wage worker. Similarly, it is found from Table 4 that the level of education is higher for regular wage workers both in the organized and unorganized manufacturing sector. As the level of education increases the proportion of regular wage workers becomes more than that of casual labour. It is seen from the table that 69 percent of the casual workers in organized manufacturing and 74 percent of the casual workers in unorganized manufacturing are literate only up to primary level, whereas the corresponding proportions are 58 and 30 percent for the regular salaried workers engaged in unorganized and organized manufacturing respectively. The implication of the differences in education and experience between casual and regular wage workers is that with growing informalization, the average quality of labour is declining with possible adverse impact on labour productivity.

[10] The implication is that conclusions drawn from an econometric study that utilizes inter-industry differences in the use of contract labour may be at variance with the conclusions drawn from a study that utilizes inter-industry differences in the use of casual labour.

Table 3: Percentage Distribution of Regular and casual Employment in Organized and Unorganized Manufacturing Sector by age categories

	Organized Manufacturing		Unorganized Manufacturing	
Age (years)	Regular Wage workers	Casual labour	Regular Wage workers	Casual labour
15-25	26.93	42.01	40.81	38.09
26-35	34.66	27.08	33.13	32.46
36-45	22.38	20.97	17.18	17.19
46-60	15.29	8.83	7.47	10.27
above 60	0.74	1.11	1.41	1.99
Total	100	100	100	100

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data

Table 4: Percentage Distribution of Regular and casual Employment in Organized and Unorganized Manufacturing Sector by education categories

	Organized Manufacturing		Unorganized Manufacturing	
Education Level	Regular Wage workers	Casual labour	Regular Wage workers	Casual labour
Not Literate	10.61	35.55	16.26	36.44
Literate below primary	6.34	11.64	11.57	16.24
Literate- primary	13.18	19.70	20.11	21.38
Literate- middle	19.55	22.77	24.71	16.56
Literate- secondary	16.13	7.41	14.11	6.6
Literate- Higher Secondary	8.92	1.48	5.01	1.66
Literate- Diploma/certificate Course	8.04	1.00	2.51	0.74
Literate- Graduate	14.34	0.43	4.77	0.38
Literate- Post Graduate and above	2.89	0.01	0.96	0
Total	100	100	100	100

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data

3. Model and Variables

The econometric model used for the analysis explains the status of a worker: regular wage worker versus casual worker. The third category, namely self-employed is excluded from the analysis (to keep the analysis simple and interpretation of results, easy). The dependent variable SW takes two values: 0 for regular worker and 1 for casual worker. All workers (other than self-employed) engaged in manufacturing activities are

considered in the sample. The unit level data from 61st round employment-unemployment survey of the NSS for 2004-05 are used.[11]

Since the variable to be explained is dichotomous, the Logit model is applied for the econometric analysis and it is estimated by the maximum likelihood method.[12] The observations are for the individuals surveyed, confined those in manufacturing. The observation-wise multipliers are used as weights in the estimation.[13] The model is specified as:

SW= f(education, age, sex, ORG, MPR, LMR, rural/urban dummy, SC/ST dummy) …(1)

In this equation, education, age[14] and sex refer to the individual in question. In the same way, the dummy variable for SC/ST (Scheduled Caste/Scheduled Tribe) is used; if the individual belongs to SC/ST, the variable takes value one, and zero otherwise. ORG is a dummy variable which takes value one if the individual is working in the organized sector enterprises, and zero otherwise. The aim is to see if the probability of being in a regular wage job is higher if one is employed in the organized sector rather than in the unorganized sector. The rural-urban dummy variable is constructed in a similar way. It takes value one if the individual is residing in an urban area and zero otherwise. In this case, the purpose is to assess if the probability of being in a regular wage job is greater if one is residing in an urban area rather than in a rural area.

[11] NSSO in the 61st round employment-unemployment survey for 2004-05 collected data for a sample of 602833 at all-India level. It calculated a multiplier for each sample observation, which it represents. These multipliers are used as weights to estimate an all India characteristic. Out of the total sample, only 244849 belongs to those who are UPSS workers and out of this only 26990 sample observations belong to manufacturing at all-India level. The sample actually used is lower than 26990 because the analysis had to be confined to the states for which a measure of labour market reforms could be obtained. For the 21 states for which the labour market reforms index is available, the number of sample observations is 24631.

