

# Employment Protection Legislation, Skills and Productivity- Evidence from Indian Manufacturing

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#### Abstract

The creation of Jobs in manufacturing sector has of late emerged as a major challenge for policy makers in India especially in the context of labor market rigidity which manifests in the form of low absorption of permanent workers due to prevalence of employment protection legislations ( such as IDA and CW act) and less skill formation amongst workers. Both of these poses serious problem for enhancement of labor as well as multifactor productivity at the firm level. The present paper using firm level data for the period 2008-15 undertakes an analysis of whether increasing usage of contract workers impacts productivity and additionally if labor quality is a determinant of productivity growth. Using a difference in difference econometric approach for the entire Indian organized manufacturing at the firm level, the paper offers several interesting findings. Increased usage of contract workers turns out to be significant in lowering productivity and more so in case of labor intensive manufacturing. In addition the labor quality accounts for improving productivity-level of education is by far the crucial variable in impacting productivity at the firm level thereby reflecting the role of skills in enhancing productivity.

#### **KEY WORDS: Employment Protection Legislation, Skills and Productivity**

JEL classification: K31, J24,J2 and D2

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## 1. Introduction

Job creation has been a core issue of the labour market for a developing country like India where millions of workers are joining the labour force every year. The estimates available from Government of India (CSO, Annual Survey of Industries) indicate that in organized manufacturing the output growth during 2008-09 to 2015-16 has been around 11% (CAGR) accompanied by an employment growth of 3%. There have been several studies undertaken in the past to discern the cause behind the lagging rate of employment growth, and two major issues which act as a barrier to employment generation turn out to be increasing capital intensity (Sen and Das, 2015) and restrictive employment protection legislation (EPL).

In India, there exist about 165 labour legislations, including 47 central acts (Debroy, 1997) which make compliance and enforcement difficult. It is the "The Industrial Dispute Act of 1947" (IDA,1947) which is considered to contain the most restrictive element of the regime, because of the constraint imposed by the Act on Collective dismissal of the workers.<sup>1</sup> In India's context Besley and Burgess (2004), remains an important documentation of the complex labor laws especially the Industrial Disputes Act (IDA 1947). In subsequent work (Sanyal and Menon, 2005; Ahsan and Pages,2007, 2009, Hasan et al, 2007; Aghion et al, 2008) reported important findings about India's labor market regimes based on the BB Index.<sup>2</sup> However there is more to the Labor market inflexibility than the examination of IDA 1947. The segmentation of the workforce into *insiders*, the workers with a protected job and *outsiders*, the ones who are either unemployed or employed on fixed-term, part-time or temporary contracts (Barone,2001) is seen as outcome of EPL.

The emerging trends on hiring of contract workers reflect the increasing contractualization of the industrial workforce (Goldar and Aggarwal 2010, Sen 2009, Sapkal 2015 and Das et al 2018). There are various factors attributed for the phenomenon, however it has been observed that employers in organised manufacturing circumvent the restrictive labour laws (particularly, IDA) by employing the workers on contractual basis who fall outside the domain of major labour laws (Kapoor, 2014, Chaurey, 2015). Sapkal (2015) finds that employment on contractual basis is relatively higher in states with pro-labour legislation.

The quality of labour force and its composition is also the matter of concern in the context of both labor as well as multi factor productivity as it provides not only a more accurate indication of the contribution of labour to production but also the impact of compositional changes on productivity achieved through skill enhancement. Further, the hiring of contract workers as is evident in India brings into limelight the question of skills learnt on the job through regular employment and thus the issue of labor quality. A recent paper by Singh et al (2018) indicates that while there are the obvious benefits to the flexible contract labour system, there are costs as well. This cost manifests in terms of possible substitution between skilled and un skilled workforce in system with contract

<sup>&</sup>lt;sup>1</sup> In 1976, the Chapter VB inserted into the Act made it mandatory for firms employing more than 300 workers to seek prior state government consent before any retrenchment or closure of a part of the enterprise. The ambit of the Act was further increased in 1982 by lowering the threshold from 300 workers to 100 workers, the overlapping jurisdictions of the state government and central government enabled the former to amend the central labour legislation, the state level amendments led to a state-level variation which has been used by several studies to assess the impact of restrictive labour laws on industrial performance.

