Working paper

Informality in the formal sector

Evidence from Indian manufacturing

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Informality in the formal sector: Evidence from Indian manufacturing[*]

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Abstract

The employment structure of India's organised manufacturing sector has undergone substantial changes over the last decade with a steep rise in the use of contract workers in place of regular workers. Much of the existing literature has attributed the widespread use of contract labour to India's rigid employment protection legislation. Using plant level data from the Annual Survey of Industries for the time period from 2000-01 to 2011-12, we find that in addition to labour market rigidities and the existence of a wage differential between contract and regular workers, firms have another important incentive to hire contract workers. Firms appear to be using contract workers to their strategic advantage against unionised regular workers to keep their bargaining power and wage demand in check. Importantly, the strength of this 'bargaining channel' varies across firms depending on their capital intensity of production, size and existing contract worker intensity. Further, we do not find contract workers to have an adverse effect on firm productivity, although their productivity appears to be lower than regular workers in some cases.

JEL classification: E24, J38, J41, J58

Key words: employment, wages, labour contracts, collective bargaining, labour productivity

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1. Introduction

Contrary to widespread perception, growth in the organised manufacturing sector has not been jobless over the last decade. Results from the Annual Survey of Industries (ASI) data report that total employment in the organised manufacturing sector increased from 7.7 million in 2000-01 to 12.9 million in 2011-12. Importantly, over half of this increase was accounted for by the increasing use of contract workers. The share of contract workers in total employment increased sharply from 15.7% in 2000-01 to 26.5% in 2011-12, while the share of directly employed workers fell from 61.1% to 51.5% in the same period. Furthermore, the average growth rate of contract employment at 10.90% has outstripped the growth of regular employment at 3.84% over the last decade. The increasing use of contract workers who can be fired easily, and do not enjoy fundamental benefits like health, safety, welfare and social security covered under different legislative provisions (such as Employees' Provident Fund and Miscellaneous Provisions Act 1952, the Employees' State Insurance Act 1948, the Workmen's Compensation Act 1923 and the Maternity Benefit Act 1961) reflects significant informalisation of the workforce and is indeed a matter of concern.

The objective of this study is two-fold. First, we attempt to examine what factors have driven contractualisation in organised manufacturing and second, we understand the implications of the increasing use of contract workers on firm productivity. More specifically, the pressing research questions that arise are: are the lower wages paid to contract workers and the savings made on the expenditure of worker benefits incentivizing firms to hire contract workers? Have trends in contractualisation varied across industries i.e. have firms across all industries witnessed contractualisation or has this phenomenon been witnessed only in certain specific industries? Is it the case that labour intensive industries witnessed greater contractualisation than capital intensive ones? Are contract workers indeed less productive than regular workers and does their presence in a firm's workforce drive down firm productivity. Using plant level data from the Annual Survey of Industries (ASI) for the time period from 2000-01 to 2011-12, we attempt to examine the relationship between the workers' wages, productivity and the extent of contractualisation in a firm.

Although, there exists a vast literature which attributes the widespread use of contract labour to India's rigid employment protection legislation, it is noteworthy that labour regulations have not become more rigid over the time period when contract worker intensity has surged. The argument that it is inflexible labour regulations alone which have incentivised firms to substitute regular workers with contract workers deserves closer scrutiny for several reasons. Our findings suggest, first, even states which made amendments to their labour laws to make them more amenable to employers have witnessed a sharp increase in contract worker usage. Second, it is capital-intensive and not labour-intensive industries, where pro-labour regulations hurt the most, which have seen a larger increase in contract worker usage. And finally, if firms were hiring contract workers only to circumvent legislations such as Industrial Dispute Act, we should have observed the highest intensity of contract worker usage across firms which hired less than 100 workers. However, the largest share of contract workers is in fact seen in firms hiring more than 300 workers. This reiterates the fact that

firms are clearly induced to hire contract workers for reasons other than rigidities in labour regulations. Further, we find that real wages of directly employed workers are on average about one and half times those of contract workers over the last decade. While this incentivises firms to employ contract workers, it is worth noting that the wage differential between contract and regular workers has fallen over the last decade. The growth rate of real wages of contract workers at 1.57% p.a. has exceeded that of regular workers at -0.40% p.a.

The fact that the period over which the share of contract workers increased over time coincided with the years which witnessed faster growth rate of contract wages relative to those of directly employed workers is puzzling. One possible explanation is that the presence of contract workers in a firm's workforce enables the firm management to curb the bargaining power of the regular workers and depress their wages. That access to an alternate competing workforce may result in depression of union wages of existing workforce has been discussed in the prevailing literature (Braun and Scheffel, 2007). Theoretically, one would expect that as wages of contract workers increase relative to those of regular workers, the share of contract workers in the total workforce would decline. But, when the wages of regular workers are determined by a bargaining process, wherein their bargaining power is curbed due to the presence of contract workers, firms have an additional incentive to hire these workers. By hiring more contract workers, the bargaining power of regular workers is reduced and consequently the wage differential between the two. Our empirical analysis using the plant level data from the ASI for the time period, 2000-01 to 2011-12, confirms this hypothesis. We also examine the effects of contractualisation on firm productivity and find that contract workers' productivity is lower than that of regular workers.

It must be clarified at the outset that ASI only provides data on organised manufacturing plants. In a scenario where 90% of the workers in the manufacturing sector are in the unorganised sector, it may be argued that it is inadequate to look at the organised sector alone. However, data on the unorganised sector is reported by the National Sample Survey Organisation's (NSSO) survey only once in five years. This lack of data comparable to the ASI forces most researchers to focus exclusively on the registered or organised sector. However, given that the objective of this paper is to understand factors driving the contractualisation and informalisation of the workforce in the organised sector, the focus on this sector is appropriate. While the ASI, provides us with a rich database to examine the causes and consequences of contractualisation, it does not provide details about the identities of contract workers- their demographics, educational background and the nature of their work. Therefore, we supplement our analysis with a case study of 222 industrial workers from three industrial in Delhi.

The structure of the paper is as follows. Section 2 presents a discussion of the existing literature on the contractualisation of India's workforce. Section 3 describes the data and key variables used in our analysis. Using this data, we present the important stylised facts on contract worker usage in India in Section 4. In Section 5, we further develop a model on firm-union bargaining which attempts to explain why firms choose to maintain this duality in the

workforce[4]. Section 6 outlines the empirical analysis using ASI plant level data and presents the results. Findings from the primary data analysis are discussed in Section 7. Section 8 presents the conclusions.

2. What Explains the Increasing Contractualisation of the Workforce?

The increasing use of contract workers in India's organised manufacturing has been a subject of much attention (Sood et al., 2014;Das et al., 2015 and Goldar and Suresh,2016).The widespread use of contract labour has been largely attributed to rigidities in India's employment protection legislation, in particular Chapter VB of the Industrial Disputes Act (IDA). In fact, it is largely because of the procedural difficulty of having to obtain prior government permission to lay off just one worker for plants covered by the IDA, that India's labour laws have been ranked stricter than those of all but two OECD countries (Portugal and Czech Republic)[5].SinceIDA applies only to 'permanent' workers/ directly employed by formal sector firms, and not to workers supplied by contractors (intermediaries) or workers employed on a 'temporary' basis, firms in the organised sector are incentivised to increasingly hire contract workers to circumvent rigidities in employment protection legislations[6]. The increasing use of contract workers has thus imparted considerable flexibility to the labour market (Sharma, 2006). There exists a vast empirical literature which has econometrically established that it is rigid labour regulations which have enhanced the use of contract workers (Fallon and Lucas, 1993; Sen et al.,2010; Ramaswamy,2013; Chaurey,2013 and Goldar and Suresh, 2016).

Although much of the discussion on the impact of labour market regulations on the contractualisation of the workforce has focused on the IDA, there is another critical legislation pertaining specifically to contract workers that needs to be discussed. This is known as the Contract Labour (Regulation and Abolition) Act of 1970 and applies to firms employing a minimum of 20 contract workers[7].As its name suggests, the Act intended to regulate and extirpate contract labour depending on the nature of the tasks they performed. In instances where contract workers were being used for perennial jobs and regular workers were doing the same job (whether the work is incidental or necessary for the industry etc.), the government has the power to prohibit the use of contract labour. Das et al. (2015) note that this Act was strengthened following the case of Air India Statutory Corporation Vs United Labour Union & Others (1996), during which the Supreme Court held that though there exists no express provision in the Act for absorption of employees in establishments where contract labour system is abolished by publication of the notification under Section 10(1) of the Act, the principal employer is under statutory obligation to absorb the contract labour. However, this was revoked in a subsequent turn of events led by the Supreme Court

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[4] It is a well-established in literature that there is a conflict in the objectives of firms and labour unions (Blair and Crawford, 1984). Firms aim to minimise the wage bill whereas labour unions try to maximise the wage bill for given demand for labour (Dunlop, 1944).
[5] OECD(2007)
[6] Dutta (2003), Ramaswamy (2003), Shyam Sunder (2011, 2012)
[7] Recently, some state governments have amended this Act making it applicable to establishments employing 50 contract workers.
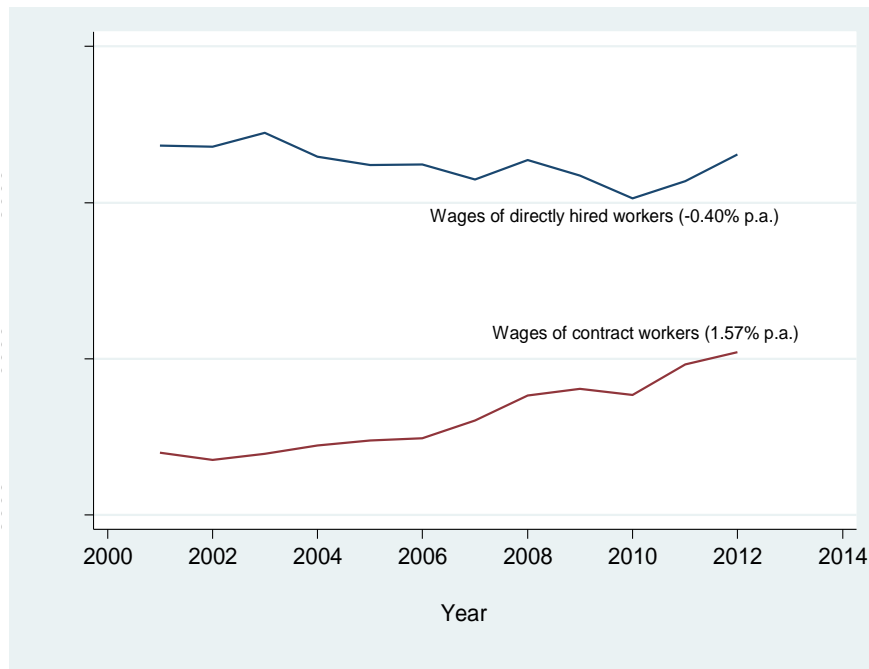
judgments in cases of the case of Steel Authority of India Ltd (SAIL) and Others versus the National Union of Waterfront Workers and Others (2001) which snapped the direct relationship between principal employer and contract labour as its employee.