[12] As a check on the results obtained by the dichotomous model (logit), a multinomial logit model has been estimated in which regular worker, casual worker and self-employed are taken as three categories. This is obviously a more general specification of the model. The results are reported in the Annex. The estimated equation for casual worker in the multinomial logit model matches well the estimated logit model corroborating the findings.

[13] The model is estimated by the STATA statistical package. The 'pweights' option is used for weighting, which uses sampling weights. Several earlier econometric studies using NSS unit level data have used the multipliers as weights for estimation of econometric models. See, for example, Gang et al. (2008).

[14] Age is taken as a proxy for experience.

MPR is the import penetration ratio of the industry to which the individual belongs. For different Input-Output sectors, the import penetration ratios have been computed from the Input-Output table for 2003-04 prepared by the Central Statistical Organization (CSO), Government of India. These have been mapped into 3-digit NIC (National Industrial Classification). Then, for each observation (i.e. each individual), the industry affiliation is used to set the values of MPR for that individual.[15]

LMR stands for labour market reforms index. This has been taken from Dougherty (2008).[16] The index is available for 21 different states.[17] Information on the state in which the individual is residing has been used to set the LMR index value for each individual.

To capture the effect of education of worker status, a set of dummy variables have been used for different levels of education. Nine levels of education have been considered. These are: not literate; literate below primary; literate-primary; literate-middle; literate-secondary; literate-higher secondary; literate-diploma/certificate course; literate-graduate; and literate-post graduate and above. The base category is taken as 'not literate'. An alternative specification of the model employed involves dividing the sample into three sub-samples according to the education level and estimating the model separately for the three sub-samples after dropping the education variable. The three levels corresponding to the three sub-samples are: (1) education up to primary, (2) education beyond primary and up to higher secondary, and (3) education beyond higher

[15] Another variable which could have been included in the model is export orientation of different industries (to reflect the competition faced by Indian firms in the export markets). This, however, could not be done since the export intensity of different input-output sectors belonging to manufacturing is strongly positive correlated with the import penetration ratio. The correlation coefficient across 68 input-output sectors belonging to manufacturing is 0.63 (Input-Output Table for 2003-04). In a sense therefore the import penetration variable captures the level of trade competition faced by different industries.

[16] This is based on a state-level survey undertaken a few years ago. It covered eight major areas of labour law, identifying 50 specific subjects of possible reform many of which could be implemented by administrative procedure rather than through formal amendments to the laws. The eight areas covered in the index are the Industrial Disputes Act (IDA), Factories Act, State Shops and Commercial Establishments Acts, Contract Labour Act, the role of inspectors, the maintenance of registers, the filing of returns and union representation. Each state is given a score reflecting the extent of reforms undertaken; the maximum possible score is 50 and the average score across states is 21. For the analysis presented here, the relative scores reported by Dougherty are used.

[17] Since the index is not available for a number of states and union territories, these are excluded. It may be pointed out here that all major states are included in the analysis.

secondary. This specification has the advantage that the effects of import competition, labour market reforms and other explanatory variables are allowed to differ according to the level of education.

The main hypotheses to be tested are that import competition as reflected in import penetration ratio induces greater informalization of industrial labour, and labour market reforms help in generating more regular wage employment. Another hypothesis to be tested is that the probability of one being in a regular wage job goes up with the level of education and experience. Such a relationship is expected because the substitution possibilities between a regular worker and a casual worker are likely to be greater for simple jobs than the jobs that require a higher level of skill/education/training. Somewhat similar argument can be given for experience.

4. Model Results

Table 5 presents the estimates of model described in Section 3 above. A significant negative coefficient is found for labour market reforms index, as hypothesized. As regards import penetration ratio, the coefficient is positive as hypothesized, but not statistically significant. The results indicate that labour market reforms encourage industrial enterprises to provide regular jobs rather than temporary or contractual jobs. However, there is insufficient evidence to infer confidently that import competition tends to raise employment of casual labour.