<sup>&</sup>lt;sup>2</sup> The study has been criticised for its methodology (Bhattacharjea 2006 and 2009). However, there are several studies such as Nagaraj (2002), Dutta (2003) and Ramaswamy (2003) which highlight that the effects of labour regulations in India wasn't observed as the poor compliance and enforcement turn them ineffective.

workers and contractual employment creates an inherent challenge for the skill formation, which in turn has huge implications for labor quality<sup>3</sup>.

India's manufacturing performance (labor as well as multifactor productivity) has been very low as compared to other developing countries including China even after more than two decades of economic reforms. Several studies have reported low or insignificant role of productivity improvement in accounting for observed manufacturing output growth (Das et al (2015), Goldar et al (2017)]. Further, Das (2015) have showed that trade openness has a positive impact on manufacturing productivity. The issue of linking productivity growth at the firm level to the labor market has often been at examination of the impact of wages and employment on productivity performance and less to the linkage of inflexible labor market as captured through labor laws (EPL) and associated skills with productivity which remains the aim of this paper.

There is a large literature on the EPL and its outcome and particularly focussing upon its impact on overall employment in the economy. The theoretical model by Bentolila and Bertola (1990) suggests that EPL lowers the fluctuation in the quantity of labour demanded over the business cycle, as during the upswings the firms will be reluctant to hiring as firing them later would be difficult, on the other hand, during downswings the firms would end up employing more than they would have under a free regime. The net effect on overall employment depends upon the fact whether the rate of destruction outweighs the rate of job creation or not. There are studies (Mortensen and Pissarides 1999; Fella 2004) in the literature which suggest that stricter EPL have the ability to increase the size of overall employment. Thus, the literature stands divided on net effect of EPL on employment levels, but its impact on lowering of labour demand fluctuation seems to be acknowledged widely. Hopenhayn and Rogerson (1993) apart from recognising the fact that EPL slower the rate of labour demand adjustment, find that it reduces the productivity of the firm. There are several channels suggested in the literature through which the impact on productivity could be explained. Bassanini et al (2009) suggests of forces operating in opposite directions which could result affect workers productivity, the absence of threat of layoff might induce the workers to act inefficiently in terms of poor performance and absenteeism but on the other hand the average productivity might increase as the firms turn more selective and the less productive matches will not be realised. The other suggested channels include the shift towards adoption of innovation which improves existing products rather than innovating the newer one, decreasing returns to investment and capital accumulation due to increased costs of the firm (Bertola, 1994)<sup>4</sup>.

The temporary workers or the contract workers emerge as the preferred form of employment in presence of stringent EPL as these sets of workers fall outside the purview of EPL. The political economy of the EPL is such that the labour reforms undertaken to address the rigidities imposed by it promote the engagement of temporary workers. The associated flexibility results in preference shift from permanent workers to temporary workers which results in segmentation of the labour

<sup>&</sup>lt;sup>3</sup> Singh et al (2018) have shown that under the "incomplete contract framework" the incentive to invest in the job is missing on part of both employers as well as employees. The lack of tenure security with the job generates perverse incentives which discourage the investment in the job by both the parties, which results in suboptimal investment in the job and inadequate skill formation. The associated flexibility has an inherent cost which could have its own effect on the productivity of the firm. Further, Sofi and Sharma (2015) find that increasing share of CW as a proportion of total workers is detrimental for industrial labour productivity.