Conventional wisdom suggests that the firm's decision to hire contract workers is primarily driven by the advantage of allowing establishments' access to a set of workers who can be fired easily. Nonetheless, firms have other incentives as well, to employ these workers. Significant amongst these are the lower wages paid to contract workers and the savings made on the expenditure of their worker benefits. The ASI data indicates that real wages of directly employed workers have on average been about one and half times those of contract workers over the last decade (Figure 1).Another important finding emerging from the recent studies on employment of contract workers in manufacturing is the role of import competition. Sen et al. (2010)[8] find that increased import competition has led to informalisation of industrial labour since the lower wages of informal workers and the savings made on the expenditure of worker benefits helps in reducing costs and thus improving competitiveness.

It is interesting to observe that the disparity in wages of regular and contract workers exists despite the fact that the Contract Labour Act requires wage parity between regular and contract workers. At the same time it is noteworthy that that the wage differential between contract and directly employed workers has fallen over the last decade. The ratio of wages of contract to directly employed workers increased from 0.63 to 0.76. The fact that the period over which the share of contract workers increased over time coincided with the period in which the wage rate of these workers actually grew faster than those of directly employed workers is indeed puzzling, and suggests that there may be other factors driving the contractualisation of the workforce.

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[8] The authors argue that import liberalization has a tendency to make the contract labour behave like an inferior input-its employment can go up when the price of the product falls. Employment of the regular workers will fall. But there is a countervailing effect as well; through a reduction in the wage rate of regular workers, employment of the regular workers might get a boost and will in turn tend to discourage contract employment. Nevertheless, it can be ascertained that if the final effect of import penetration on the level of contract employment is positive (i.e. the contract labour acting as inferior input), then the share of contract employment will also rise.

Figure 1: Changes in annual real wages for contract and regular workers by year

Wages of directly hired workers (-0.40% p.a.)

Wages of contract workers (1.57% p.a.)

Source: ASI unit level data

The presence of contract workers in a firm's workforce enables the management to curb the bargaining power of the regular, directly employed workers and thus depress the wages of directly employed workers. This argument has been discussed in Sen et al. (2010), Saha et al (2013) and Goldar et al (2016). That access to an alternate competing workforce may result in depression of union wages of existing workforce has been shown in the existing literature (Braun and Scheffel, 2007). The authors find erosion in the bargaining power of low-skilled unionised workers with increased labour outsourcing in Germany. The use of contract labour thus reduces labour cost directly and indirectly (Goldar, 2016). While the direct effect comes from the lower wages paid to contract workers, the indirect effect comes from the fact that the presence of contract labour reduces the bargaining strength and wages of regular workers.

Given that there are a number of factors other than labour regulations that explain increases in the contract worker intensity across the manufacturing sector, this study attempts to empirically understand the role of these issues, in particular the bargaining power channel. Much of the above mentioned literature (barring Chaurey, 2015 and Goldar, 2016) uses ASI's aggregate state-industry data and while these papers discuss the role of the lower wages paid to contract workers, they do not explicitly compute the wages or emoluments. They simply use minimum wages of the state as a proxy for wages of contract workers and estimate the effect of state minimum wages on the share of contract workers in a given industry in a state level. The use of the aggregate state-industry ASI data does not permit the computation of wages of contract and regular workers. A firm level analysis using micro-data is required to take this discussion forward, and this is what we attempt to do in this paper.

3. Data and variables

The data used in this analysis is from the ASI, the most comprehensive annual database on organised manufacturing in India[9]. We use ASI plant level data for the period from 2000-01 to 2011-12 to obtain an unbalanced panel of registered manufacturing plants. India's Central Statistical Organisation has recently made available factory identifiers which have allowed us to use plant level panel. The ASI database extends to the entire country. It covers all factories registered under Sections 2m(i) and 2m(ii) of the Factories Act, 1948 i.e. those factories employing 10 or more workers using power; and those employing 20 or more workers without using power. The ASI frame is based on the lists of registered factory/ units maintained by the Chief Inspector of Factories (CIF) in each state. The survey frame is divided into census and sample sectors, where the census sector includes larger plants. While, the definition of census and sample sectors has undergone some changes over the years, for the period under study in this paper it has remained fairly stable. From 2000-01, the definition of the census sector has included units employing 100 or more workers and all industrial units belonging to the five industrially less developed states (Manipur, Meghalaya, Nagaland, Tripura and Andaman & Nicobar Islands). From 2011-12, the census sector continued to include all factories employing 100 or more workers and all factories in six less industrially developed States/Union Territories(Manipur, Meghalaya, Nagaland, Tripura, Sikkim and Andaman & Nicobar Islands).

The ASI data provides information on output, value added, fixed capital, investment, materials, fuel, total persons engaged, workers and wages and salaries to all employees (directly employed workers, contract workers, supervisory and managerial staff and unpaid family workers).It also contains details about the type of ownership, the type of organisation, as well as the start year of each plant which allows us to calculate the age of the enterprise. The ASI reports the book value of plant and machinery both at the beginning and at the end of the fiscal year, net of depreciation. Our measure of capital in this study is the net value of plant and machinery at the end of the fiscal year. Two key variables of interest in our analysis are the wages of contract and directly employed workers. While these are not reported directly in the data, we compute these by dividing the wage bill to the two types of production workers by their respective number[10].

It is important to mention that there are three different industrial classifications used in the ASI dataset for the time period under study. For the surveys between 1998-99 and 2003-04 the industrial classification used was NIC-1998, between 2004-05 and 2007-08, it was NIC -2004 and 2008-09 onwards, it was NIC-2008. In this study, we undertake a concordance exercise across these different classifications to make the dataset comparable as per the NIC-2004 classification.

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[10]   ASI reports data on the total wage bill to contract and directly employed workers separately. It also provides data on total emoluments to the type of workers. However, this is available in a disaggregated manner only till 2007-08. Therefore, we use the former in this analysis.

The data collected from the ASI are at current prices and any analytical work requires deflating these variables. An obvious candidate for this is the wholesale price index (WPI) series. However, we cannot use the WPI as a deflator directly because while ASI follows the NIC classification of industries, WPI is constructed with a view to capturing price movements based on nature of commodities and final demand. Therefore, we construct a WPI for each of the industries in the analysis by approximating commodities based on the nature of economic activities and map NIC activities to WPI commodities[11]. To deflate wages, however, we use the Consumer Price Index of Industrial Workers (CPIIW).

The raw data consist of about 628,924observations over 12 years, with an average of about 52,400 plants surveyed each year. We only study observations corresponding to open plants (570,050) and plants with positive values of output, plant and machinery and total persons engaged. Table 1 shows that on average, 25% of the observations in each round have missing values for output, value added, plant and machinery or total persons engaged. Finally, we also drop the states and union territories of Jammu & Kashmir, Himachal Pradesh, Chandigarh, Delhi, Nagaland, Manipur, Tripura, Sikkim, Meghalaya, Arunachal Pradesh, Daman & Diu, Dadra & Nagar Haveli, Pondicherry, Lakshadweep, Goa and Andaman & Nicobar Islands due to lack of information on employment legislation. The final sample consists of 444,970plant-year observations in 19states.

Table 1: Share (%) of observations in each round which report missing values for output, value added, plant and machinery and total persons engaged.

Year	Total open firms	Percentage of firms which report missing values for output, value added, plant and machinery and total persons engaged
2000-01	32,034	35.19
2001-02	32,364	28.98
2002-03	31,911	26.34
2003-04	42,083	26.17
2004-05	36,091	24.04
2005-06	41,961	28.94
2006-07	42,872	29.74
2007-08	38,794	35.60
2008-09	37,437	29.51
2009-10	41,066	29.87
2010-11	33,937	4.58
2011-12	34,420	4.10

Source: ASI unit-level panel data

Since the focus of this analysis is contractualisation, it is important to mention that there are a large number of firms which report no contract workers (Table 2). Importantly, the number of firms reporting usage of contract labour has increased from 16.18% to 32.93% over the period under study. It is not clear whether the firms which reported missing contract workers systematically chose not to disclose contract worker usage to avoid complying with Contract Labour Act.

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[11] Capital is deflated using the WPI created for NIC 29.

Table 2:   Share (%) of observations in each round which report no contract workers

Year	Total open firms	Percentage of firms which report no contract workers
2000-01	32,034	83.82
2001-02	32,364	81.18
2002-03	31,911	79.86
2003-04	42,083	79.67
2004-05	36,091	77.84
2005-06	41,961	77.89
2006-07	42,872	76.84
2007-08	38,794	78.85
2008-09	37,437	77.24
2009-10	41,066	77.17
2010-11	33,937	67.63
2011-12	34,420	67.07

Source: ASI unit-level panel data

An additional problem in the ASI data is the presence of a large number of outliers. To reduce their influence in our estimates, we "winsorise" the data, following Dougherty et al. (2013). This procedure essentially involves top-coding and bottom-coding the 1% tails for each plant-level variable. In other words, for each year and each variable we replace outliers in the top 1% tail (bottom 1% tail) with the value of the 99th (1st) percentile of that variable.

Next, we turn to the variables which are not obtained from the ASI database. Quantifying differences in labour market regulations (LMR) across states is a contentious subject in the existing literature and much of the existing literature relies on the Besley-Burgess index (2004). This index summarised state-level amendments to IDA between 1958 and 1992[12]. Each amendment was coded as a 1, -1, or 0 depending on whether the amendment in question is deemed to be pro-worker, pro-employer, or neutral. The scores were then cumulated over time with any multiple amendments for a given year coded to give the general direction of change. On the basis of these scores, states were classified as having flexible, neutral or inflexible labour regulations. Despite the extensive use of the Besley-Burgess index in the literature, it has been heavily criticised. Bhattacharjea (2006, 2009) claims that the Besley-

