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Estimating Determinants of Contractualization of Workers in Organized Sector in India

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Abstract
The structural adjustment programme adopted in 1990 led to the removal of all existing pre-reform regulations and restrictions imposed on the Indian industries. This radically transformed India's trade relations with international markets. The liberalization of Indian economy on one hand accelerated foreign capital as well as technology influx while on the other hand increased competition for the domestic economy. Thus the increased openness and flexibility arising from the economic transformation prompted the domestic producers to resort to alternative informal routes of employment thereby leading to increased contractualization of employment substituting of regular workers by contract workers in the manufacturing industries.
Thus this paper is an empirical study which focuses on exploring and identifying the industry specific factors which are affecting the degree of casualization in Organized manufacturing sector of India. Panel regression using STATA has been used and the econometric analysis reveals that average firm size, value of output, capital intensity, profit per worker and welfare benefits for workers have considerable favourable effect on the employment of contractual workers while trade union activity and the ratio of male to female workers employed have significant negative impact on contract worker employment in the manufacturing industries of the organized sector in India.

Keywords: contractualization, capital intensity, trade union activity, feminization, panel regression
JEL Classification: C33, J21, L60

1.Introduction

India's LPG (liberalization globalization privatization) policy freed the economy from the shackles of various market restrictions and regulation and created a strong competition in production, growth and sustainability of industries. The labour market reform led to segmentation of workforce in the Indian Industries between permanent/direct/regular workers who are directly recruited by the employer enjoying the benefits of protective labour laws, job security as well as social security like paid holidays, sick leave and in many cases, parental leave etc and contract/casual workers who are recruited under flexible labour policies with minimum or no job and social security at the prevailing market price either directly or through agencies/contractors with little or no access to either paid leave of any kind or skills/career enhancement opportunities. Employers prefer hiring contract workers because of the non commitment to employee privileges such as paid leave, gratuity, bonus, etc., short term or seasonal resource requirement, requirement of specific technical skill set on sporadic basis and greater flexibility to hire and fire the number of workers based on economic performance. This in turn positively aids resource management, cost efficiency and maximization of profit.
Given the rich labour endowment in India, a study of the recent trend and patterns in the contractualization of employment in manufacturing industries is justified. Using the ratio of contract workers to total workers employed in the organized manufacturing industries as an index of the incidence of 'contractualization', an industry level analysis of the incidence and average annual trend of contractualization are done for 22 two digits over 3 different time periods (refer Table 1 in Annexure). The study shows an increase in ratio of contract workers in total workers

in the economy as well as in almost all industries. The average rate of contractual employment increased from 22.21% in 2001-02 to 36.86% in 2015-16. Majority of the capital intensive manufacturing industries like coke and refined petroleum products, chemical and chemical products, rubber and plastic products, basic metals, other nonmetallic products, computer, electronic and optical products, electrical equipment, motor vehicles, trailers and semi-trailers have recorded steady growth in contract worker participation during the study period. The ratio of contract workers in total workforce has been the lowest in textile and wearing apparel industries. It is also observed that certain kinds of industry groups (namely, food products, tobacco, beverage, basic metals, coke and petroleum products, non-metallic mineral products, fabricated metal products and transport products) attract more contract workers than others. This can be explained in terms of the need for different type of skill for production process. Industries will be more flexible towards hiring contract worker in which remuneration is low and/or no special skillset or training is required or the nature of work is repetitive floor based (Ganguly 2022).

Contractualization has immense socio economic significance as it leads to exploitation of contractual workers by employers in terms of working hours and work pay in an attempt to reduce costs, insecurity and vulnerability of workers, disintegration of family and household life, and ultimately the health of democracy and society in Indian economy. Ghosh (2004) showed that significant proportion of the casual/contract laborers earn wages and employment benefits much less than those of permanent workers, and they also reflect a high incidence of poverty and lowest working standard in the country. Hence identifying the determinants affecting the degree of contractualization has immense economic significance for policy makers. This paper thus focuses on estimating the industry specific determinants of contractualization in the formal sector of Indian industries. The following section provides a literature survey of studies carried out in this field of study.