<sup>&</sup>lt;sup>4</sup> Lazear(1990) shows that as long as the markets are efficient any impact of state mandated EPL would be countered by the market mechanism themselves, however the presence of market imperfections such as wage rigidities or uncertainty about the future of the firm etc. might act as a barrier to self-adjustment(Bassanini et al, 2009).

market and increasing substitution of permanent workers with the temporary ones. The labour market reforms promoting the temporary workers result in an increased engagement of temporary workers while decreasing the likelihood of the securing a permanent job as the conversion rate of temporary job to permanent and direct hiring in permanent jobs is much lower (Blanchard and Landier 2002; Cahuc and Postel-Vinay 2002).

In particular, the paper examines if the increasing usage of contract workers dictated by employment protection legislation (EPL) hampers productivity performance of the firm and in addition if labor quality acts a determinant of productivity enhancement. The paper is structured as follows- Section 2 presents trends on contract worker engagement in Indian manufacturing. The methodology and dataset are documented in section 3. The econometric estimates are analysed in section 4. The final section concludes the paper.

# 2. Contract workers and Indian manufacturing- Some trends

The usage of workers as "contract worker" in manufacturing is governed by the "Contract worker regulation and Abolition Act (1971)". Of late we find evidence of increasing usage of contract worker in manufacturing sectors of Indian economy as against the permanent workers. The rigid labor laws are often cited as the core factor responsible for the engagement of contract workers in organized manufacturing; however, the less discussed aspect of the contract worker engagement is the role of judiciary in allowing firms to hire contract workers.



#### Chart1 –Contract Workers Vs Directly Employed Workers in organised Manufacturing

Source: Author's own compilation using Annual Survey of Industries data.

Chart 1 provides yearly data on contract worker versus directly employed workers for the aggregate manufacturing. Two points are important. First, there has been a huge jump in contract worker engagement 2001-02 onwards. Secondly the same year marks the pronouncement of judgement in

Steel Authority of India v. National Union Water Front Workers<sup>5</sup> by Supreme court of India. The pronounced judgement was to determine the fate of the contract worker subsequent to abolition of employment on contractual basis for the job, as provisioned in the section 10 of the Act. The court held the view that in no manner there was any obligation upon the employer to employ the contract worker as permanent subsequent to abolition. The judgement in a way gave an impetus to the hiring of contract workers. The share of contract workers in total workers increased from 22% in 2001-02 to 32% in 2008-09, growing annually at 12% per annum for the organised sector manufacturing. In aftermath period of the global financial crisis the composition of the industrial workforce was more or less the same with a stagnant share of contract workers.





Source: Author's own compilation using Annual Survey of Industries data.

During the period 2001-02 to 2008-09 i.e. right before the onset of financial crisis, the number of contract workers per factory increased at 9% (CAGR), increasing from on an average 10 to 18 which eventually saw moderate decline over next few years. Since 2000-01 the number of directly employed or permanent workers per factory was more or less constant around 37 till 2008-09 and is at 30 for the year 2015-16. The chart 1 coupled with chart 2 provides clear evidence of workforce contractulisation, indicative of the fact that flexibility associated with contract workers was utilised by the firms to meet their labour demand.

Moving on from the aggregate picture to industry wise pattern of contract worker usage in terms of labour intensive Vs capital intensive industries. Chart 3 shows that in 2011-12 the total number of workers in organised manufacturing increased to 10.4 million workers from 6.1 million workers, it was the capital-intensive industries which absorbed nearly 80% of the workers of which the contract worker accounted for 60% points. In terms of growth between 2000-01 to 2005-06 and 2005-06 to 2011-12 the labour-intensive industries witnessed a constant rate of growth in terms of directly employed workers and witnessed a decline in contract worker absorption, while the capital-intensive industries continued with their rapid absorption of contract workers. The industry wise pattern is indicative of the fact that the jobs where the role of labour is restrictive to mere operation

<sup>&</sup>lt;sup>5</sup> AIR 2001 SC 3527

of machines or repetitive machine-based task the contract labour can easily be substituted by a permanent worker. The prevalent wage discrimination between contract workers and direct workers along with the easy substitution of contract worker enables the firms in capital intensive industries to achieve cost competitiveness. However, for labour intensive industries where the role of skills in production process is an essential input the substitution is feasible only up to a point as beyond that the inherent cost associated with skills outweighs the cost saving associated with contract worker.