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[12]   After 1992, there has been very limited major state level amendment activity except in three cases, namely, Gujarat, Uttar Pradesh and Andhra Pradesh. Gujarat in March 2004 amended the IDA as applied to Gujarat by amending section V-D that said chapters V-A and V-B are not applicable to establishments declared to be in SEZ (special economic zones) by the Government of India. This amendment takes worker termination in an SEZ out of the purview of industrial dispute definition as defined by IDA. However such establishments are required to give one month notice and a compensation of 45 days' pay for every year of continuous service. Andhra Pradesh in August 2003 amended the Contract Labour Regulation and Abolition (CLRA) Act of 1970 by permitting employment of contract labour in a host of activities that are not considered to be core activity of an establishment. Uttar Pradesh amended the IDA in 2002 by changing the threshold for retrenchment from 300 workers to 100 workers thereby bringing the state's IDA in line with the central amendment of 1982 (Ramaswamy, 2013).In 2014, Rajasthan passed changes which reduces the applicability of the Factories Act to units with more than 20 workers with power and 40 without power (down from the existing norm of 10 and 20 workers respectively); of the Contract Labour Act (CLA) to companies with more than 50 workers (from the current 20); and of the Industrial Disputes Acts (IDA) to factories employing 300 workers (up from the current 100).
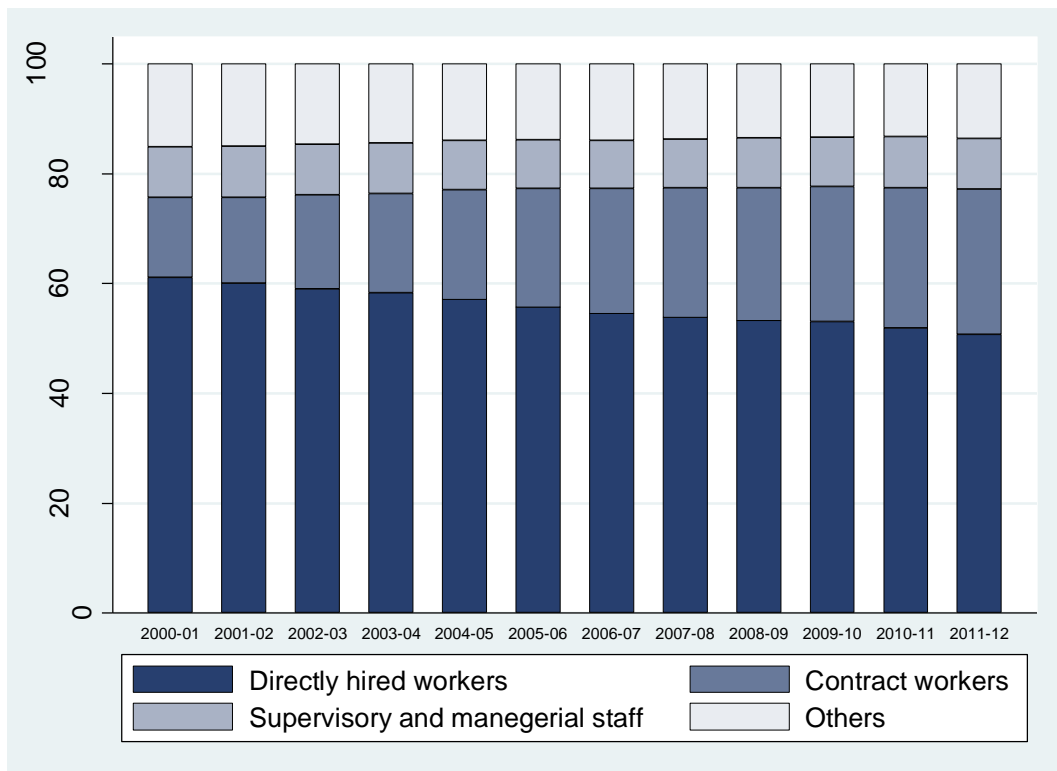
Burgess scoring system can erroneously classify a state as pro-employer or pro-worker with just one or two amendments to the IDA in the 50 years covered by the index. Nagaraj (2004) points out this index focuses only on IDA, abstracting from several other laws which are responsible for inflexibilities in the labour market. Given these concerns, the measure of LMR used in this paper is from a study by Gupta et al. (2009). They have developed a composite measure of LMR across states by combining information from three key studies- Besley and Burgess (2004), Bhattacharjea (2008), and OECD (2007). While the BB measure relies on amendments to the IDA as a whole, Bhattacharjea's measure focuses exclusively on Chapter VB of the IDA. This section deals with the requirement for firms to seek government permission for layoffs, retrenchments, and closures. Bhattacharjea considers not only the content of legislative amendments, but also judicial interpretations to Chapter VB in assessing the stance of states vis-à-vis labor regulation. The OECD study is based on a survey of experts and codes progress in introducing changes in recent years to not only regulations dealing with labor issues, but also the relevant administrative processes and enforcement machinery. The regulations covered by the survey go well beyond the IDA and include the Factories Act, the Trade Union Act, and Contract Labour Act among others. On the basis of this composite index, states are classified as having flexible, neutral and inflexible assigning scores of 1, 0 and -1[13]. There are two other important variables which are used as instrumental variables in our empirical analysis- minimum wages and absenteeism rates of directly employed workers. Minimum wage rates are set by respective state government and vary across states over time. Data on both variables is obtained from the Labour Bureau, Ministry of Labour and Employment.

4.   Key stylised facts on contract worker usage

Over the first decade of the 21st century, contractual workers have steadily substituted directly employed workers in the organised manufacturing sector. Figure 2 shows the secular increase in contract worker usage over the years. Employment in the organised sector increased by 6.67 million over this period and 43.7 % of this increase in employment came from the organised sector. However, such aggregate statistics may conceal underlying disaggregated trends. Therefore, it is imperative to analyse how contract worker usage has varied across different states, industries and firm sizes.

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[13]   Andhra Pradesh, Rajasthan, Tamil Nadu, UP, Uttarakhand and Karnataka are classified as having flexible labour regulations. Maharashtra, Orissa and West Bengal are classified as having inflexible labour regulations. Assam, Bihar, Jharkhand, Gujarat, Haryana, Kerala, Madhya Pradesh, Chhattisgarh and Punjab are classified as the neutral states.

Figure 2: Composition of workforce in organised manufacturing sector

Source: ASI unit-level panel data

a. All states witnessed an increase in use of contract workers

Table 3presents the share of contract workers across states in the organised manufacturing sector in 2000-01 and 2011-12. While there is significant variation in the shares of contract workers across states, it is worth noting that all states witnessed an increase in the share of contract workers. The states which witnessed the largest rise in the shares of contract workers are—Bihar, Uttaranchal, West Bengal and Maharashtra. Interestingly, besides Bihar, the other two states are classified as having inflexible regulations. It is worth noting that even the states classified as having flexible regulations (Rajasthan, Uttar Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu) witnessed sharp increases in contract workers intensity.
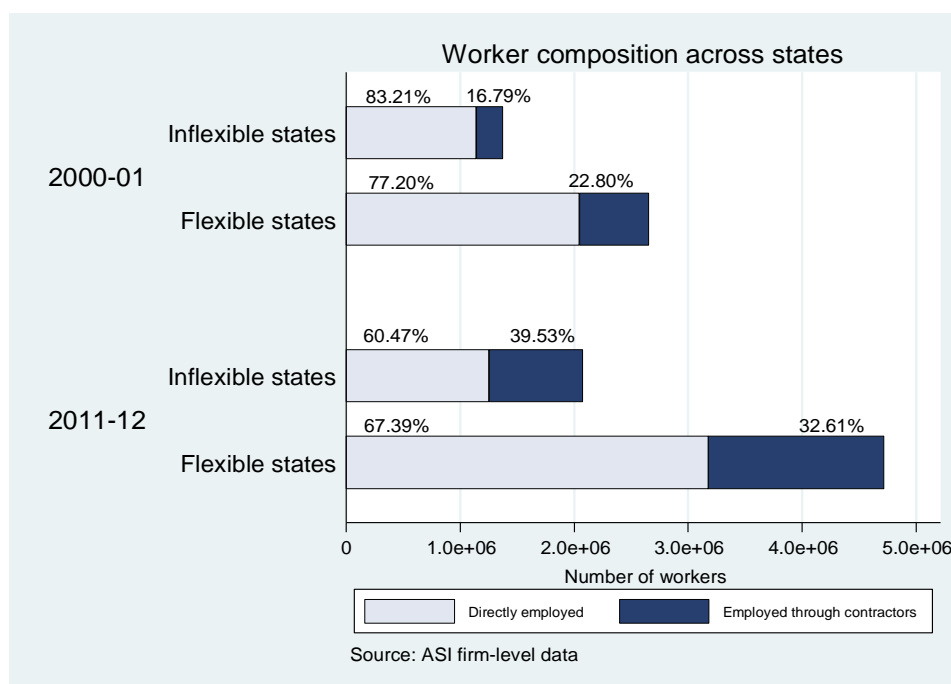
Table 3:   Share (%) of contract workers in total workers by state

State	Share of contract workers in total workers by state (%)	
	2000-01	20011-12
Punjab	16.46	28.68
Uttaranchal	21.22	51.87
Haryana	30.26	50.35
Rajasthan	22.73	37.18
Uttar Pradesh	25.21	38.59
Bihar	38.24	67.90
Assam	7.22	20.97
West Bengal	10.52	33.06
Jharkhand	12.40	31.69
Orissa	28.74	48.16
Chhattisgarh	24.80	44.65
Madhya Pradesh	23.55	34.30
Gujarat	26.91	35.08
Maharashtra	18.84	40.68
Andhra Pradesh	44.88	48.33
Karnataka	11.30	21.92
Kerala	4.16	14.55
Tamil Nadu	8.03	19.54

Source: ASI unit-level panel data

If it was only stringent labour regulations driving the contractualisation of labour, we would have witnessed greater contractualisation across those states which have more inflexible labour regimes and little or no contractualisation in states with flexible labour regimes. However, the above table indicates that this is indeed not the case. If we classify states into two categories i.e. flexible and inflexible states on the basis of the Gupta et al(2009) index (Graph A), we find that the shares of contract workers in total workforce has increased, while that of directly employed workers has fallen in both categories. Remarkably, the increase in share of contract workers has been larger for flexible states than inflexible states, while the decline in shares of directly employed workers has been smaller for flexible states.

Figure 3: Share (%) of different workers across states and years

Worker composition across states

Source: ASI unit-level panel data

b. Capital intensive industries have seen a larger increase in contract worker usage

Table 4 shows the share of contract and directly employed workers across industries at the beginning and end of the decade. Clearly, there has been an increase in usage of contract workers across industries. What stands out, however, is that the industries where contract worker intensity increased the most are in fact capital intensive industries[14]. The two industries which witnessed particularly large increase were NIC 34(Manufacture of motor vehicles, trailers & semi-trailers) and NIC 35 (Manufacture of other transport equipment).Since labour intensive industries are more constrained by labour regulations, and capital intensive industries require relatively more skilled workers, one would have expected to see greater increase in contract worker intensity in these industries. But, this does not appear to be the case (Figure 4), reinforcing the possibility that there are factors other than labour regulations driving contractualisation.
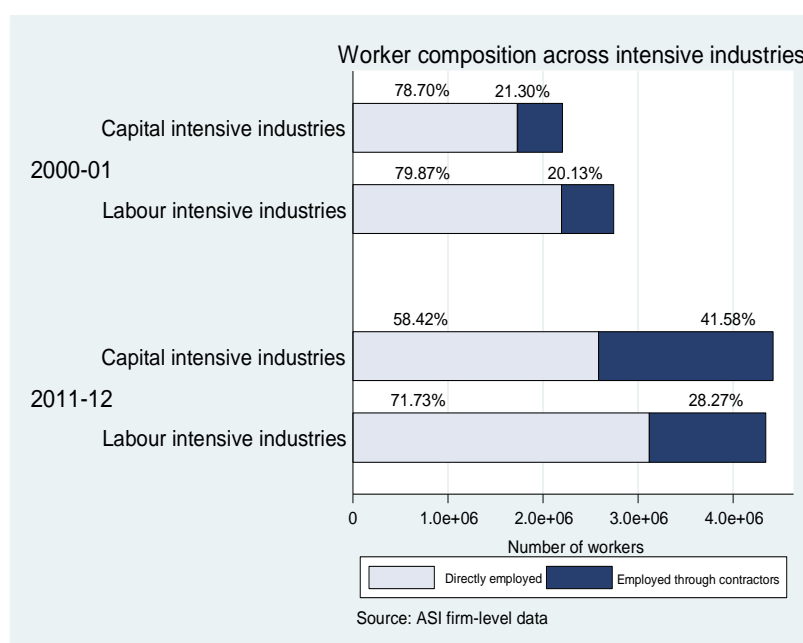
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[14] Capital intensity is defined as the ratio of real net value of plant and machinery to total workers (both directly employed and employed through contractors). In order to classify industries as labour or capital intensive, we calculate the labour intensity for all industries in the organised manufacturing sector for every year from 2000-01 to 2011-12.An industry is classified as labour intensive if its capital intensity is below the median value for the manufacturing sector throughout the decade. Similarly, an industry is classified as capital intensive if its capital intensity is above the median value for the manufacturing sector throughout the decade. The remaining industries are classified as ambiguous. The industries with following NIC are classified as labour intensive: 16, 17, 18, 19, 20, 28, 29, 33, 35 and 36. Capital intensive industries include industries with NIC 21, 22, 23, 24, 25, 26, 27, 30, 32 and 34. The remaining industries are classified as ambiguous.

