Working Paper 369

Explaining the contractualisation of India's workforce

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January 2019

INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS

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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 directly hired 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, we find that in addition to labour market rigidities and the existence of a wage differential between contract and directly hired workers, firms in the organised manufacturing sector have another important incentive to hire contract workers. Firms appear to be using contract workers to their strategic advantage against unionized directly hired 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.

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

JEL classification: *E24, J38, J41, J58*

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Explaining the contractualisation of India's workforce*

Radhicka Kapoor# and P. P. Krishnapriya+

1. Introduction

India's manufacturing sector has been characterized by its dualistic structure i.e. the prevalence of a formal/organized sector which coexists with a large "unorganized sector". Employment estimates from establishment surveys of the organized and unorganized manufacturing sector show that the share of the latter has declined over the years. Yet, it continues to account for a disproportionately large share of total manufacturing employment (Figure 1). As recently as 2015-16, the unorganized sector continued to employ over 70% of total manufacturing employment[1]. This is a cause for concern. Firms in the organized sector pay higher wages, are more productive and provide better working conditions, security of tenure, non-wage benefits and social security than firms in the informal sector. Given the pressing need for productive employment creation in a country like India, there is an urgent need to turn our attention to the formal sector.

Figure 1: Distribution of Employment in the Organised and Unorganised Manufacturing Sector

* This study was funded by the International Growth Centre (IGC) – India, Central. This paper is an updated version of our previous paper, "Informality in the formal sector: Evidence from Indian manufacturing", International Growth Centre Working Paper, May 2017 available at https://www.theigc.org/wp-content/uploads/2017/05/Kapoor-and-Krishnapriya-working-paper-2017.pdf.
We are grateful to Aditya Bhattacharjea, Ajit Ghose, Anirban Kar, , B.N.Goldar, K.L. Krishna, Rana Hasan and Utsav Kumar for their helpful comments and suggestions.

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1 It is worth noting that between 2010-11 and 2015-16, the total employment in the unorganized manufacturing sector increased in absolute terms by 1.1 million and this increase was entirely a consequence of the growth in employment in own account (household) enterprises.

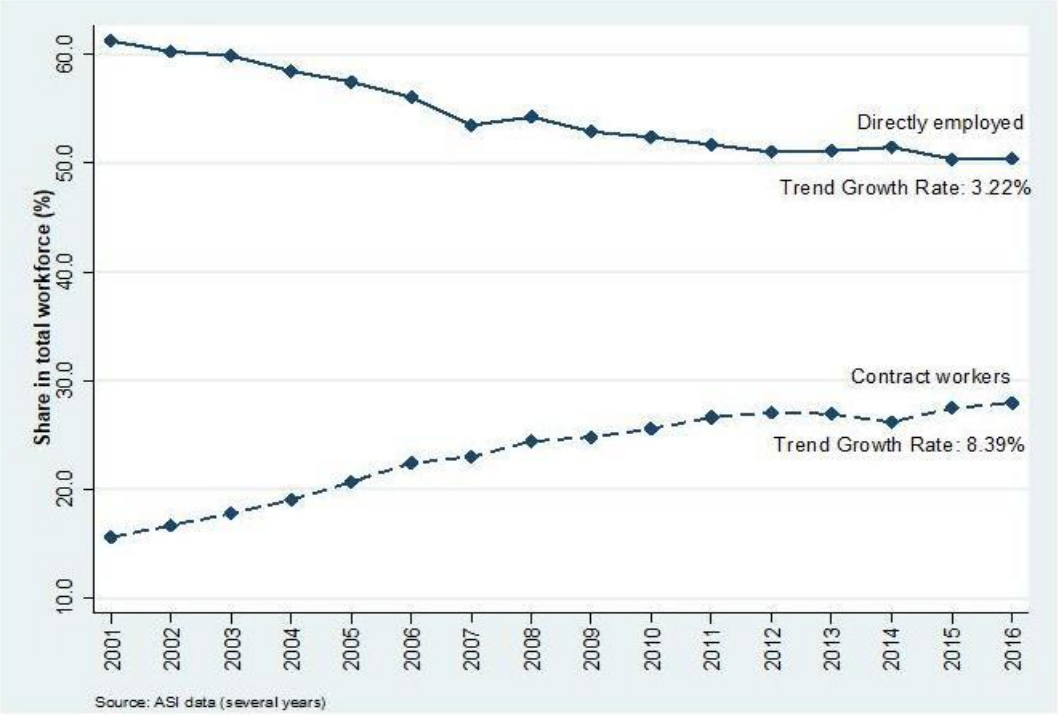
Table 1: Total Employment in Manufacturing Sector (in millions)