#### Source: Das et al (2018)

Singh et al (2017) undertake probit estimation to study the factors which influence hiring of contract workers. The factors which turn out to be the driving the phenomenon are exports, capital intensity the location of the firm in terms of labour regime strictness and the level of skilled workforce.

# 3. Methodology and Data

### 3.1. Methodology

The paper aspires to assess the impact of increasing contractulisation of the workforce and the labour quality on productivity of the organised sector manufacturing firms. The empirical approach being used here as a tool is the difference-in-difference approach, which was introduced by Rajan and Zingales (1998). It has been extensively used to assess the differential impact of labour market policies, Mico and Pages (2006), Bassanini and Venn (2007), Bassanini et al (2009), Cigano (2010) Lisi (2013) etc are some of them which estimate the effect of EPL on productivity, employment and Investment. The difference-in-difference approach is based upon set of fundamental assumptions, which enables one to isolate the differential effect. We assume that the increasing share of contract workers as proportion of total workers and labour quality have an effect on productivity of the firm and its impact is differential for labour intensive industries vis-à-vis capital-intensive industries. The differential impact arises because of the central role of labour in the production process for labour-intensive industries vis-a vis capital intensive industries. Mathematically, it can be represented as:

# $\Delta \overline{lnProd^{L}} - \Delta \overline{lnProd^{C}} = f(CW, LQ)$

With assumption of linear functional form for f and a Cobb Douglas production function with constant returns to scale, the econometric model being estimated is the following:

$$lnProd_{fist} = \beta_1 CW_{fist} + \beta_2 L_i * CW_{fist} + \beta_3 L_i * LQ_{fist} + \beta_4 LQ_{fist} + \beta_5 (K/L)_{fist} + \delta_i + \gamma_s + \theta_t + \epsilon_{fist}$$

In order to control for the firm level effects associated with location and international trade there are two additional variables introduced into the equation above:

$$lnProd_{fist} = \beta_1 CW_{fist} + \beta_2 L_i * CW_{fist} + \beta_3 L_i * LQ_{fist} + \beta_4 LQ_{fist} + \beta_5 (K/L)_{fist} + Urban_f + Exporting_f + \delta_i + \gamma_s + \theta_t + \epsilon_{fist}$$

The model above is the baseline specification for the results presented in the subsequent section of the paper.

#### 3.2. Data

The Annual Survey of Industries is the principal source of statistical information on organised sector manufacturing in India, the annual survey covers all factories registered under section 2m(i) and 2m(ii) of the Factories Act,1948 i.e. the firms which employ 20 or more workers and operate without power, and those which employ 10 or more workers with power. The sampling strategy of the survey categories the factories into sectors, viz., Census and Sample, where the census sector includes the larger firms and surveyed regularly.

Using the firm level information from 2008-09 to 2014-15, an unbalanced panel of organised manufacturing firms has been constructed. The data provides detailed information on assets and liabilities, employment and labour cost, expenses, receipts, input items, products and by-products etc. Since the ASI estimates are at current prices, the effect of price change has been corrected by deflating the nominal variables by the using the Wholesale Price Index (WPI) series of 2004-05 as the base year released by the Office of the Economic Advisor, Ministry of Commerce and Industry, Government of India.

According to the latest ASI estimates of 2015-16 the top 5 states in terms of output and employment have a contribution around 55%, taking the fact into account the firms from the North eastern states (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura and Meghalaya), Goa and Jammu and Kashmir have been dropped. The union territories except NCT of Delhi have been dropped as these do not have legislatures of their own to amend the Central labour legislation, though Lakshadweep has a legislature but ASI lacks information on it. The firms located in Telangana, the state carved out of Andhra Pradesh in 2014 have been included into the former state to ensure consistency for the entire period. In order to improve the precision of the estimates only those firms which are of open status or have non-zero values of output and employment have been included.