Table 4: Share (%) of contract workers in total workers by industry

NIC	Industry	2000-01	20011-12
15	Mf of food products and beverages	20.54	30.94
16	Mf of tobacco products	63.44	65.51
17	Mf of textiles	9.17	14.21
18	Mf of wearing apparels; dressing and dyeing of fur	5.78	15.18
19	Tanning and dressing of leather; Mf of luggage, handbags saddlery, harness and footwear	18.83	19.48
20	Mf of wood and of products of wood and cork, except furniture; Mf of articles of straw and plaiting materials	9.39	24.60
21	Mf of paper and paper products	21.94	27.34
22	Publishing, printing and reproduction of recorded media	5.71	22.67
23	Mf of coke and refined petroleum products and nuclear fuel	19.23	42.65
24	Mf of chemicals and chemical products	20.12	39.36
25	Mf of rubber and plastic products	13.28	30.45
26	Mf of other non-metallic mineral products	33.07	57.31
27	Mf of basic metals	23.56	44.24
28	Mf of fabricated metal products, except machinery and equipment	27.70	45.13
29	Mf of machinery and equipment n.e.c.	10.77	33.87
30	Mf of office, accounting and computing machinery	46.40	49.60
31	Mf of electrical machinery and apparatus n.e.c.	12.64	38.42
32	Mf of radio, television and communication equipment and apparatus	9.40	32.52
33	Mf of medical, precision and optical instruments, watches and clocks	5.34	19.39
34	Mf of motor vehicles, trailers and semi-trailers	11.55	44.65
35	Mf of other transport equipment	12.57	48.25
36	Mf of furniture; manufacturing n.e.c.	15.17	24.17

Source: ASI unit-level panel data

Figure 4: Share (%) of different workers across industries and years
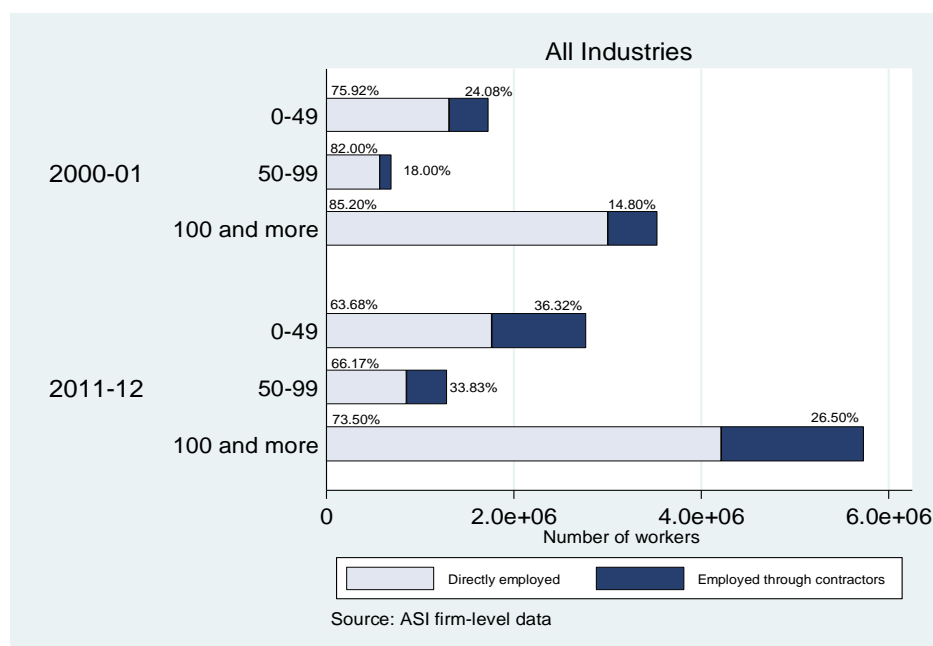

Source: ASI firm-level data

Source: ASI unit-level panel data

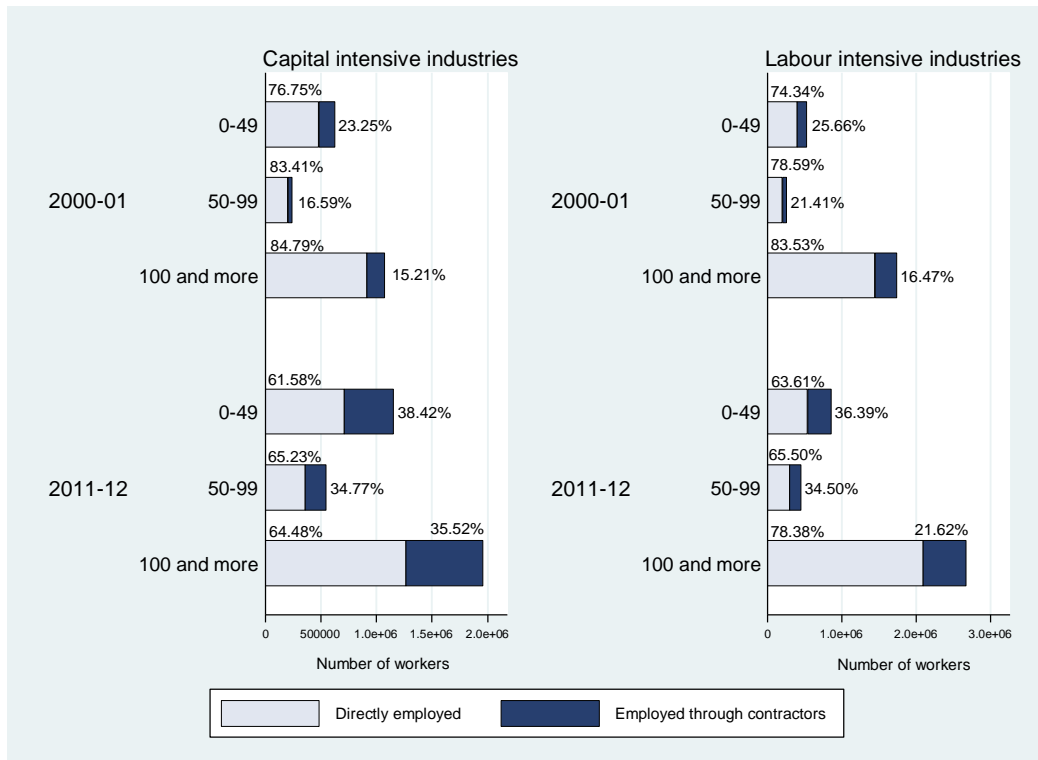### c. The use of contract labour has spread, especially across large firms

Next, we examine the intensity of contract worker usage across firms of different sizes at the beginning and end of the decade. We divide firms into three bins on the basis of number of workers—0 to 49, 50-99, 100+ workers and find that the share of contract workers in total workforce has increased across all size bins. The firms in the 100+ category have seen the largest increase in contract worker intensity (Figure 5). If firms were hiring contract labour only to circumvent legislations such as IDA, we should have observed highest intensity of contract worker usage in the bin of firms hiring 50-99 workers, just below the threshold where Chapter VB of IDA kicks in. This lends credence to the fact that firms are induced to hire contract workers for reasons other than rigidities in labour regulations. In fact, when we disaggregate labour and capital intensive firms in these three size bins separately, we find that it is large capital intensive industries which have become increasingly reliant on contract labour (Figure 7). This is indeed contrary to what we expect. Furthermore, we find that large capital intensive firms expanded via contract workers in both states with flexible and inflexible labour regulations. On the other hand, large labour intensive firms have done so more in states with inflexible regulations as compared to states with flexible labour regulations. This suggests that labour and capital intensive firms may well be driven by different motivations to increase contract worker intensity.

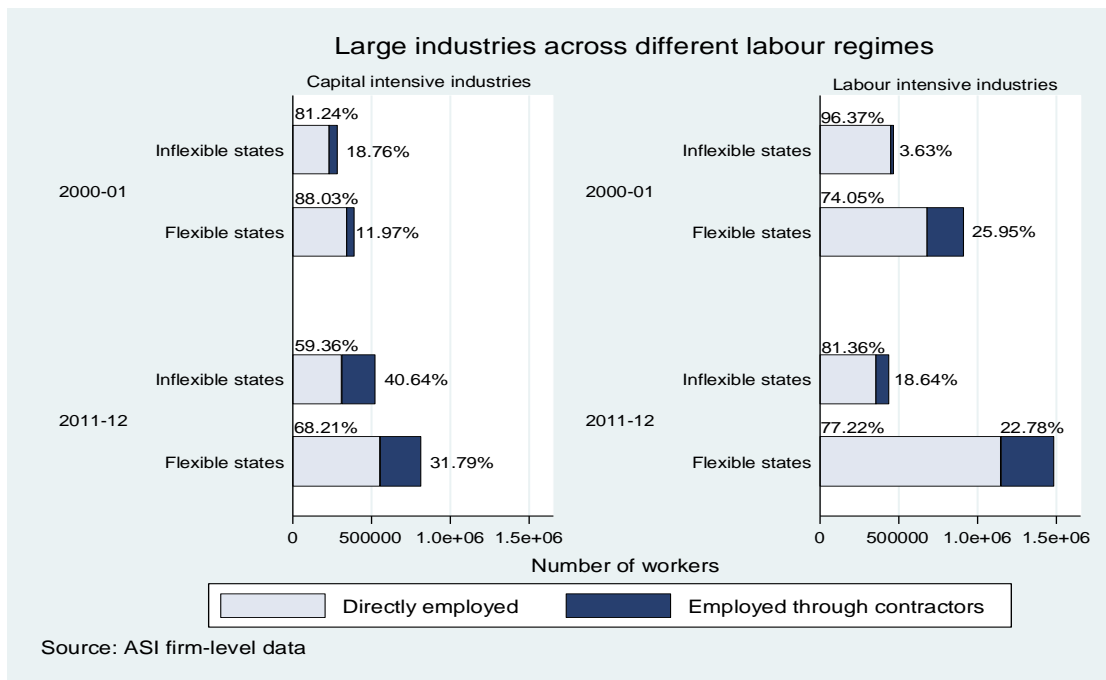Figure 5: Share (%) of different workers across firms of different sizes