	2000-01	2005-06	2010-11	2015-16
Unorganised sector (NSS)	37.1	36.44	34.88	36.04
Organised sector (ASI)	7.75	8.80	12.25	13.72

Source: ASI and NSS establishment data (several years)

The pace of job creation in the organized manufacturing sector over the time period, 2000-01 to 2015-16, has been sluggish. Results from the Annual Survey of Industries (ASI) which covers formal firms registered under the Factories Act report that total employment in the organised manufacturing sector increased from 7.7 million in 2000-01 to 13.7 million in 2015-16. 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 15.5% in 2000-01 to 27.9% in 2015-16, while the share of directly hired workers fell from 61.2% to 50.4% in the same period. Furthermore, the average growth rate of contract employment at 8.39% has outstripped the growth of regular employment at 3.22% over the last decade. The increasing use of contract workers who are not employed directly by the employer, but by an intermediary or contractor on short term contracts, reflects significant informalisation of the organised workforce. These workers can be fired easily, have little or no job security and enjoy far fewer benefits in terms of health, safety, welfare and social security compared to directly employed workers. Given the deplorable conditions under which they work, a rapid increase of such jobs is unlikely to meet the challenge of productive job creation.

Figure 2: Change in composition of workers in organized manufacturing sector over time



The objective of this study is two-fold. First, to examine what factors have driven contractualisation in organised manufacturing and second, to understand the implications of the increasing use of contract workers on firm productivity. More specifically, the pressing research questions that arise are as follows. Are the lower wages paid to contract workers and the savings made on the expenditure of worker benefits incentivizing firms to hire contract workers? Do trends in contractualisation vary 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 directly hired 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) the time period from 2000-01 to 2013-14, we attempt to examine the relationship between the workers' wages, productivity and the extent of contractualisation in a firm in the organised manufacturing sector.

Although, there exists a vast literature which attributes the widespread use of contract labour to India's rigid employment protection legislations, 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 directly hired workers with contract workers deserves closer scrutiny for several reasons. 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, common wisdom suggests that rigid labour regulations bite labour intensive industries more than capital intensive industries. Thus, we should expect to see a greater increase in contract worker usage in the former. On the contrary, we find that it is capital-intensive and not labour-intensive industries, which have seen a larger in contract worker usage. These findings reiterate 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 hired workers are on average about one and half times those of contract workers over the last decade. While this encourages firms to employ contract workers, it is worth noting that the wage differential between contract and directly hired workers has fallen over the last decade. Real wages of contract workers grew at 1.92% p.a., while those of directly hired workers remained stagnant.

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 hired 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 directly hired workers and depress their wages. Contract workers act as an alternative workforce, which firms use to their strategic advantage, to suppress the wage demands of their unionized workforce (Braun and Scheffel, 2007). Theoretically, one would expect that as wages of contract workers increase relative to those of directly hired workers, the share of contract workers in the total workforce would decline. However, when the wages of directly hired workers are determined by a bargaining process, wherein their bargaining power is curbed due to the presence of contract workers, firms have an additional motivation to hire these workers. By hiring more contract workers, the bargaining power of directly hired workers is reduced and consequently the wage differential between the two worker types diminishes. Our

empirical analysis using the plant level data from the ASI for the time period from 2000-01 to 2013-14 supports this hypothesis. We also examine the effects of contractualisation on firm productivity and find that contract workers do not have an adverse impact on firm productivity, although their productivity is lower than that of directly hired workers.