Table 5: Model Estimates, explaining dichotomy between regular and casual workers

Explanatory variable	Coefficient	t-ratio	Elasticity	Marginal effect
Import penetration ratio	0.145	0.70	0.013	
Labour market reforms index	-0.023***	-6.64	-0.715	
Organized sector dummy	-0.853***	-12.24		-0.177
Literate below primary	-0.469***	-3.97		-0.090
Literate- primary	-0.718***	-7.13		-0.134
Literate- middle	-1.052***	-9.89		-0.188
Literate- secondary	-1.595***	-12.92		-0.243
Literate- Higher Secondary	-2.151***	-11.73		-0.267
Literate- Diploma/certificate Course	-2.576***	-10.25		-0.283
Literate- Graduate	-3.735***	-9.38		-0.338
Literate- Post Graduate and above	-6.731***	-9.26		-0.313
Age	-0.015***	-5.03	-0.329	
Sex (1-male, 2-female)	0.407***	4.45		0.085
SC/ST dummy	0.145*	1.90		0.031
Urban area dummy	-1.155***	-16.67		-0.243
constant	2.322	8.70		
No. of observations	10923			
Pseudo R-squared	0.222			
LR chi-squared (15)	1084.9 Prob=0.000			

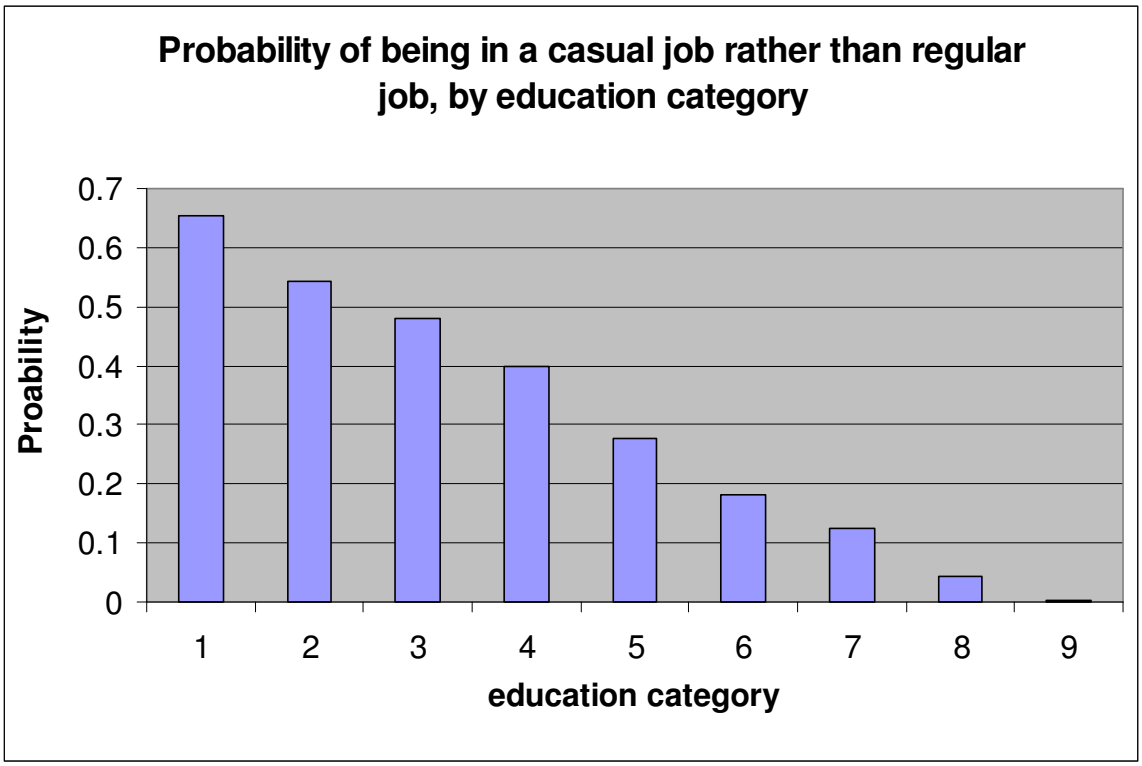
Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data.

*, *** statistically significant at 10 percent and one percent level of significance, respectively.