2. Literature Review

The study conducted by Neethi (2008) revealed that contractual employment exists in almost all industry groups and the nature and intensity of contractualization is not only region-specific (Schmidt J D, 2005) but also industry-specific factors. Some of the studies propagated that the pre-reform stringent labour laws and restricted foreign and private investment policy acted an impediment for the producers and hence post reform they are now replacing the earlier policies by flexible policies (Sachs, *et al.* ,1999; Sood, Nath et al., 2014). The study conducted by Maiti et al. (2009) and Sen et al. (2013) use the Besley and Burgess (2004) indices for estimating the intensity of labour market control and shows that that stringent labour regulations had notable positive impact on the recruitment of contract workers. Sen et al. (2013) find a significant direct impact of trade on contract labour employment across states and industries during the period from 1998-99 to 2004-05. However, the empirical study using pooled cross-industry data from 1999-00 to 2001-02 carried out by Pradhan (2006) establishes an inverse effect of import intensity on the ratio of contract to regular workers in India's organized manufacturing. According to Braun and Scheffel (2007), the increasing trend in contract workers can possibly be attributed to firm's strategic decision to use contract workers as a proxy workforce to subdue the negotiation power of the permanent/direct workers and reduce their wages. The study conducted by Solaja (2015) showed that labour casualization has weakened volume of trade union members, financial strength and bargaining power of trade unions in Nigeria. Many studies have shown that not only is contract employment higher among women but also the estimated average long-run wage difference linked with casual employment is much greater and more robust among male workers than female workers (Craig and Mullan, 2010; Gornick and Meyers, 2009). Singh et al (2017) showed that firms there is a positive correlation between contractualization and the skill of workers. Firms with a higher employment of unskilled workers are more likely to hire contract workers than the firms employing a lesser number of unskilled workers. There is a considerable amount of literature focusing on the correlation between nature of employment and feminization (i.e higher female workforce employment) in the manufacturing sector of developing countries. Studies reveal that the employment of female workers at low-cost is seen to be higher in informal / contractual type of employment in global market (Standing 2006; Joekes 1999; Seguino 2000; Perrons 2004; Saracoglu et al. 2018).There is a considerable amount of research

available on trends and patterns in growth of casual workers in Indian organized industries and the effect of foreign trade, competitiveness and labour regulations on contract worker employment, however few studies have been carried to understand the role of industry specific determinants of the employment of contract workers in the Indian industries. This gap is addressed in this paper.

3.Data and Methodology

3.1 Data and data Source

This study is primarily empirical in nature supported by theoretical arguments. The period considered for the study is from 2000 to 2018. The data used for analysis are secondary data. The data from Annual Survey of Industries (ASI) reports for the time frame 2000-01 to 2015-16 and data from the reports published by Labour Bureau of Ministry of India are used for all empirical analysis. The Annual Survey of Industries encompasses the entire factory sector comprising industrial units (called factories) registered under section 2(m)(i) and 2(m)(ii) of the Factories Act.1948. The classification of the industrial activities of the factories into industry groups based on the value of the principal product manufactured by them is coded at 2 digit NIC, 3 digit NIC and 4 digit NIC. NIC 1998 was followed for the classification of industries from ASI 1998-99 to ASI 2003-04. NIC 2004 was followed from ASI 2004-05 till ASI 2007-2008. Post 2008-09 a new NIC-2008 classification has been introduced for data compilation and tabulation in the annual survey reports. In this study 2 digit NIC 2008 classification of the estimates for different industrial aggregates has been considered. In order to make the data under different NIC classifications comparable the concordance table has been used. 22 industries at two NIC code level have been considered in our study. The industries which have been considered in this study are: food, beverage, tobacco, wearing apparel, textile, leather and products of leather, wood and products of wood (except furniture), paper and products of paper, publishing, printing and recorded media, coke and petroleum, chemical and products of chemical, rubber and plastic products, other non-metallic mineral products (eg glass, ceramic etc), basic metals, fabricated metal products, machinery and equipment n.e.c, electrical machinery and apparatus n.e.c, electronic equipment and apparatus, motor vehicles, trailers and semitrailers manufacturing industry, industries related to other transport manufacturing, furniture and other manufacturing n.e.c.