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 important stylised facts on contract worker usage in India in Section 4. In Section 5, we develop a model on firm-union bargaining which attempts to explain why firms choose to maintain this duality in the workforce.[2] Section 6 outlines the empirical analysis using ASI plant level data and presents the results. Section 7 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,2017).The widespread use of contract labour has been ascribed 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)[3]. Since IDA applies only to 'permanent' workers or those directly hired by firms, and not to workers supplied by contractors (intermediaries) or workers employed on a 'temporary' basis, firms in the organised sector tend to employ contract workers to circumvent rigidities in employment protection legislations. The rising 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; Saha et al.,2013;Ramaswamy,2013;Chaurey,2013 and Goldar and Suresh, 2017).

Whilst India's labour regulations are largely perceived as being one of the strictest in the world in terms of employment protection legislation (OECD, 2007), it needs to be noted that they cover less than 10% of the total workforce and large masses of the workforce engaged in the unorganized sector are left unprotected against any contingencies and arbitrary actions of employers. Importantly, these legislations are quite poorly enforced (Nagaraj, 2004). How stringent or relaxed labour laws are in practice thus depends on how well enforced they are in a particular context. Given the differences between de-facto and de-jure flexibility in labour regulations due to heterogeneity in enforcement intensity at the state level, Sapkal (2016) has examined the combined effect of both these factors (variations in labour regulations and enforcement intensity across states) on the growth of contract workers. He finds the effect of strict EPL and enforcement intensity on the incidence of temporary contract workers to be

[2] 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, 1950).

[3] OECD (2007)

positive and statistically significant across Indian states. Firms in inflexible labour regimes and those in flexible labour regimes tend to hire differentially more temporary contract workers in response to variable enforcement intensities[4].

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 establishments in which twenty or more workmen are employed or were employed on any day of the preceding twelve months as contract labour.[5] This Act intends to regulate and extirpate contract labour depending on the nature of the tasks they performed. Under Section 10 of the Act, the government can prohibit the use of contract workers in instances where contract workers are being used for perennial jobs and directly hired workers are doing the same job --whether the work is incidental or necessary for the industry (Das et al., 2015). While, several central and state governments have issued notifications abolishing employment of contract workers, the question of what happens to these contract workers after abolition has largely been determined judicially. Das et al. (2016) have highlighted a few judgments in this context. The first is the case of the Steel Authority of India Limited (SAIL) and Others versus the National Union of Waterfront Workers and Others (2001)which snapped the direct relationship between principal employer and contract labour. The judgement in this case stated that the principal employer had no obligation to employ contract labour in regular work after abolition. Further, the judgment in the case of International Airport Authority versus International Air Cargo Union (2009) absolved the principal employer of any responsibility with respect to contract workers and stated that since the salary of the contract worker is paid by the contractor the "ultimate supervision and control lies with a contractor". In another judgement (Hindustan Steelworks Construction Ltd v. Commissioner of Labour and Others, 1996), the Supreme Court placed no liability on the principal employer if there is a shortfall in wages paid to contract workers when they were performing the same task as directly hired workers. Here too, the Supreme Court did not place the liability on the principal employer. Such judicial interpretations of the legislative provisions of CLA over the 2000s can be interpreted as having a pro-employer stance and have possibly made it easier for employers to use contract workers over time.