Source: ASI unit-level panel data

Figure 6: Share (%) of different workers across firms of different sizes and labour intensity

Source: ASI unit-level panel data

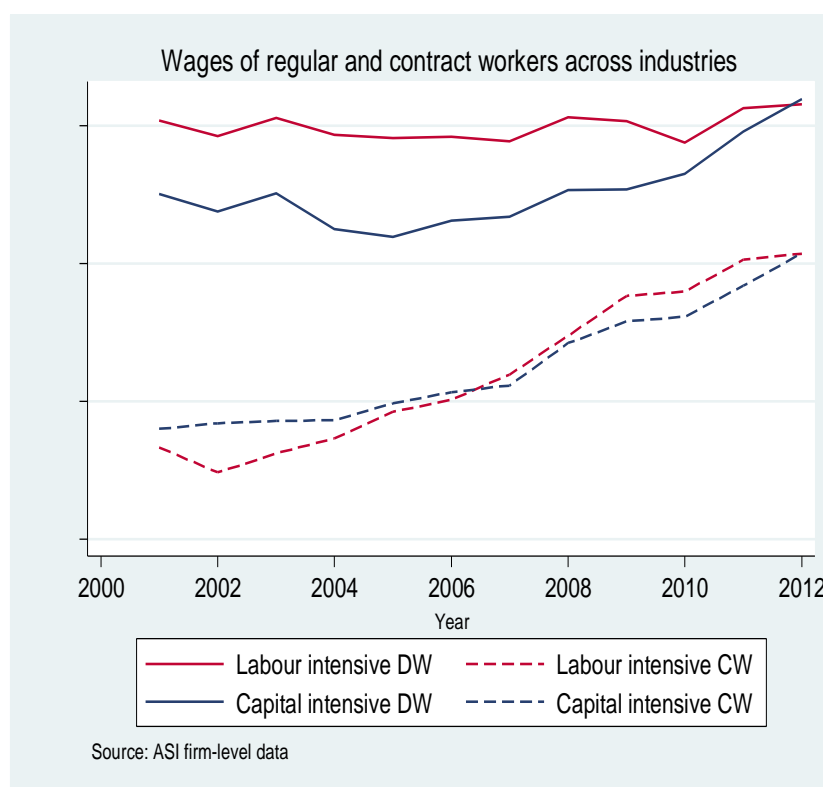Figure7: Share (%) of different workers across firms of different sizes and industries

Source: ASI unit-level panel data

d. Wages of contract workers are significantly lower than those of regular workers

As discussed in Section 2, the wages of contract workers are significantly lower than those of regular workers, although the wage differential between the two has narrowed with wages of contract workers growing faster than those of directly employed workers. The wage differential has narrowed in both labour and capital intensive industries (Figure 8). The wage gap was larger to begin with in labour intensive industries, and declined more rapidly as compared to capital intensive industries, where the wage gap virtually stopped declining after 2008. Moreover, wages paid to directly employed workers in labour intensive industries were higher than those paid to directly employed workers in capital intensive industries, with the difference disappearing in 2011-12. The wages paid to contract workers in the two types of industries though has been roughly similar over the time period.

Figure 8: Real wages (in Rs) of different workers across different industries

Source: ASI unit-level panel data

Next, we examine the wage differential between contract and regular workers across different sized firms. Here the wage differential appears to have narrowed only in large firms. For both small and medium sized firms, the gap has remained relatively constant over time. Contract wages in small and medium firms have been roughly similar over the decade, although the wages paid to directly employed workers in the latter have been higher than those in the former (Figure 9).

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Figure 9: Real wages (in Rs) of different workers across different firm sizes

Wages of regular and contract workers across industries

Legend:
- Large DW
- Medium DW
- Small DW
- Large CW
- Medium CW
- Small CW

Source: ASI firm-level data

Source: ASI unit-level panel data

We also examine the wage differential between contract and regular workers across industries (Table 5). As is evident, wage ratios between contract and regular workers have a wide spread, though in most cases less than one. A few industries stand out though, namely-manufacturing of textiles, manufacturing of wearing apparels; dressing and dyeing of fur, Tanning and dressing of leather; manufacturing of luggage, handbags saddlery, harness and footwear, and Mf of wood and of products of wood and cork, except furniture; manufacturing of articles of straw and plaiting materials as the wages paid to contract workers are in fact higher than those paid to regular workers. This may be a result of contract workers having some special skills or performing some specific tasks as compared to regular workers. The proportion of firms where contract workers receive higher wages compared to regular workers, which indicates specialisation, range from 13% in the Food industry, 19% in Textiles, 5% in Chemicals, 17% in Basic Metals, 8% in the Motor Vehicles, and 10% in rubber, wood and paper. We also observe that across most industries, the ratio of wages of contract workers to regular workers has increased.

Table 5:   Ratio of contract to regular wages by industries

NIC2digit	2000-01	2011-12
15	0.72	0.87
16	0.67	0.52
17	0.81	1.06
18	1.25	1.01
19	1.01	0.99
20	1.03	1.06
21	0.62	0.78
22	0.54	0.59
23	0.25	0.45
24	0.49	0.60
25	0.69	0.81
26	0.59	0.60
27	0.51	0.50
28	0.55	0.72
29	0.50	0.63
30	0.96	0.61
31	0.41	0.56
32	0.43	0.70
33	0.50	0.71
34	0.41	0.52
35	0.63	0.68
36	0.80	0.82

Source: ASI unit-level panel data

5.   Theoretical framework

Bargaining models have often been used in the literature for explaining negotiations between firms and labour unions. Several studies utilise efficient bargaining models which use the Nash bargaining framework to determine wage and employment outcomes (McDonald and Solow, 1981). Other frequently used bargaining models are monopoly union model, also called `right to manage' model (Oswald, 1982) and Rubinstein's sequential bargaining model[15] (Fernandez and Glazer, 1989). Most of these are limited to situations where all workers hired by the firm are unionised. However, in the Indian scenario described above, the existence of dualism in the nature of contracts and the partial unionisation of the workforce may result in different outcomes. Sen et al. (2010) explore this issue in their study. They suggest that besides other factors, the inherent feature of the bargaining structure might be pivotal in determining the wage gap between regular and contract workers. In this section, we use the efficient bargaining model in an attempt to understand this wage differential.

The firm

We consider a representative firm which uses two types of inputs: labour, L, and other inputs (such as capital, technological innovation, research etc.), I, to produce output, Y. We assume labor and intermediate inputs vary in the short run. The production function is given as:

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[15]   The efficacy of some these bargaining have been often debated and discussed in the literature (Fanti and Gori, 2013).

$$Y = Y(L_d, L_c, I)$$

where, L_d represents directly hired workers; L_c, workers hired through contractors and Y is twice differentiable concave function in its arguments. For simplicity we take a Cobb-Douglas production function.

$$y = AL_d^\eta L_c^\gamma I^\beta$$

Output elasticity of directly hired workers, workers hired through contractors and other inputs are given by η, γ and β respectively. A is the total factor productivity. The total labour used by the firm is the sum of all workers hired by the firm, $L_d + L_c = L$. In the short-run, the firm operates in perfectly competitive markets for output and workers hired through contractors. Therefore, output price and cost of contract workers are taken to be fixed at p andw_c, respectively. Wages of directly hired workers are given by w_d and without loss of generality, we assume$(w_d \geq w_c)$and$(\eta \geq \gamma)$. The firm's short-run profit, π is characterised by

$$\pi(L_d, L_c) = pAL_d^\eta L_c^\gamma K^\beta - w_d L_d - w_c L_c - rI$$

For simplicity, we normalise output prices such that p =1.

Labour union

Further, we assume that all directly hired workers are represented by a trade union whose objective is to maximise the welfare of its members by increasing their wages. Wages of directly hired workers are determined through negotiations between the firm and the union. Wage paid to the contract workers is the reservation wage for directly hired workers. The resulting objective function, *U* of the trade union can be expressed using the following.

$$U(L_d) = (w_{d-}w_c)L_d$$

The bargaining problem

The wage of the directly hired workers is fixed through bargaining between the firm and the union where the ex-ante relative bargaining power of the firm is given by α and $0 \leq \alpha \leq 1$. As mentioned before, there exists an asymmetry in the objectives of the firms and the union. In particular, the firm's objective is to maximise its profit, π whereas union aims to maximise the wage bill of the directly hired workers.Contract workers can be hired in place of directly hired workers. However, they may not perfect substitutes due to possible differences in productivity.

We use the Nash bargaining framework to express our firm-union bargaining problem. In this set up, firms and union bargain over the number of workers to be hired directly and their wages.

$$\arg\max_{L_d, L_c} \varphi(L_d, L_c) = \pi(L_d, L_c)^\alpha U(L_d)^{(1-\alpha)}$$

$$\Rightarrow \arg\max_{L_d, L_c, I} \varphi(L_d, L_c) = (AL_d^\eta L_c^\gamma I^\beta - w_d L_d - w_c L_c - rI)^\alpha ((w_{d-}w_c)L_d)^{(1-\alpha)}$$

Differentiating with respect to L_d, we get the following first order condition.

$$\frac{\partial\varphi}{\partial L_d} = \alpha(\eta AL_d^{\eta-1}L_c^\gamma I^\beta - w_d)(w_{d-}w_c)L_d + (1-\alpha)(w_{d-}w_c)(AL_d^\eta L_c^\gamma I^\beta - w_d L_d - w_c L_c$$
$$- rI) = 0$$

$$\Rightarrow \alpha(\eta AL_d^\eta L_c^\gamma I^\beta - w_d L_d) + (1-\alpha)(AL_d^\eta L_c^\gamma I^\beta - w_d L_d - w_c L_c - rI) = 0 \qquad (1)$$

Likewise, differentiating with respect to L_c and I, we get the following.

$$\frac{\partial\varphi}{\partial L_c} = \left(\gamma AL_d^\eta L_c^{(\gamma-1)}I^\beta - w_c\right)(AL_d^\eta L_c^\gamma I^\beta - w_d L_d - w_c L_c - rI)^{(\alpha-1)} ((w_{d-}w_c)L_d)^{(1-\alpha)} = 0$$

$$\Rightarrow AL_d^\eta L_c^\gamma I^\beta = \frac{w_c L_c}{\gamma} \qquad (2)$$

and, $L_c^* = \left(\frac{A\gamma L_d^{*\eta}}{w_c}\right)^{\frac{1}{1-\gamma}}$

$$\frac{\partial\varphi}{\partial I} = \left(\gamma AL_d^\eta L_c^\gamma I^{(\beta-1)} - r\right)(AL_d^\eta L_c^\gamma I^\beta - w_d L_d - w_c L_c - rI)^{(\alpha-1)} ((w_{d-}w_c)L_d)^{(1-\alpha)} = 0$$

$$\Rightarrow AL_d^\eta L_c^\gamma I^\beta = \frac{rI}{\beta} \qquad (3)$$

Using (2) and (3) we further obtain $rI = \frac{\beta}{\gamma}w_c L_c$ (4)

Substituting (2) and (4) in (1), we obtain

$$\left(\frac{\eta\alpha}{\gamma}\right)w_c L_c + (1-\alpha)\left(\left(\frac{1}{\gamma}\right) - 1 - \left(\frac{\beta}{\gamma}\right)\right)w_c L_c - w_d L_d = 0$$

Rearranging this further,

$$\frac{L_c}{L_d} = \frac{\gamma}{(\eta\alpha + (1-\gamma-\beta)(1-\alpha))\frac{w_c}{w_d}}$$

The ratio of contract workers to regular workers, $\left(\frac{L_c}{L_d}\right)$ is inversely related their wage ratio $\left(\frac{w_c}{w_d}\right)$ if and only if $\left(\eta\alpha + (1-\gamma-\beta)(1-\alpha)\right) > 0$. This relation holds when $\beta + \gamma \le 1$. In other cases, there exists a critical value of α, $\alpha^c \equiv \alpha < \frac{\gamma-1}{\eta+\gamma-1}$, below which the ratios are positively related to each other. That is, if a firm's bargaining power falls below a certain threshold, in order to regularise union's say, they start hiring more contract workers relative

to regular workers even when wages of contract workers increase vis-à-vis their regular counterparts.