3.2 Methodology of Data Analysis

Static Panel regression analysis is done using the econometric method specified in Baltagi's Econometric Analysis of Panel data. A panel data regression is considering both time series as well as cross sectional data. Panel data identifies and controls the problems of heterogeneity and multicollinearity of data and gives higher degrees of freedom and hence eliminates the chances of biased estimates. Therefore, panel regression analysis has been conducted using STATA software for the following equation

$$Z_{it} = a + \beta X_{it} + u_{it}$$

where i = 1...n denotes the cross-section dimension; t = 1...T denotes the time-series dimension. a is a scalar, β is n × 1 and Xit is the i^{th} observation on n explanatory variables. Most of the panel regression applications utilize a one-way error component model for the disturbances, with $u_{it} = \eta_i + \rho_{it}$ such that, η_i denotes the unobservable firm-specific/individual effect which does not vary with time. It is excluded from the regression. ρ_{it} denotes the disturbance fluctuating with individuals/firms and time. This is treated as the usual disturbance in the regression.

In this study two approaches are used to estimate equation in panel, namely (i) fixed effects model (FEM) and random effects model (REM). Selection between REM and FEM is done more rigorously with the help of Hausman specification test. If the estimated value of Chi-square is more than its predicted value at a chosen level of significance λ and degrees of freedom k, then we reject null hypothesis and accept the fixed effects estimator. On the other hand, if the null hypothesis is not rejected, then we accept the random effect estimator test and Wald test (also called the wald chi-squared test) are conducted for fixed effect and random effect model respectively to test whether explanatory variables in a model are significant

Panel regression is performed in this study to determine various industry specific factors affecting the employment of contract workers in the organized manufacturing sector. In doing so, the effect of the independent variables in this model namely average firm size, capital intensity, welfare benefits, capital stock, male to female workers and trade union activity on contract workers to total workers' ratio (i.e. Lc/L) is analyzed.

3.3 Modelling the relationship

It has been well acclaimed that the decision to hire contract labour is based on cost considerations. Employment of contract workers enables firms to reduce their cost of production, particularly in urban areas, since the wages paid to contract workers are often lower than wages paid to regular workers. Thus the employer will hire contract workers alongside regular workers if he enjoys cost advantage from hiring contract workers. Thus the employer is faced with two cost functions

$C_c = C(\ L, L_C, X_i)$ …….. (3..3.1)

$C_r = C(L_r, X_i)$ …….. (3.3.2)

Such that

Cc represents the total cost of hiring regular workers and contract workers

C_r represents the cost of hiring only regular workers

L_r represents number of regular workers

L_C represents number of casual workers where

$L_r + Lc = L$ representing total employment of workers

X_i represents the labour and product market specific factors.

It is clear that given firms are ready to hire both contract and regular workers, they will hire contract labour if and only if total cost of hiring contract and regular workers is less than the total cost of hiring only regular workers,

i.e $C_C < C_r$.

In other words, firm will hire more of contract workers if

$C_r - C_C > 0$

This cost differential is determined by both labour market as well as product market specific factors that influence it. This can be represented in the following equational format as

$C_r - C_C = \beta X_i + u$

$Or,\ C_r / Cc\text{-}1 = \beta X_i + u$ ……(3.3.3)

The ratio of the cost of hiring regular worker to total cost of hiring regular and contract worker ($C_r/C_{C)}$ changes with changes in the ratio of contract workers to total workers (Lc/L). In other words, if (Lc/L)] increases, then (C_r/C_C) will fall assuming that increase in contract worker participation is accompanied by fall in regular worker participation. The employment of contract worker is influenced by various industry specific factors. To understand the factors affecting the contract worker participation ratio, Lc/L is taken as the dependent variable in this model. Thus for the analysis of the impact of the industry specific factors on the employment of contract workers, panel regression analysis is done for 22 industries for the period 2001 to 2015 The explanatory variables in this model represent the industry specific factors related to both factor market as well as product. The variables considered are

1. Average firm size shows total workers per firm and thus represents size as a factor that influences the firm to employ contract labour. This variable also helps to bridge existing literature on labour regulations and threshold effects.