It is widely believed that the firm's decision to employ 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 hired workers have on average been about one and half times those of contract workers over the last decade (Figure 3).Another important finding emerging from the recent studies on employment of contract workers in manufacturing is the role of import competition. Saha et al. (2013) find that

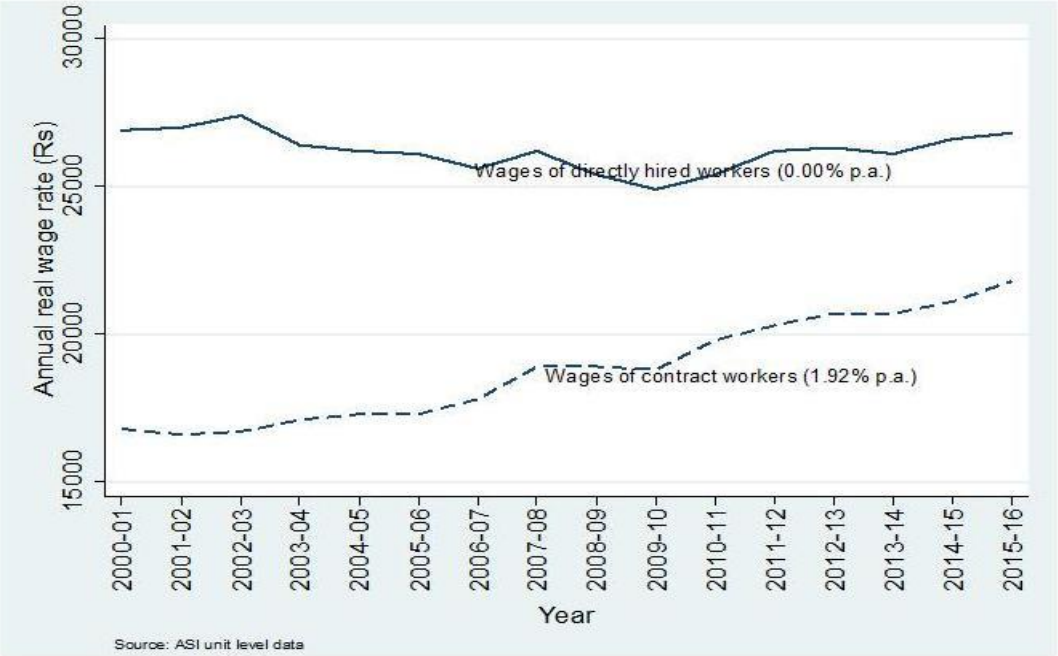
[4] Another study which examines the effects of differences in enforcement regimes across states, though in a different context, is by Soundararajan (2018). Exploiting the state-time variation in minimum wages and enforcement rates across India, the author finds that minimum wages do not affect labor market outcomes in weak enforcement regimes. On the other hand, in stricter regimes, wage effects are positive and significant.

[5] Recently, some state governments have amended this Act making it applicable to establishments employing 50 contract workers.

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[6].

Interestingly, 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 the wage differential between contract and directly hired workers has fallen over the last decade. The ratio of wages of contract to directly hired workers increased from 0.63 to 0.81. The fact that the increase in the share of contract workers happened at a time when their wages increased at the rate of 1.92 by per annum, while those of directly hired workers remained stagnant is indeed puzzling. It also suggests that the existence of a wage differential between the two worker types may not be the principal driver of contractualisation[7].

Figure 3: Changes in annual real wages for contract and directly hired workers by year



The presence of contract workers in a firm's workforce enables the management to curb the bargaining power of directly hired workers and thus depress the wages of directly hired workers. This argument has been discussed in Saha et al. (2013) and Goldar (2016).Braun and

[6] The authors argue that with increased import liberalization, contract labour behaves like an inferior input-its employment can go up when the price of the product falls. Employment of the directly hired workers will fall. But there is a countervailing effect as well; through a reduction in the wage rate of directly hired workers, employment of the directly hired 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.

[7] Directly employed workers receive several types of non-wage compensation to employees in addition to their normal wages and salaries. Thus, in addition to wage data, ASI also provides data on total emoluments to workers. However, this is not available in a disaggregated manner after 2007-08. Therefore, we use the wages data for our analysis.

Scheffel (2007) find an erosion in the bargaining power of low-skilled unionised workers with increased labour outsourcing in Germany. Thus, the use of contract labour 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 directly hired workers. However, this indirect effect is yet to be explored empirically in the Indian context.