The information on skills, which is an essential element of the empirical estimation has been captured using the Labour Quality (LQ) Index series from India KLEMS database. Using the methodology of JGF (1987) the labour quality for Indian Manufacturing was estimated by Aggarwal (2004) and subsequently extended by Krishna et al (2018). The index of aggregate LQ tracks the changes in the education, age and the gender composition of the workforce for both organised as well unorganised manufacturing using various rounds of Employment-Unemployment Survey (EUS)

by National Sample Survey Organisation (NSSO). The India KLEMS database provides the LQ Index series for 14 industries with 2000 as the base year, which can be then mapped onto 4-digit level of National Industrial Classification 2008 (NIC-08)<sup>6</sup>.

## 3.3. Description of the Variables

## 3.3.1. Dependent variables

Since the objective of the paper is to assess the impact on productivity the two variables included as the dependent variable includes Labour Productivity (LP) and Total Factor Productivity (TFP). Labour productivity being a measure of efficacy enables us to assess the impact of contract worker engagement and labour quality on the efficiency of labour as an input, defined as the real output generated per unit of labour.

The measurement of TFP using the traditional production function estimation approach has been a challenge as the estimates so obtained are biased owing to the correlation between unobserved productivity shocks and inputs levels. In response to a positive productivity shock the profit maximising firms expand output and similarly in response to a negative productivity shock they cut back on output, which as a result affects the level of input usage. Olley and Pakes (1996) came with a methodology to control for the unobservable productivity shock using Investment as a proxy for it. The methodology is restricted to the firms with non-zero values of investment as it is based on an assumption of strict monotonicity between investment and productivity.

Levinsohn and Petrin (2003) using the firm level evidence find that there are substantial adjustment costs associated with Investment, as a result of which the response to productivity shock is not smooth. They suggest that using Intermediate inputs rather than investment can solve the simultaneity problem and help avoid the loss of information associated with firms having zero and negative values of investment. Petrin et. al (2004) introduces the STATA command levpet to estimate TFP using Cobb-Douglas production function with labour and capital as the inputs.

In order to estimate the TFP using the levpet command the firm level information on output, capital, labour and energy has been sourced from ASI plant level information. In this paper the intermediate input used as a proxy here is the real energy, while capital being represented by stock of real invested capital and labour input by total no. of person engaged.

## 3.3.2. Independent variables

**Share of Contract worker in Total worker:** Using the firm level information on labour composition, which includes the total number of workers and the workers employed through contractors the share of Contract Workers as fraction of total workers is computed.

**Labour Intensive:** In order to estimate the differential impact on Labour intensive industries, they are identified by calculating the No. of Person engaged per unit of capital for each of the 24 industries according to NIC-08 classification for the entire period 2008-09 to 2014-15. The median value of the ratio is used to classify the firms into labour intensive and capital intensive<sup>7</sup>.

**Capital Labour Ratio:** It is defined as ratio of Real Invested Capital and Total Person Engaged and computed at the firm level.

<sup>&</sup>lt;sup>6</sup> The Concordance between the KLEMS Industrial classification and NIC-08 is available in Appendix I.

<sup>&</sup>lt;sup>7</sup>Appendix II provides the classification of NIC-08(2 Digit) industries into Labour-intensive Industries and Capital-Intensive Industries.

**Urban:** The better access to markets and connectivity have been acknowledged as the growth driver for the firms, to control for the locational advantages with the firms located in the Urban areas the dummy variable has been included. The dummy variable takes the value 1 for the firms located in the Urban areas and o for the ones in the rural areas.

**Exporting:** The integration of the domestic firms with the global markets enables firms to be more productive as acknowledged by (Bernard and Jensen, 2004). For the firms which export more than 10% of their output the dummy variable is assigned value 1 and 0 otherwise.