2. Welfare benefits: The workers of all industries operating in the organized sector are expected to protected under regulatory laws on wage fixation. Hence payment of minimum wage and welfare benefits like bonus, gratuity, provident fund, etc., are mandatory for the employees under statutory provision. In absence of industry-specific minimum wage, the ratio of payment on welfare benefits to total value of output is considered here as a measure of welfare benefits. This also acts as an indicator of the extent of job security provided by a specific industry.

3. Capital intensity of the firm is defined by the ratio of total capital of the firm to total workers in the firm. Here invested capital has been considered to represent total capital. This variable classifies the industries into labour-intensive and two, capital-intensive.
4. Output: Total value of output produced by the firm has a direct effect on the cost of firm. It is often used as the indicator of the size of the firm also.
5. Capital stock is represented by gross fixed capital formation of the firm and is considered to represent the capital structure of the industry.
6.Male to female workers is considered as a factor as many studies have identified that more of female workers are hired as contract workers than their male counterparts.
7. Profit per unit of output is considered as a measure of competitiveness of the industry. The competitiveness of the industry plays a crucial role in determining contract employment as has been suggested by many studies.
8. Trade union activity is measured by the ratio of man-days lost in industrial disputes to total workers instead of the ratio of unionized workers to total unionizable workers. This is because union membership data not only exclude the membership of unregistered unions and unions registered but a sizable number of registered unions fail to submit statutory annual returns. On the other hand, data on mandays lost in industrial disputes are more reliable and hence used to represent trade union activity,

4. Findings and Analysis of Panel Regression Results

Panel regression is done with all six industry specific variables, namely gross capital formation, average firm size, profit per unit of output, social security benefits enjoyed by workers, value of output produced by the firm and ratio of male to female workers employed by the firm on ratio of contract workers in total workers (refer Table 4.1 in Annexure). The findings show that except for gross fixed capital formation all other five variables have resulted significant. Average firm size and profit per unit of output have resulted statistically significant at 1% level of significance and ratio of male to female workers, provident fund and other welfare benefits and value of output has resulted significant at 10% level of significance. The average firm size, profit per unit of output show strong positive effect on the ratio of casual workers to total workers Since profit per output is also an indication of the size of the firm, thus the implication of the result is that large industries will have larger share of casual/contract labour in total employment. Social security benefits enjoyed by workers which is measured in terms of provident fund and other welfare benefits shows significant positive impact implying that firms where job security is high also tend to attract higher contract workers. The ratio of male to female workers show a significant negative effect on contract worker participation. This implies that industries which hire relatively more male to female workers are likely to hire less of contract workers while industries hiring comparatively more female to male workers are employed hire more of contract workers. This result has an important implication that the female workers comprise a higher proportion of the contract employment.

The effect of capital intensity of the industry on ratio of contract worker to total worker is studied and Haussmann test accepts the random effect model (refer Table 4.2 in Annexure). The result is significant at 1 percent level of significance. The results show that invested capital to labour ratio is positively related to the ratio of contract to total worker. Thus industries which are relatively capital intensive in nature demand more contract workers compared to the relatively labour intensive industries. This implies that the capital intensive industries require more workers to do repetitive floor based duties or work which requires no special skills or technical expertise and hence employ more contract worker.