Therefore although it is expected that when w_d declines L_d must increase, data indicates that this may not be the case. *Ceteris paribus,* any fall in the negotiated L_d decreases the share of unionised labour, diminishing union's bargaining power $(1 - \alpha)$. Even a fall in the monetary wages of the regular workers may not be a sufficient incentive for firms to hire them as due to stringent regulations, it is not easy for firms to disengage these workers, once employed.

6. Empirical strategy

The main objective of this study is to understand what induces firms in the organised sector to hire contract workers. While we take advantage of the state-level variation in labour regulation, we also extend our analysis to incorporate the wage differential between contract and directly employed workers. Our basic assumption is that it is not labour market rigidities alone which are driving contractualisation of the workforce, but also the fact that contract workers receive lower wages helping firms reduce their wage bill and the fact that they help the firm's management diminish the bargaining power of regular workers. The basic specification proposed to evaluate this is as follows:

$$\ln\left(\frac{CW}{TW}\right)_{fist} = \theta_0 + \theta_1 Time + \theta_2 LMR_s + \theta_3 \left(\frac{W_c}{W_d}\right)_{fist} + \theta_4 Age_{fist} + \varepsilon_{fist} \tag{4}$$

CW/TW is the ratio of contract workers to total workers in factory *f* in industry *i* in state *s* at time *t*. LMR is the state level index of labour market regulations. These are time invariant and state specific. W_c and W_d are the average wage rates paid to contract and regular workers respectively. We also control for the age of the factory-a time variant plant specific characteristic. We include industry fixed effects, but refrain from using year-fixed effects as we introduce time trend, *T*, in the specification. Industry fixed effects control for industry specific factors which may influence the ease of substitution between contract and regular workers. As discussed in the previous section, given that the wage differential between contract and regular workers, and the share of contract workers are determined jointly through an equilibrium mechanism and there exists an endogeniety problem[16], the above equation cannot be estimated using the ordinary least squares. To address endogeneity concerns, we use Instrumental Variable estimation in our analysis. The instruments should be such that it is highly correlated with the endogenous variables, but uncorrelated with the error term. We introduce two instruments here. The first is the minimum wages in the state. The minimum wage rate[17] in a state is highly correlated with the wages of contract workers.CLA mandates/stipulates that wages of contract workers must not be lower than the prescribed

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[16] Intuitively, the endogeneity can be explained as follows: When contract workers become more expensive relative regular workers increase (i.e. the ratio of wages of contract to directly employed workers increases), we expect to see a fall in the share of contract workers. However, this decline in the share of contract workers in the firm's workforce results in an increase in the bargaining power of regular workers, resulting in an increase in their wages and consequently a decline in the ratio of the wages of contract to directly employed workers.

[17] These wages are determined by respective state governments and vary across states and over time.

minimum wage. Thus, minimum wages are expected to set the floor for the wages paid to contract workers. Much of the existing literature on contractualisation has used minimum wages of contract workers as a proxy for contract worker wages. The other instrument is the rate of absenteeism of directly employed workers. Absenteeism rates represent the percentage of man-days lost due to absence to the corresponding total man-days scheduled to work[18]. Absenteeism is defined as the failure of a worker to report for work when he is scheduled to work. A worker is considered scheduled to work when the employer has work available for him and the worker is aware of it (authorised absence is also treated as absence while presence even for a part of the shift is treated as presence for whole shift). Absence on account of strikes, lockout, layoff, weekly rests or suspension is not taken into account. Thus, it relates to only voluntary absence due to personal reasons of the individual concerned and not factors endogenous to the labour regulatory regime of the state. Higher values of absenteeism rates reflect higher value of bargaining power of workers in question. They capture the bargaining power of directly employed workers and therefore serve as a suitable instrument for wages of directly employed workers.

Table 6 reports the estimates of equation 1. The first column reports the results for all firms hiring contract workers for the period under study. Unsurprisingly, the coefficient on LMR is negative and statistically significant suggesting that plants in states with more flexible labour regulations have lower shares of contract workers. Importantly, we find that the coefficient on the log of the ratio of wages of contract to directly employed workers to be positive and statistically significant. Typically, one would expect the sign on this coefficient to be negative as the share of contract workers in the plant's workforce declines as contract workers become relatively more expensive. In a partial equilibrium analysis, where the wages of regular workers are not a function of the share of contract workers, we would expect that as wages of contract workers increase relative to those of regular workers, the share of contract workers in total workforce should decline. However, in the given scenario, the net effect of the wage differential on the share of contract workers depends on two channels- the bargaining channel and the price channel (the fact that we would substitute more expensive regular workers with cheaper contract workers). The positive sign on the wage differential suggests that the bargaining effect overwhelms the price effect and despite the rising relative wages of contract workers, firms continue to hire them as they help the management suppress the bargaining power of regular workers.

Column 2 reports the results of the regression for capital intensive industries separately. Here too we find the coefficient on LMR to be negative and statistically significant, and on the wage differential to be positive and statistically significant. For labour intensive industries reported in Column 3, we find the coefficient on the wage differential to be statistically insignificant, though on LMR it is negative and statistically significant. This reflects the fact that for labour intensive industries, circumventing rigidities in labour regulations is the main motivation behind hiring contract workers and the existence of a wage differential between the two types of work has no significant effect on the share of contract workers. Next, we

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[18] The man-days scheduled to work are arrived at by adding the man-days actually worked and the man-days lost on account of absence of the workers due to some reason or the other.

breakdown firms by size i.e. small (those having total employment of less than 20), medium (those having total employment between 20 and 99) and large (those having total employment greater than 100) firms. In the case of small firms (Column 4), we find the coefficient on the wage differential and labour market regulations to be statistically insignificant. This is unsurprising, as we would not expect to witness the bargaining effect or the effect of labour regulations to play out in such small firms. For medium sized firms (Column 5), we find the coefficient on wage differential to be insignificant, though LMR is negative and statistically significant as found in most other cases. In the case of large firms (Column 6), too, the sign and significance of LMR remains the same. The coefficient on the wage differential between contract and regular workers is positive and significant. This is perhaps a result of the fact that for large firms, the benefit of hiring contract workers due to the effect they have on suppressing regular workers outweighs the costs arising from the relative increase in their wages over time. We also disaggregate the sample of large firms into large labour intensive and large capital intensive industries. We find that in the case of large capital intensive firms, the coefficient on the wage differential was positive and significant, but for large labour intensive firms it was insignificant.

Further, we classify the sample into firms with high and low shares of contract worker intensity. For this purpose, we compute the median contract worker intensity across firms for each year under study, and classify firms into the respective categories depending on whether the share of contract workers is above or below the median. The motivation for this is the following- in firms which already have a high share of contract workers, we should not expect to see the bargaining channel. Since such firms already have a substantially large share of contract workers that help suppress the bargaining power of regular workers, they have little or no incentive to hire more contract workers simply for this particular purpose. They would hire more contract workers only if they are relatively cheaper. On the other hand, firms which have a smaller share of contract workers would benefit from hiring contract workers even if they become relatively more expensive as this would help suppress the bargaining power of regular workers. That is precisely what we see in our estimates. In the case of firms with a low share of contract workers (Column 9), the coefficient on wage differential is positive and significant while in the case of firms with a high share of contract workers (Column 10), the coefficient is negative and significant.

Table 6: Regression results

Category	All (1)	K-intensive (2)	L-intensive (4)	Small (4)	Medium (5)	Large (6)	Large K-intensive (7)	Large L-intensive (8)	Low CW (9)	High CW (10)
					ln(CW/TW)					
$\ln(W_C/W_D)$	0.29**	0.42**	0.55	-6.17	-0.3	0.61***	0.60***	-0.17	0.68***	-0.08**
	(0.12)	(0.19)	(0.4)	(14.44)	(0.23)	(0.16)	(0.2)	(0.38)	(0.17)	(0.03)
Time	0.02***	0.02***	0.02***	0.05	0.00***	0.02***	0.02***	0.03***	0.02***	0.00***
	(0.00)	(0.00)	(0.00)	(0.08)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LMR-GHK	-0.03***	-0.05***	-0.07**	0.17	-0.03***	-0.05***	-0.05***	-0.01	-0.06***	0
	(0.01)	(0.01)	(0.03)	(0.45)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.00)
ln(Age of firm in years)	-0.07***	-0.05***	-0.06**	-0.05	-0.03***	-0.07***	-0.05**	-0.15***	-0.02	-0.01***
	(0.01)	(0.02)	(0.02)	-0.11	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)	(0.00)
N	64513	26495	20057	5007	20376	39130	17256	13245	42057	22456
RMSE	0.82	0.78	0.99	3.37	0.7	0.96	0.85	0.99	0.94	0.11

Source: ASI unit-level panel data; Note: Standard errors are given in parentheses; (* $p<0.01$; ** $p <0.05$; *** $p<0.10$); the dependent variable is ln (CW/TW).