**Labour Quality:** There are 3 series of labour quality series included to explain the effect of its multiple aspects on productivity. The three measures of LQ used as a measure of skills includes the Index of Aggregate LQ, LQ Index of Education and the LQ Index of Agg. The Index of Aggregate LQ tracks the overall changes in the sex-age-education composition, the other two series capture the changing scenario of age and education of the workforce in Organised manufacturing. The role of gender is an important aspect of growth especially the participation of women in the workforce, but for the time being we exclude that aspect from the paper. Since the focus here is on organised manufacturing the series corresponding to organised manufacturing is used.

#### 4. Results

Before presenting the results of the econometric estimation, the descriptive statistics of the explanatory variables is shown in the Table 1. Among the seven explanatory variables, two of them are dummy variables.

Table 1:Descriptive Statistics					
Variable	Observation	Mean	Standard Deviation	Min	Max
Share of CW in Total Workers	1,97,491	0.225	0.354	0.000	1.000
Labour Intensive	1,98,877	0.428	0.495	0.000	1.000
Aggregate LQ Index	1,98,877	109.755	16.421	28.720	145.990
Education LQ Index	1,98,877	111.552	10.172	96.610	133.930
Age LQ Index	1,98,877	97.874	5.743	75.610	113.060
Capital Labour Ratio	1,98,877	8245.938	12793.59	1.263807	80487.2
Urban	1,98,877	0.598	0.490	0.000	1.000
Exporting	1,98,877	0.089	0.284	0.000	1.000

There are 6 specifications of the baseline model estimated as a part of the econometric exercise, where the first 3 specifications are the ones with Total Factor Productivity (TFP) as the dependent variable and the other three are the ones with Labour Productivity (LP) as the dependent variable, omitting the capital labour ratio variable in them. The productivity and labour quality variables have been expressed in terms of natural log, to estimate the elasticity of productivity wrt labour quality indicators. The estimation has been undertaken on a pool of 1,97,491 observations covering 97,221 firms with fixed effects to control for state, industry and year effects. The effect of outlier observations has been eliminated by winsorizing the data.

Since the dataset being used here is the panel estimation, the choice between random effects and fixed effects has been made using the Hausman test, results of which turned out to be in favour of fixed effects model with significant chi-square values. To ensure that the estimated coefficients satisfy the assumptions of homoscedasticty and suffer from no autocorrelation the standard errors computed are clustered standard error option. The significant values for the F statistics are indicative of the fact that the coefficients of the model are jointly statistically significant from zero.

Among the set of control variables included as explanatory variables i.e. Urban and Exporting, the significant coefficient for Exporting firms is indicative of the fact that participation of the firm in the global market impacts its productivity and it impacts LP more than the TFP. The firms located in the urban areas depict higher TFP than the ones located in the rural areas as reflected by the insignificant coefficient of the variable Urban but weakly significant for Labour productivity reflects some gain for it. The increasing stock of capital wrt labour isn't significant at all.

The increasing share of contract workers as a fraction of total workers affects productivity negatively and the impact is much more for the firms in the labour-intensive industries. An increase of about 1% point of contract worker share in Total workers lowers the TFP by 0.04% points and additionally for labour intensive industries it is another 0.06% points. In context of LP, the increase of 1% point of contract worker reduces the labour productivity by 0.32% points for manufacturing firms in general and for labour intensive industries the magnitude is of about 0.46%. Based on the results obtained, it can be inferred that the labour reforms which provide flexibility though hiring of workers on contractual, temporary or fixed terms basis lower the efficiency of the workers.

The significant coefficient wrt Aggregate LQ points towards the role of human capital in firm level productivity, with no additional effects in case of labour intensive industries. In terms of precise numbers, an increase of 1% in aggregate labour quality index will increase the TFP by 0.46% and labour productivity by 0.79%. Education happens to be the most successful commonly used measure of labour quality/skills, in the empirical estimations undertaken the improvement in education level of workers raises the productivity of firms in general but it doesn't bring about any additional gain to the labour-Intensive firms, rather it seems to lower it .An experienced worker brings the stock of knowledge and skills gathered over the years, which increases the technical efficiency of the firm itself, using age as a proxy for the experience its role is evaluated. The skills of the worker accrued though years of on the job experience seems to add higher to the productivity of the workers in labour intensive industries, it highlights the role of skills as a productivity driver.