As hypothesized, education is found to bear a negative relationship with the probability of being in a casual job (rather than a regular job), i.e. the higher the level of education of an individual, the lower is the probability of his/her being in a casual job. The probability of being in a casual job for individuals in different education categories is depicted in Figure 1. This has been prepared by taking all other explanatory variables at their sample mean. The negative relationship between education level and the probability

of being in a casual job is clearly visible. While, for an illiterate, the probability of being in a casual job is about 65%, those for category 8 (Literate- Graduate) and category 9 (Literate- Post Graduate and above) are only about 4% and 0.2% respectively.

Figure 1



Source: prepared on the basis of results reported in Table 4.1. The education categories are: 1- not Literate; 2- Literate below primary; 3- Literate- primary; 4- Literate- middle; 5- Literate- secondary; 6- Literate- Higher Secondary; 7- Literate- Diploma/certificate Course; 8-Literate- Graduate; and 9- Literate- Post Graduate and above.

Turning to the results obtained for other explanatory variables, the estimated coefficient is significantly negative for age and for organized sector, urban areas and SC/ST dummy variables. It may accordingly be inferred that the probability of being in a casual job is relatively less if an individual is employed in the organized sector or is residing in urban areas or both. The results indicate that, other things remaining the same, an individual belonging to the SC/ST categories has a lower probability of having a regular job. The difference in probability between SC/ST category and general caste is,

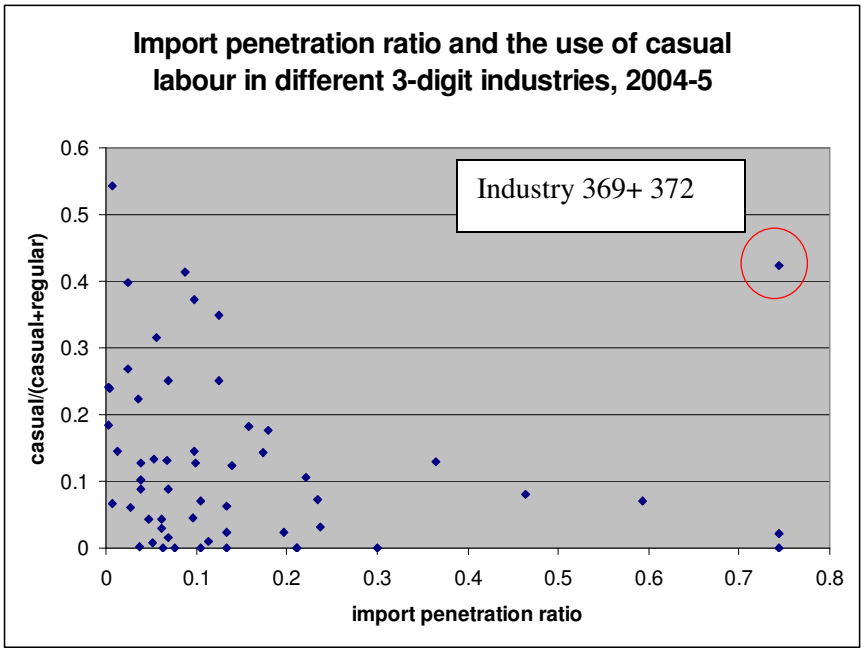
however, small, as brought out by the estimated marginal effect shown in the table. It is lower merely by about 3 percentage points.

The negative coefficient of age implies that the probability of being in a regular job goes up with age. This is arguably the effect of experience.

The coefficient of the dichotomous variable representing sex of the respondent individual is positive, indicating thereby that, other things remaining the same, males are more likely to be in a regular job than females. The difference in probability is about nine percentage points as indicated by the marginal effect reported in the table.