Next, we attempt to examine if contract workers are indeed less productive than regular workers and if their presence in the firm's workforce has an adverse effect on firm productivity. The availability of establishment level data has spawned a large literature on the estimation of total factor productivity (TFP) at the individual establishment level. Typically, these studies make use of a production function and assume output (usually measured as deflated sales or value added) to be a function of the inputs the firm employs and its productivity (Katayama et al., 2009).

$$Y_{it} = A_{it} L_{d,it}^{\alpha_d} L_{c,it}^{\alpha_c} K_{it}^{\alpha_k}$$

Where, Y_{it} , $L_{d,it}^{\alpha_d}$, $L_{c,it}^{\alpha_c}$, $K_{it}^{\alpha_k}$ denote production, directly employed labour, contract labour and capital respectively and A_{it} is total factor productivity. Taking natural logs results in a linear production function,

$$y_{it} = \alpha_0 + \alpha_d l_{d,it}^{\alpha_d} + \alpha_c l_{c,it}^{\alpha_c} + \alpha_k k_{it}^{\alpha_k} + \varepsilon_{it}$$

where lower case letters refer to natural logs and

$$\ln(A_{it}) = \alpha_0 + \varepsilon_{it}$$

α_0 measures the mean efficiency level across firms and over time; ε_{it} is the time and producer specific deviation from than mean, which can then be further decomposed into an observable and unobservable component. This therefore results in the following estimation equation:

$$y_{it} = \alpha_0 + \alpha_d l_{d,it}^{\alpha_d} + \alpha_c l_{c,it}^{\alpha_c} + \alpha_k k_{it}^{\alpha_k} + \vartheta_{it} + u_{it}^q$$

$\omega_{it} = \alpha_0 + \vartheta_{it}$ represents firm-level productivity and u_{it}^q is an i.i.d component, representing unexpected deviations from the mean (due to measurement error, unexpected delays or other external circumstances). We begin our analysis by estimating the above equation using OLS (Column 1, table 7). However, existing literature indicates that estimating the firm level production equation using OLS runs into several methodological issues as productivity and input choices are likely to be correlated leading to a simultaneity or endogeneity problem. Including a plant fixed effect can address the problem of time-invariant unobserved heterogeneity, such as differences in management ability, which may otherwise yield a spurious productivity-contractualisation relationship. Therefore, we re-estimate the equation using fixed effects (Column 2). However, time varying unobserved heterogeneity within plants may also be present, and thus endogeniety concerns persist. For instance, unobserved productivity shocks that are part of the idiosyncratic error may systematically influence both GVA and the share of contract workers. Consequently, estimated coefficients from a fixed effects regression may still be biased. Other input choices may well suffer from simultaneity bias as well. To address the problems of time-invariant and time varying unobserved heterogeneity correlated with covariates, we make use of the system GMM estimator (GMM-SYS). The GMM-SYS estimator combines time differencing of the model to get rid of the plant fixed effect with instrumenting endogenous covariates with both lagged level and lagged differences of time covariates. This approach not only allows us to take into account

endogeneity coming from unobservable firm-specific fixed effects but also the simultaneity bias arising due to the endogeneity of inputs (Van Beveran, 2010). The results of this are presented in column 3 and 4 in Table 7.

To evaluate the validity of the GMM-SYS estimation, we need to perform two tests: the Arellano-Bond test which tests for the absence of second order autocorrelation in the transformed idiosyncratic errors and the Hansen test which tests the validity of the imposed over-identifying moment conditions directly. If the nulls of both tests cannot be rejected, this points at the validity of the GMM-SYS estimation results.

However, we find the null of no serial correlation in the Arellano-Bond test to be rejected in our model. Because the first difference of independently and identically distributed idiosyncratic errors will be serially correlated, rejecting the null hypothesis of no serial correlation in the first differenced errors at order one does not imply that the model is mis-specified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid. Therefore, we need to use an alternative estimator, namely the Difference GMM (DIFF-GMM) estimator. At the cost of a more complicated syntax, this can fit models with low-order moving-average correlation in the idiosyncratic errors or predetermined variables with a more complicated structure than allowed for by GMM-SYS.

The results for DIFF-GMM are reported in Column 5 and 6. Here we find that the null of both the Arellano-Bond test and the Hansen test cannot be rejected. We find the coefficients on both directly employed workers and contract workers to be positive and statistically significant suggesting that both types of workers have a positive effect on firm productivity. However, we find the coefficient on directly employed workers to be significantly greater than that on contract workers suggesting that the latter have lower productivity than the former. We repeat this estimation for each of the industrial groups at the NIC 2 digit classification. There are five industries where we find the productivity of contract workers to be significantly lower than that of directly employed workers. These are: manufacture of food products and beverages, tobacco products, textiles and wearing apparel and paper & paper products. It is worth noting that barring manufacture of paper and paper products, these industries are relatively labour intensive industries, which did not require very specialised or skilled workers. Therefore, it appears that despite the existence of a significant productivity differential between the two types of workers, they continue to hire contract workers to circumvent legislations. In capital intensive industries, on the other hand, there was no significant difference in the productivity. This may well be because contract workers receive training or because they are performing the more labour intensive tasks in these industries.

Table 7: Productivity regression results

Dependent variables: ln(output)	Pooled OLS	Fixed effect OLS	SYS1-GMM	SYS2-GMM	DIFF1-GMM	DIFF2-GMM
(t)	(1)	(2)	(3)	(4)	(5)	(6)
ln(output) (t-1)	0.743***	0.246***	0.091***	0.135***	0.290***	0.280***
	(0.01)	(0.11)	(0.01)	(0.01)	(0.02)	(0.02)
ln(CW)	0.088***	136***	0.135***	0.103***	0.107***	0.108***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln(DW)	0.059***	177***	0.168***	0.140***	0.150***	0.156***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln(plant and machinery)	0.105**	0.105**	0.146***	0.145***	0.066***	0.064***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Time effect	Yes	Yes	Yes	yes	yes	Yes
AR(1)			0.00	0.00	0.00	0.00
AR(2)			0.00	0.04	0.62	0.72
Obs	62308	62308	62308	62308	62308	62308

Source: ASI unit-level panel data; Note: Robust standard errors are given in the parenthesis ;(* $p<0.01$; ** $p <0.05$; *** $p<0.10$); the dependent variable is log output. All GMM regressions treat the lagged ln(output) as predetermined; the AR(1) and AR(2) values are the p-values for first and second order autocorrelated disturbances.

7.   Case study based on a primary survey

In addition to the use of plant level data from ASI, we supplement this analysis using primary data from a survey of manufacturing sector workers in the industrial areas of Delhi. The objective of this survey is to assess the extent of contractualisation of the workforce in these areas, the differences in the nature of the work performed by regular and contract workers, their educational and age profiles and wages. We also attempt to understand what types of firms/ industries witnessed greater contractualisation. Given these objectives, the questionnaire was structured to seek both quantitative as well as qualitative answers from the workers. It covered the individual characteristics of the workers (age, place of origin, marital status, educational qualification and vocational training) and the employment characteristics of the workers. This not only included details of the organisation they were employed in (the name of organisation, main production activity and size) but also details of the workers' employment such as how long they have worked in the organisation, the nature of the tasks performed by them, whether they are regular or contract workers, their wages, hours of work and the type of benefits they receive. These are particularly important to understand in the backdrop of the fact that the law requires parity in the wages of regular and contract workers, and that contract workers are to be used for peripheral and non-core activities of the production process and not perform the same task as regular workers.

We randomly surveyed 222 industrial workers from three industrial areas across various districts of Delhi, namely, Naraina Industrial Area (South-West Delhi), Okhla Industrial Area (South Delhi) and GT Karnal Road Area (North-West Delhi)[19]. Since these regions come under the same jurisdiction, they are subjected to similar laws. In each of the locations, we interviewed 60 to 85 workers randomly during their lunch breaks at various common cafeterias and eateries at the survey locations (Table 8).

Table 8: Number of workers across locations

Location	Number of workers surveyed
Naraina Industrial Area	60
Okhla Industrial Area	85
GT Karnal Road Area	77

Source: ASI unit-level panel data

The interviewed workers are employed across a range of industries. We attempt to map the industries reported by respondents to the NIC-2 digit industrial classification (2004). A disproportionately large share of workers we interviewed were engaged in NIC 18 (manufacture of wearing apparel, dressing and dyeing of fur). The other two industries which accounted for a large chunk of the interviewed workers were NIC 22 (Publishing, printing and reproduction of recorded media) and NIC 29 (manufacture of electrical machinery and apparatus n.e.c). On other hand, a meagre share of the respondents was reported in the following industries- NIC 15 (manufacture of food products and beverages); NIC 32

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[19]   Except for one, all surveyed workers are males.

(manufacture of radio, television, and communication equipment and apparatus) and NIC 36 (manufacture of furniture, manufacturing n.e.c.) The industry-wise distribution for the entire sample and the three regions separately is reported in Table 9.

Table 9: Distribution of workers across industries

NIC2digit	Freq.
15	2
16	7
17	10
18	53
19	11
21	8
22	32
24	14
25	15
28	8
29	31
31	9
32	2
33	7
34	9
36	2
Ambiguous[20]	4

Source: ASI unit-level panel data

Further, we find that the largest share of interviewed workers (45%) were employed in large firms (i.e those having more than 100 workers). Across the three regions, Okhla Industrial Area stands out in this context. Over 70% of the interviewed workers in this area were employed in large firms (Table 10). On the other hand, in GT Karnal Road only 16% of the interviewed workers reported to be employed in large firms.

Table 10: Distribution of workers by firm size

| Location | Number of workers | | | |
	below 19	20 to 49	50 to 99	100 plus
Naraina Industrial Area	25.00	21.67	8.33	45.00
Okhla Industrial Area	4.71	11.76	12.94	70.59
GT Karnal Road Area	36.36	41.56	5.19	16.88
All	21.17	24.77	9.01	45.05

Source: ASI unit-level panel data

Next, we examine the composition of the interviewed workers.62.44% of the interviewees reported to be regular workers. The share of casual and contract workers stood at 19.91% and 17.19% respectively. The composition of contract workers, however, differed across the three locations (Table 11). The largest share of contract workers was found in the Okhla industrial area while the lowest was in GT Karnal Road. This may well be because of the fact that this region reported a relatively smaller share of interviewed workers in large firms (100+) and

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[20] Those interviewed workers who worked at multiple firms were classified into the "ambiguous" category.

these are the firms which typically report a higher share of contract workers (as seen in the stylised facts section). This is in fact confirmed when we look at the distribution of workers by firm size (Table 12). Of the 38 interviewed contract workers, 84% were employed in large firms having more than 100 workers. Only one reported to be employed in very small firms.

Table 11: Share (%) of different workers across locations

	Naraina Industrial Area	Okhla Industrial Area	GT Karnal Road Area
Regular workers	66.33	49.41	76.62
Contract workers	10.00	34.12	3.90
Neither	0.00	0.00	1.30
Casual Workers	26.67	16.47	18.18

Source: ASI unit-level panel data

Table 12: Distribution of workers by firm size

Type	below 19		20 to 49		50 to 99		100 plus	
	freq.	percent	freq.	percent	freq.	percent	freq.	percent
Regular	29	61.70	41	74.55	15	75.00	53	54.00
Contract	1	2.13	5	9.09	0	0.00	32	32.00
Neither	1	2.13	0	0.00	0	0.00	0	0.00
Casual	16	34.04	9	16.36	5	25.00	14	14.00

Source: ASI unit-level panel data

Next, we look at the age and educational profile of interviewed workers. The age of respondents varied from 18 to 56 years. The average age of regular workers was 30 years while that of the contract workers was 2 years less, suggesting that new entrants in the workforce tended to get absorbed into contractual jobs rather than regular jobs (Figure 9). Further, majority of the workers (81.90%) were migrant labourers. Most of them were from various parts of Uttar Pradesh followed by Bihar, and other states such as Uttarakhand, Madhya Pradesh, Himachal Pradesh, Jharkhand, Haryana and West Bengal. The share of migrant workers among regular and contract workers was similar.