### 5. Summary and Conclusion

In wake of the challenge of job creation associated with the a developing country like India, this paper makes an attempt to study the impact of increasing employment on contract basis and the role of skills on firm productivity. The need for studying the impact of contract employment arises due to the existence of multiple and restrictive labour laws in India, which have been critically evaluated over the years. Using the firm level data from Annual Survey of Industries and difference in difference methodology the paper quantifies the impact of increasing contract worker share and different aspects of labour quality on firm productivity. The aspects of labour quality explored in the paper include the education level and the age of the workers. This paper would help one to critically evaluate the direction on going labour reforms across the world in terms of rampant contractual employment.

The sub optimal investment in the job due to the lack of incentives on part of both employer and employee in case of contractual employment seems evident from the estimated coefficients, especially for the labour intensive industries where it might be difficult to substitute one worker

with the other. The role of skills in driving the productivity is evident for firms on an average, of various aspects of skills the two aspects explored in the paper are education and age (as a proxy to experience). The education of the worker whether technical or general raises the firm level productivity, while having a much more pronounced effect for labour productivity, thus one can conclude that education makes worker efficient. The age (experience) of the worker impacts labour intensive industries as the worker brings along with him the years of on the job accumulated experience. Based on the result one can conclude that the role of worker characteristics in firm productivity dynamics is immense and at the same time lack of tenure associated with permanent job acts a constraint to firm productivity.

Table 2: Econometric Results						
Dependent Variable	In Total Factor Productivity		In Labour Productivity			
	Specification I	Specification II	Specification III	Specification IV	Specification V	Specification VI
Share of CW in Total Workers	-0.0478***	-0.0484***	-0.0481***	-0.326***	-0.326***	-0.328***
	(0.0143)	(0.0142)	(0.0143)	(0.0172)	(0.0171)	(0.0172)
Labour Intensive x Share of CW in Total Workers	-0.0691***	-0.0689***	-0.0680***	-0.140***	-0.138***	-0.138***
	(0.0206)	(0.0206)	(0.0206)	(0.0261)	(0.0261)	(0.0261)
In Aggregate LQ Index	0.467***			0.794***		
	(0.0492)			(0.0564)		
Labour Intensive x In Aggregate LQ Index	-0.0203			-0.176		
	(0.101)			(0.119)		
In Education LQ Index		0.945***			1.588***	
		(0.0711)			(0.0820)	
Labour Intensive x In Education LQ Index		-0.660***			-0.648**	
		(0.175)			(0.216)	
In Age LQ Index			-0.634***			-0.947***
			(0.0934)			(0.101)
Labour Intensive x In Age LQ Index			0.814***			0.809***
			(0.111)			(0.123)
In Capital Labour Ratio	0.00115	-0.000519	0.00322			
	(0.0050)	(0.0050)	(0.0050)			
Urban	0.0124	0.0125	0.0119	0.0213*	0.0208*	0.0200*
	(0.0079)	(0.0079)	(0.0079)	(0.0091)	(0.0091)	(0.0091)
Exporting	0.0390***	0.0390***	0.0393***	0.0699***	0.0695***	0.0710***
	(0.0066)	(0.0066)	(0.0066)	(0.0080)	(0.0080)	(0.0080)
Constant	2.424***	0.193	7.624***	5.080***	1.350***	13.34***
	(0.245)	(0.342)	(0.439)	(0.282)	(0.398)	(0.421)
Observations	197491	197491	197491	197491	197491	197491
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.0509	0.0372	0.0384	0.0380	0.0385	0.0375
Corr(u_i,Xb)	0.1144	0.0702	0.0722	0.0529	0.0541	0.0511
F-Statistic	18.01***	41.42***	44.17***	88.19***	87.53***	89.78***