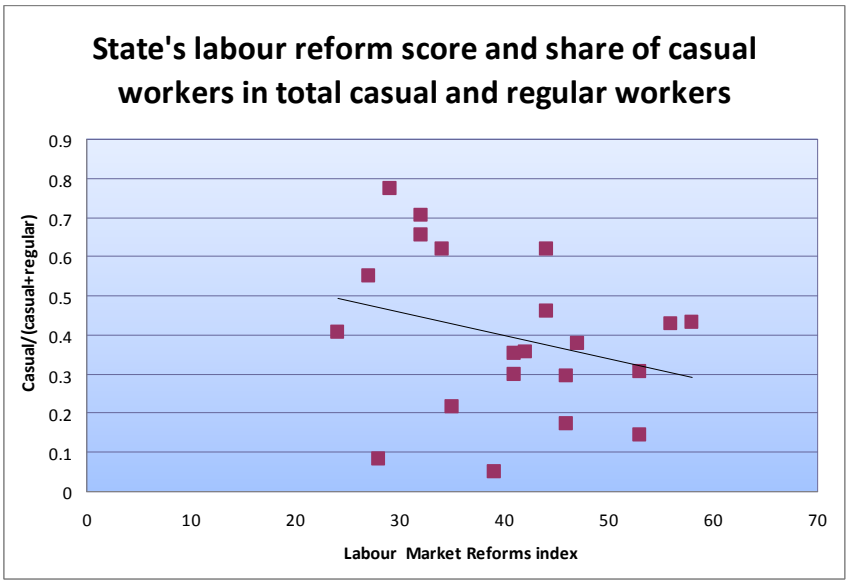
Although the coefficient of the import penetration variable is positive in Table 5, inter-industry differences (at 3-digit industry level) in import penetration ratio and the proportion of casual workers do not show a positive relationship. Rather, a negative correlation is found. The correlation coefficient is -0.12. The scatter plot is shown in Figure 2. It will be noticed that there is an outlier. If that point is ignored, the correlation coefficient is -0.30, which is statistically significant. By contrast, inter-state differences in labour market reforms index does bear a negative relationship with the proportion of casual workers in manufacturing, consistent with results of the model presented in Table 5. The correlation coefficient is -0.29. The scatter plot is shown in Figure 3.

Figure 2



Source: Import penetration ratios have been computed from Input-Output table for 2003-04. The share of casual workers in various 3-digit manufacturing industries has been computed from unit level NSS 61st round survey data.

Figure 3



Source: Labour market reforms index for states has been taken from Dougherty (2008) (available for 21 states). The share of casual workers in various states has been computed from unit level NSS 61st round survey data.

The finding of a negative correlation between the level of import penetration and the use of casual labour across various three-digit industries as depicted in Figure 2 is at variance with the estimated positive coefficient of the import penetration variable in results of the logit model estimation presented in Table 5. Therefore, based on these two pieces of empirical evidence, it is not possible to reach any definite conclusion on the effect of import competition. [18] The estimates of the logit model for different educational categories thus come handy for getting a better understanding of the effect of import competition. The results are presented in Table 6. The results suggest that the effect of import competition on workers with low education differs from that on workers with relatively higher education. It appears from the results that, for workers with education beyond primary level, import competition tends to reduce the probability of their being in a regular job. Such effect is, however, not found for workers with education up to primary level. Why import competition causes informalization among relatively more educated industrial workers, is a pertinent question. The explanation possibly lies in the fact that cost saving through casualization is relatively greater for workers with relatively higher education. The wage gap between regular worker and casual worker is relatively greater for workers with education higher than primary than that for worker with education up to primary.

[18] Attention may be drawn here to the distinction between partial and total correlation. Thus, even if trade liberalization bears a positive relationship with employment of casual workers, a simple correlation coefficient between the two variables may turn out to be negative (since the influence of other explanatory factors is not controlled for). It may be noted further that the coefficient of the import penetration variable is positive in the multinomial logit model (shown in the Annex) as in the results of the logit model in Table 5.

Table 6: Model Estimates, explaining dichotomy between regular and casual workers, by educational category

Explanatory variable	Educational categories		
	Up to primary	Beyond primary and up to higher secondary	Beyond higher secondary
Import penetration ratio	-0.592** (-2.41)	0.809*** (2.59)	0.979 (0.73)
Labour market reforms index	-0.021*** (-5.05)	-0.023*** (-3.53)	-0.042* (-1.84)
Organized sector dummy	-0.867*** (-9.94)	-0.859*** (-7.63)	-1.771*** (-3.66)
Age	-0.004 (-1.37)	-0.029*** (-4.77)	-0.071** (-2.48)
Sex (1-male, 2-female)	0.356*** (3.68)	0.690*** (3.65)	0.157 (0.29)
SC/ST dummy	0.111 (1.20)	0.312** (2.41)	0.594 (0.85)
Urban area dummy	-1.283*** (-14.73)	-1.094*** (-9.56)	-0.500 (-1.20)
constant	1.746 (6.56)	0.901 (1.99)	1.810 (1.25)
No. of observations	5294	4304	1325
Pseudo R-squared	0.109	0.111	0.165
LR chi-squared (7)	355.3 Prob=0.000	205.2 Prob=0.000	65.1 Prob=0.000

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data

Note: t-ratios in parentheses

*, **, *** statistically significant at 10, 5 and one percent level of significance, respectively.