The result of the study of impact of trade union activity on employment of contract worker is statistically significant at 1 percent level of significance (refer Table 4.3 in Annexure.) Haussmann test accepts the random effect model. Trade union activity of the firm is also found to have strong negative effect on the ratio of contract workers to total workers. This supports the existing standard literature that trade unions. This implies that firms in which trade union activities are strong tend to recruit lower share of contract workers. This suggests that in industries with strong

trade unionization exists, these unions work exercise their collective bargaining power towards the benefit of the workers and assurance of job security. With increasing labour market deregulation and weakening negotiation power of trade unions, it is seen that job security has become a rising concern since these contract workers can be easily shed due to the weak contracts and flexible labour market conditions under which they are employed. The firms prefer to engage more contract workers at lower wages creating job insecurity.

5. Managerial application of the study

The findings of this study are consistent with economic logic and theoretical arguments and the results will be helpful in managerial decision making with respect to employment and wage rate determination. In the new era of globalization and liberalisation which considerably relaxed labour market regulation and weakened collective bargaining, the role of trade unions need to be studied with respect to the substitution of regular workers by contract workers. Also with increasing feminization (i.e increasing proportion of female to male workers in workforce) in industrial employment, whether contractualization of workers is happening at the cost of female workers need to be analysed. This study addresses these dynamics between feminization and contractualization and highlights a socioeconomic concern with respect to gender equality in industrial employment. With the overall economic goals of achieving socio economic equality and balanced economic development, while reviewing the adverse effects of unemployment on individual's morale and health, the socio economic impact of under-employment or contract/casual employment needs special attention. This provides the scope of the present study.

6. Limitation of the study

The study is limited to industry specific factors and has not accounted for the effect of rent sharing, market conditions and regional factors due to non-availability of data at the industry level. These issues may be undertaken in future extension of research on this topic. Also the period for the study has been limited to 2018 and hence has not captured the analysis of employment during COVID period. Studies of pre and post COVID contractualization of workforce can be future scope of study.

Conclusion

Thus summing up, the overall fall in permanent employees and overall increase in contract workers over the decade suggests that negotiation power of labour has continuously eroded during the period under consideration suggesting increase in labour market flexibility. Empirical findings also show that the employment of contract workers is increasing higher rate over the years while that the employment of direct or regular workers is increasing at a lower rate over the years in the organized manufacturing sector of India. It is also found that firm size significantly affects contract worker employment. In large industry the share of casual/contract labour will be higher in total employment. The ratio of male to female workers show a significant negative effect on contract worker participation. This implies that industries which hire more of male workers compared to female workers are likely to hire less of contract workers while industries where more of female workers compared to male workers are employed hire more of contract workers. This result has an important implication that the female workers comprise a higher proportion of the contract employment. Another important finding is that industries which are relatively capital intensive in nature demand more contract workers compared to the relatively labour intensive industries. The justification of this result can be explained as follows: the capital intensive industries require more workers to do repetitive floor based work, which does not require specialist skills, or technical knowledge and hence employ more contract worker. Also it is found that firms with strong presence of trade union activities tend to recruit lower share of casual workers. This supports the existing standard literature that trade unions exercise their collective bargaining power towards the benefit of the regular workers.

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Annexure

Table 1

Ratio of Contract Workers to Total workers in Organized Manufacturing Industries and its Annual Change during 2001-02, 2009-10 and 2015-16.