Standard errors estimated are clustered standard errors and are in parentheses \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Appendix I: Concordance table of KLEMS industries with National Industrial Classification-2008

KLEMS	Description (NIC & KLEMS)	NIC 2008
Code		
3	Food and Beverages and Tobacco	1010+ 1020+ 1030+ 1040+ 1050+ 1061+ 1062+
		1071+ 1072+ 1073+ 1074+ 1075+ 1079+ 1080+
		1101+ 1102+ 1103+ 1104+ 1200
4	Textiles, Textile Products and	1311+ 1312+ 1313+ 1391+ 1392+ 1393+ 1394+
	Leather and Footwear	1399+ 14101+ 14102+ 14103+ 14104+ 14109+
		1420+ 1430+ 1511+ 1512+ 1520+ 01632
5	Wood and Of Wood and Cork	1610+ 1621+ 1622+ 1623+ 1629
6	Pulp, Paper and Paper Products	1701+ 1702+ 11709+ 1811+ 1812+ 1820+ 5811+
	and Printing and Publishing	5812+ 5813+ 5819
7	Coke, Refined Petroleum and	1910+ 1920
	Nuclear Fuel	
8	Chemicals and Chemical Products	2011+ 2012+ 1013+ 2021+ 2022+ 2023+ 2029+
		2030+ 2100+ 2680
9	Rubber and Plastics	2211+ 2219+ 2220
10	Other Non-Metallic Mineral	2310+ 2391+ 2392+ 2393+ 2394+ 2395+ 2396+ 2399
11	Basic Metals and Fabricated Metal	2410+ 2420+ 2431+ 2432+ 2511+ 2512+ 2513+
	Products	2591+ 2592+ 2593+ 2599
12	Machinery, n.e.c.	2520+ 2750+ 2811+ 2812+ 2813+ 2814+ 2815+
		2816+ 2817+ 2818+ 2819+ 2821+ 2822+ 2823+
		2824+ 2825+ 2826+ 2229+ 3040+ 3311+ 3312
13	Electrical and Optical Equipment	2610+ 2620+ 2630+ 2640+ 2651+ 2652+ 2660+
		2670+ 2710+ 2720+ 2731+ 2732+ 2733+ 2740+
		2790+ 3250+ 3314+ 3319+ 3320+ 9512+ 9521
14	Transport Equipment	2910+ 2920+ 2930+ 3011+ 3012+ 3020+ 3030+
		3091+ 3092+ 3099+ 3315
15	Manufacturing n.e.c., Recycling	3100+ 3211+ 3212+ 3220+ 3230+ 3240+ 3290+ 3830

**Source:** Measuring Productivity at the Industry Level – The India KLEMS Database (accessible at https://rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=894)

**Appendix II:** Classification of NIC-08(2 digit) industries into Labour-intensive Industries and Capital-Intensive Industries

Labour Intensive Industries		Capital Intensive Industries		
NIC-08	Industry	NIC-08	Industry	
(2 Digit)		(2 Digit)		
12	Manufacture of tobacco products	10	Manufacture of food products	
13	Manufacture of textiles	11	Manufacture of beverages	
14	Manufacture of wearing apparel	17	Manufacture of paper and paper	
15	Manufacture of leather and related products	19	Manufacture of coke and refined petroleum products	
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	20	Manufacture of chemicals and chemical products	
18	Printing and reproduction of recorded media	21	Manufacture of pharmaceuticals, medicinal chemical and botanical products	
22	Manufacture of rubber and plastics products	23	Manufacture of other non-metallic mineral products	
25	Manufacture of fabricated metal products, except machinery and equipment	24	Manufacture of basic metals	
28	Manufacture of machinery and equipment n.e.c.	26	Manufacture of computer, electronic and optical products	
31	Manufacture of furniture	27	Manufacture of electrical equipment	
32	Other manufacturing	29	Manufacture of motor vehicles, trailers and semi-trailers	
33	Repair and installation of machinery and equipment	30	Manufacture of other transport equipment	

Source: Own Compilation

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