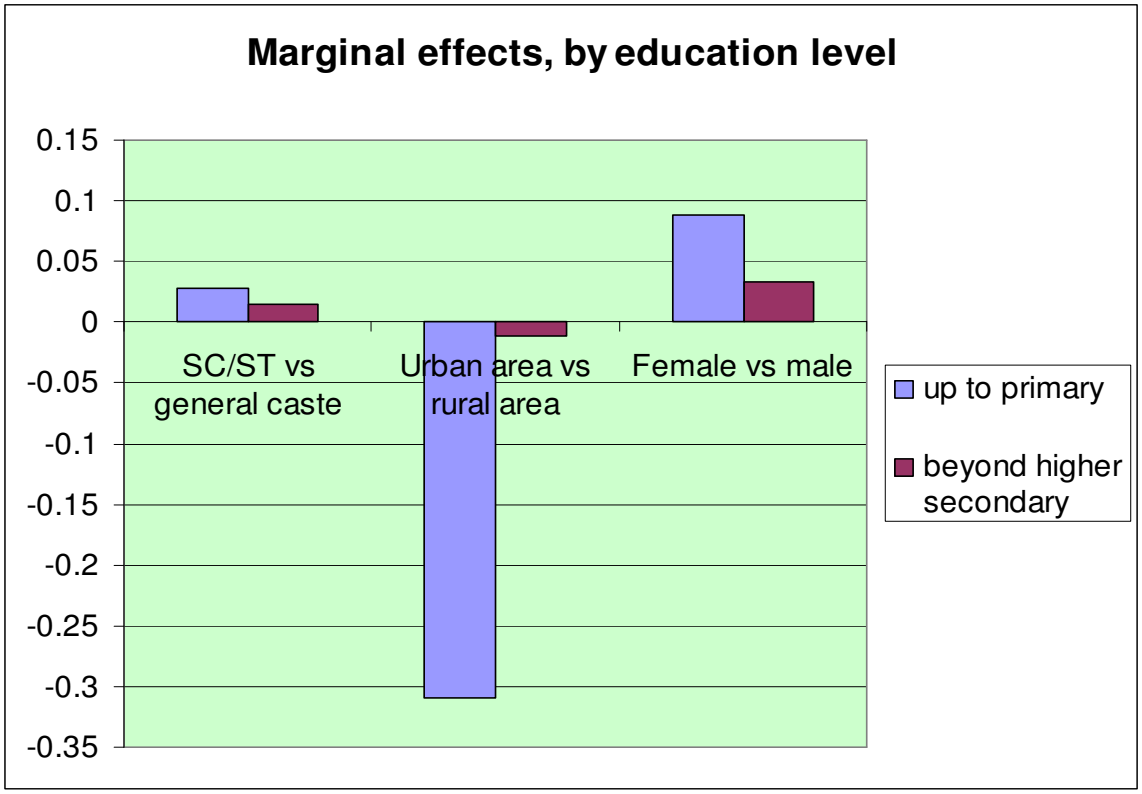
It would be noticed that in the model estimates for workers with education above higher secondary, the coefficient of import penetration is positive but not statistically significant. This category includes workers with high levels of education, for example, those with engineering degree who obviously cannot be replaced by casual workers. This seems to be the reason for the statistical insignificance of the coefficient. It appears therefore that casualisation of labour caused by import competition is relatively greater for workers belonging to the education category 'above primary and up to higher

secondary' than for workers with education above higher secondary, especially those with high levels of education.