Industry	2001-02	2009-10	2015-16	Annual Change %
Food products	33.4	41.3	29.1	-0.4
Beverage	37.7	49.2	51.5	2.4
Tobacco	61.5	67.8	56.3	10.3
Textile	11.6	16.0	16.1	3.1
Wearing apparel	19.0	16.6	10.9	4.9
Leather & related products	12.4	20.6	19.4	4.8
Wood except furniture	12.4	18.5	23.5	6.6
Paper and paper products	30.5	28.9	30.0	0.8
Printing and reproduction of recorded media	23.1	38.3	16.0	5.8
Coke and refined petroleum products	26.6	50.3	65.5	7.1
Chemicals and chemical product	21.8	31.3	42.0	5.1
Rubber and plastics products	15.9	28.8	35.6	6.3
Other non-metallic mineral products	29.0	46.3	61.6	5.8
Basic metals	27.2	40.0	45.2	3.8
Fabricated metal products,	30.0	38.4	41.9	3.3
Computer, electronic and optical products	7.6	41.4	39.2	14.2
Electrical equipment	16.8	35.3	41.3	6.9
Machinery and equipment n.e.c.	11.5	27.1	33.8	8.7
Motor vehicles, trailers and semi-trailers	22.6	39.3	49.0	6.1
Other transport equipment	15.0	37.7	49.6	10.7
Furniture	21.9	30.3	32.1	5.2
Other manufacturing	12.3	15.5	21.4	5.4
Mean value	22.21	34.50	36.86	

Source: Computations based on ASI Data

Table 4.1

Panel Regression of Ratio of Contract Workers to total workers on Industry specific factors

Number of obs = 86 No of groups = 22	Fixed-effects (within) regression			Random-effects GLS regression		
	Coef.	T	P>|t|	Coef.	z	P>|z|
grosscapitalformation	-1.97e-07	-0.14	0.892	3.84e-07	0.27	0.789
averagefirmsize	2284998	3.19	0.002*	.1258917	2.26	0.024
Profitsperoutput	90.05251	3.89	0.000*	105.3097	4.92	0.000
provfundwelfareexp	.0000231	1.74	0.087**	.0000202	1.57	0.116

Value_output	1.75e-07	1.89	0.063**	1.51e-07	1.65	0.099
Maleto femaleworker	-.074779	-1.76	0.084**	-.0637472	-1.53	0.127
R Sq	within = 0.6498 between = 0.2372 overall = 0.3416			within = 0.6321 between = 0.3238 overall = 0.4201		
	F(6,58) = 17.93 corr(u_i, Xb) = -0.3367 Prob > F = 0.0000			Wald chi2(6) = 105.17 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000		
HausmanTest: chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 23.93 **Prob>chi2 = 0.0000** Hausman test accepts fixed effect model						

Source: computed from ASI data, GOI

*all values are significant at 1 percent significance level

** all values statistically significant at 10 percent level of significance

Table 4.2

Panel Regression of Ratio of Contract Worker to total workers on capital intensity

Number of obs = 86 **Number of groups = 22**	**Fixed-effects (within) regression**			**Random-effects GLS regression**		
	Coef.	**T**	**P>|t|**	**Coef.**	**z**	**P>|z|**
Investedcapitalworker	.1072472	3.87	0.000	.101168	4.10	0.000*
Cons	27.12729	21.51	0.000	27.36061	9.43	0.000
R Sq	within = 0.1923 between = 0.0847 overall = 0.1157					
	F(1,63) = 15.00 corr(u_i, Xb) = -0.1001 Prob > F = 0.0003			Wald chi2(1) = 16.77 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000		
Hausman test : chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)= 0.24 Prob>chi2 = 0.6272 Hausman test accepts random effect model						

Source: calculated from ASI data, GOI

*at 1 percent significance level

Table 4.3
Panel Regression of Ratio of Contract Worker to Total Worker on TU activity

NO of obs = 83 **No of groups = 21**	**Fixed-effects (within) regression**			**Random-effects GLS regression**		
	Coef.	**T**	**P>|t|**	**Coef.**	**z**	**P>|z|**
Trade union activity	-.8994225	-8.69	0.000	-.901177	-8.79	0.000*
Cons	35.05181	41.31	0.000	35.20889	11.78	0.000
R Sq	within = 0.5532 between = 0.0419 overall = 0.1793					
	FF(1,61) = 75.53 corr(u_i, Xb) = 0.0145 Prob > F = 0.0000			Wald chi2(1) = 77.23 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000		
Hausman test	chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 0.02 **Prob>chi2 = 0.8997**					

Source : computed from ASI data, GOI
*at 1 percent significance level
Note: Hausman test accepts Random effects model