Figure 10: Cumulative distribution of age (in years) for different workers
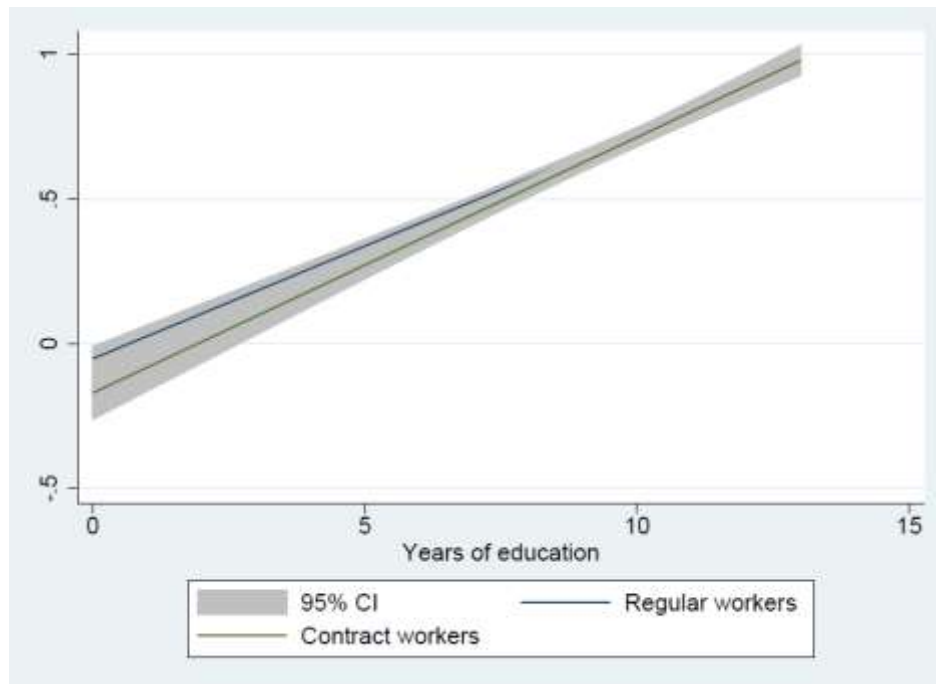

Source: ASI unit-level panel data

Interestingly, we find that educational attainment of regular workers is similar to that of contract workers (Figure 10). On average, most workers had completed middle school education. However, the wages of workers did not vary significant across different levels of education. This was the case for both regular and contract workers (Table 13).

Table 13: Distribution of workers by education

Education	Freq.	Percent	Cum.
Illiterate	24	11.27	11.27
1 to 4 grades	13	6.10	17.37
5 to 7 grades	27	12.68	30.05
8 to 9 grades	61	28.64	58.69
10 to 11 grades	45	21.13	79.81
12 grade	33	15.49	95.31
12 grade plus	10	4.69	100.00

Source: ASI unit-level panel data

Figure 11: Cumulative distribution of years of education for different workers

Source: ASI unit-level panel data

The field studies undertaken by Rajeev (2009) bring out that the contract workers get lower wages than the directly employed workers and the contract workers often do not get medical benefits or have very limited earned leaves. Evidently, the increasing use of contract labour in organised manufacturing is a matter of concern since this implies a decline in the quality of jobs in organised manufacturing. However, unlike the national trend, in our sample, the wages paid to the two different types of workers is not significantly different. Table 14 reports the average wages of regular and contract workers for industries where we interviewed both regular and contract workers. Of the eight such industries, in all but one, we find that the wages paid to the two types of workers were comparable. However, the percentage of contract workers who received any benefits from contractors was significantly lower than regular workers employed in the same industry. This despite the fact that most contract workers reported that they were performing the same task as regular workers. Of the 38 sampled contract workers, 32 reported that they were performing the same task as regular workers. We also find that the share of workers employed with their current employer for less than a year was greater among contract workers, reinforcing the frequent churning and job instability associated with such contracts. We find that share of contract workers who were employed for more than a year by their current employers (42%) was significantly less than their regular counterparts (64%). This further indicates the lack of job security faced by the former.

8.   Conclusion

While the increasing contractualisation of the workforce may give a false perception of employment creation in the manufacturing sector, the fact is that it reflects deterioration in

the quality of jobs being generated. Importantly, since these workers can be easily shed due to the weak contracts under which they are employed, there is also a big question mark on the sustainability of employment growth driven by growth of contract workers (Sood et al, 2014). Since the unorganised sector anyway accounts for a disproportionately large share of employment in the manufacturing sector (over 90 per cent), the increasing informalisation of the organised sector will certainly not help India address the challenge of productive job creation.

Given that it may well be profit motive that is driving firms' decisions to hire contract workers and not just the need to retain greater flexibility in labour use, the proposal to amend the Contract Labour Act to bring contract workers at par with regular workers, is indeed a step in the right direction. Recently, the government has proposed an executive order making it compulsory to pay contract workers at least Rs 10,000 a month. As wages paid to contract workers are lower than those of regular workers, such a move will ensure financial security to the former. However its overall effect on the welfare of contract workers and productive job creation is ambiguous. Presently, different states have different minimum wages factoring in local costs and characteristics. This order, which essentially amounts to universalizing a minimum wage across regions, may well have adverse effects. It might result in jobs moving from smaller states, which have low minimum wages, to those states where the minimum wages are at par with the Rs 10,000 threshold, leading to increasing inter regional disparities. In addition, such a move may end up disproportionately burdening small/medium enterprises as opposed to larger enterprises that operate on greater profit margins.

While the idea of parity in wages of contract workers and regular workers particularly when they are performing the same task is critical, there is no economic rationale for contract workers employed in rural Uttar Pradesh to receive the same minimum wages as those working in Delhi. Besides, the universalisation of minimum wages of contract workers could result in creation of more informal jobs and shrinkage of formal employment, thereby restricting workers to the informal sector rather than helping them make a transition to the formal sector. Although the move to provide financial security to contract workers is a step in the right direction, what is equally important is the provision of decent conditions of work, job security and social security.

References

Besley, Timothy J., and Robin Burgess. "Can labour regulation hinder economic performance? Evidence from India." *CEPR discussion paper* (2002).

Bhattacharjea, Aditya. "The effects of employment protection legislation on Indian manufacturing." *Economic and Political Weekly* (2009): 55-62.

Bhattacharjea, Aditya. "Labour market regulation and industrial performance in India: A critical review of the empirical evidence." *Indian Journal of Labour Economics* 49, no. 2 (2006): 211-232.

Blair, Douglas H., and David L. Crawford. "Labor union objectives and collective bargaining." *The Quarterly Journal of Economics* (1984): 547-566.

Braun, Sebastian, and Juliane Scheffel. "Does International Outsourcing Depress Union Wages?." *SFB 649 Discussion Paper 2007-033* (2007)

Chaurey, Ritam. "Labor regulations and contract labor use: Evidence from Indian firms." *Journal of Development Economics* 114 (2015): 224-232.

Das, Deb K., Homagni Choudhury, and Javir Singh. *Contract Labour (Regulation and Abolition) Act 1970 and Labour Market Flexibility: An Exploratory Assessment of Contract Labour use in India's Formal Manufacturing*. No. 300. ICRIER Working Paper, 2015.

Datt, Ruddar. *Lockouts in India*. Manohar Publishers, New Delhi, 2003.

Dunlop, John Thomas. *Wage determination under trade unions*. Oxford: Blackwell, New York, 1950.

Fallon, Peter R., and Robert EB Lucas. "Job security regulations and the dynamic demand for industrial labor in India and Zimbabwe." *Journal of development Economics* 40, no. 2 (1993): 241-275.

Fanti, Luciano, and Luca Gori. "Efficient bargaining versus right to manage: a stability analysis in a Cournot duopoly with trade unions." *Economic Modelling* 30 (2013): 205-211.

Fernandez, Raquel, and Jacob Glazer. *Striking for a bargain between two completely informed agents*. No. w3108. National Bureau of Economic Research, 1989.

Goldar, Bishwanath, and Suresh Chand Aggarwal. "Informalization of industrial labor in India: effects of labor market rigidities and import competition." *The Developing Economies* 50, no. 2 (2012): 141-169.

Goldar, Bishwanath, and Suresh R. (2016).*Contract Labour in Organized Manufacturing in India.*in K. P. Kannan, Rajendra P Mamgain and PreetRustagi (eds.), Labour and Development- Essays in honour of Professor T S Papola, Academic Foundation, New Delhi, 2016 (forthcoming)

Gupta, Poonam, Rana Hasan, and Utsav Kumar. "Big reforms but small payoffs: explaining the weak record of growth in Indian manufacturing."*Available at SSRN 1346042* (2009).

Hirsch, Boris, and Steffen Mueller. "The productivity effect of temporary agency work: Evidence from German panel data." *The Economic Journal*122, no. 562 (2012): F216-F235.

Indian Society of Labour Economics. Annual Conference. *Contract labour in India: Issues and perspectives*. Edited by KR ShyamSundar. [Published] in collaboration with Indian Society of Labour Economics, Institute for Human Development [by] Daanish Books, 2012.

Katayama, Hajime, Shihua Lu, and James R. Tybout. "Firm-level productivity studies: illusions and a solution." *International Journal of Industrial Organization* 27, no. 3 (2009): 403-413.

McDonald, Ian M., and Robert M. Solow. "Wage bargaining and employment." *The American Economic Review* 71, no. 5 (1981): 896-908.

Oswald, Andrew J. "The microeconomic theory of the trade union." *The Economic Journal* 92, no. 367 (1982): 576-595.

Organization for Economic Co-operation and Development. (2007). *OECD Economic Surveys: India.* Volume 2007, Issue no. 14.

Rajeev, Meenakshi. "Contract labour act in India: A pragmatic view."*International Journal of Economic Policy in Emerging Economies* 3, no. 3 (2010): 237-252.

Ramaswamy, Krishnarajapet Vidyaranya. "Liberalization, outsourcing and industrial labor markets in India: Some preliminary results." *Labour Market and Institution in India, 1990s and Beyond, Manohar, New Delhi* (2003).

Ramaswamy, Krishnarajapet Vidyaranya. "Liberalization, outsourcing and industrial labor markets in India: Some preliminary results." *Labour Market and Institution in India, 1990s and Beyond, Manohar, New Delhi* (2003).

Saha, Bibhas, Kunal Sen, and Dibyendu Maiti. "Trade openness, labour institutions and flexibilisation: Theory and evidence from India." *Labour Economics* 24 (2013): 180-195.

Shyam Sundar, K. R. *Non-regular workers in India: Social dialogue and organizational and bargaining strategies and practices*. No. 466556. International Labour Organization, 2011.

Sood, Atul, Paritosh Nath, and Sangeeta Ghosh. "Deregulating capital, regulating labour: The dynamics in the manufacturing sector in India."*Economic and Political Weekly* 49, no. 26&27 (2014): 58-68.

Van Beveren, Ilke. "Total factor productivity estimation: A practical review."*Journal of economic surveys* 26, no. 1 (2012): 98-128.

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