The results for explanatory variables other than import penetration ratio are similar to that presented in Table 5 which utilizes the entire sample. In particular, it may be noted that the coefficient of labour market reforms index is significantly negative in the estimates for all three sub-samples. However, some interesting patterns are observed in Table 6. The coefficient of the SC/ST dummy variable in the model estimate for the education category "beyond higher secondary" is over five times the coefficient in the model estimate for the education category "up to primary". The opposite pattern is observed for the coefficient of urbanization dummy variable. It should be pointed out here that the estimated marginal effect for SC/ST dummy is not much different between the education categories "up to primary" and "beyond higher secondary" (Figure 4).[19] By contrast, the rural-urban difference in the probability of finding a regular job is far greater for individuals with education up to primary level than for individuals with education above higher secondary. Similarly, the male-female difference in the probability of finding a regular job declines with the level of education. The coefficient of this variable is statistically significant for workers with education up to primary and those with education up to higher secondary, but not for worker with education above higher secondary. If the male-female difference in the probability of finding a regular job is treated as gender discrimination, this discrimination seems to disappear with education beyond higher secondary.

[19] It is also interesting to note that the coefficient for the SC/ST dummy variable is statistically significant only for the educational category, 'beyond primary and up to higher secondary'. It is not significant for the lower or higher educational category.

Figure 4



Source: same as for Table 5.

5. Concluding Remarks

The results of the econometric analysis presented above indicate that intensification of import competition in the post-reform period has been responsible to some extent for the increasing informalization of labour in Indian manufacturing. This supports to some extent a view that globalization is leading to a 'race to the bottom' in labour standards in developing countries. The results of economic analysis also indicate that labour market reforms tend to counter the tendency towards informalization and help in the creation of regular salaried/wage employment opportunities in manufacturing. One may be tempted to treat this as empirical evidence in support of the view that the labour market rigidities particularly the Industrial Disputes Act is the prime cause or an important cause of increasing employment of contract and temporary workers. Such inference will, however, be hasty since it is important to recognize that the sample used for the econometric analysis is dominated by hired workers engaged in unorganized manufacturing, and the

Industrial Dispute Act does not apply to them. The same is possibly true for several other regulations which are held responsible for rigidities in the labour market. Why labour market reforms encourage unorganized manufacturing enterprises to substitute casual labour by regular wage labour is therefore a puzzle. One possibility is the index of labour market reforms constructed by Doughrty (2008) includes a large number of reform measures that can be taken by the state governments and some of these impact both organized sector manufacturing enterprises and the unorganized sector manufacturing enterprises that have hired workers. Another possibility is that the reform measures taken by the state governments reflect the changes in the attitude of the state governments towards enterprises and the workers employed in the enterprises. The changes in attitude of the state governments have a significant bearing on the way business is done in the states, and in particular it encourages small enterprises to hire worker on a more regular basis. It is needless to say that these are speculations on what could be the reasons for the observed, robust negative relationship between labour market reforms and the proportion of casual workers, and a more thorough investigation is needed. This is a matter that may be taken up in future research.

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Annex: Results of the Multinomial Logit model

Table A.1: Model Estimates, explaining worker status: regular workers, casual workers and self-employed

Explanatory variable	Equation for casual workers		Equation for self-employed	
	Coefficient	t-ratio	Coefficient	t-ratio
Import penetration ratio	0.244	1.25	0.339*	1.95
Labour market reforms index	-0.019***	-6.07	0.0009	0.30
Organized sector dummy	-0.753***	-11.08	-3.951***	-43.40
Literate below primary	-0.416***	-3.66	-0.142	-1.33
Literate- primary	-0.648***	-6.65	-0.284***	-2.97
Literate- middle	-0.987***	-9.81	-0.390***	-4.16
Literate- secondary	-1.473***	-12.09	-0.489***	-4.20
Literate- Higher Secondary	-2.058***	-11.24	-0.171	-1.13
Literate- Diploma/certificate Course	-2.510***	-10.05	-1.26***	-6.07
Literate- Graduate	-3.551***	-8.97	0.048	0.21
Literate- Post Graduate and above	-6.808***	-9.36	-0.599*	-1.79
Age	-0.008***	-3.16	0.025***	10.22
Sex (1-male, 2-female)	0.326***	3.84	1.535***	20.19
SC/ST dummy	0.115	1.57	-0.335***	-4.72
Urban area dummy	-1.041***	-15.47	-1.169***	-18.80
constant	1.855***	7.96	-0.488***	-2.23
No. of observations	24627			
Pseudo R-squared	0.285			
LR chi-squared (30)	3062.5 Prob=0.000			

Source: Authors' computation based on unit records of NSS 61st round employment-unemployment survey data.

*, *** statistically significant at 10 percent and one percent level of significance, respectively.