This study attempts to empirically examine the various factors driving the contractualisation of the workforce in the manufacturing sector, 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. While they discuss the role of the lower wages paid to contract workers, they do not explicitly compute the wages or emoluments. They 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 directly hired workers. A plant/establishment level analysis using micro-data is required to take this discussion forward, and that is precisely 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. We use the ASI plant level data for the period from 2000-01 to 2015-16 to obtain an unbalanced panel of registered manufacturing plants. India's Central Statistical Organisation has recently made available factory identifiers which provide us a plant level panel dataset. 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 2013-14, 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 hired 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 hired 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.

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, the industrial classification used 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.

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.[8] However, to deflate wages, we use the Consumer Price Index of Industrial Workers (CPIIW).[9]

The raw data consist of about 746,201observations over 14 years, with an average of about 53,300 plants surveyed each year. We only study observations corresponding to open plants (521,492) and plants with positive values of output, plant and machinery and total persons engaged. Table A1 in Appendix shows the number of observations in each round having 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 416,047 plant-year observations in 19 states.

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).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. Nevertheless, it is worth noting that the number of firms reporting usage of contract labour has increased from 16.2% to 33% over the period under study.

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 (Dougherty et al, 2014). This procedure essentially involves top-coding and bottom-coding the 1% tails for each plant-level variable.

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

[9] We use 1993-94 as the base year to splice the data in order to develop a comprehensive and continuous series.

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.

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	32,038	79.85
2001-02	32,365	76.02
2002-03	31,912	74.05
2003-04	42,084	75.18
2004-05	36,092	73.8
2005-06	41,962	74.22
2006-07	42,829	72.37
2007-08	38,795	72.85
2008-09	37,438	70.86
2009-10	41,067	70.26
2010-11	33,938	61.39
2011-12	34,421	60.03
2012-13	37,954	69.52
2013-14	38,597	66.81

Source: ASI unit-level panel data

Next, we turn to the variables which are not obtained from the ASI database. The quantification of differences in labour market regulations (LMR) across states has been an extremely contentious subject. Much of the existing literature relies on the Besley-Burgess index (2004) which summarised state-level amendments to IDA between 1958 and 1992[10]. 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. Although, the Besley-Burgess index has been used extensively in the literature, it has received much criticism (Dougherty et al., 2014). Bhattacharjea (2006, 2009a, 2009b) argues that the Besley-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

[10] It needs to be noted that after 1992, there have been some amendments at the state level. 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 a 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.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). Maharashtra and Haryana followed suit.

index. Nagaraj (2004) points out this index focuses only on IDA, when there are in fact several other labour laws which impact industrial performance.[11]

Given these and several other 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 (2009a), and OECD (2007). While using the Besley and Burgess measure, Gupta et al. (2009) make two important changes to the original coding. They classify Gujarat and Madhya Pradesh as neutral. Besley and Burgess reported them as pro-worker and pro-employer respectively[12]. Next, Gupta et al (2009) use Bhattacharjea's (2009a) measure which focuses on classifying states on the basis of differences in Chapter V-B of the IDA. As noted by Gupta et al (2009) not only does Bhattacharjea (2009a) consider the content of legislative amendments, he also examines the judicial interpretations of the amendments to Chapter V-B. Importantly, he does not rely on Besley and Burgess's interpretation of legislative amendments as he takes issue with their approach on several accounts.[13] 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 labour 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.

Using the score assigned to a state in each of these three studies (1 for flexible, 0 for neutral and -1 for inflexible), Gupta et al. (2009) then create a composite classification of states' labour market regime by adopting a simple majority rule across the three studies. The state-wise classification as per each of these studies and the final classification used by us are reported in Appendix A (Table A2). As noted by Bhattacharjea (2017), the use of an index based on a mechanical reading of a single labour law may lead to seriously flawed results. However, for the purpose of the empirical analysis in this paper, a quantification of LMR is unavoidable.

The empirical analysis conducted in this paper also requires data on the minimum wage rate and absenteeism rate of directly hired workers at the state level. We obtain this data from the reports on the working of the minimum wage law and the ASI's Volume II reportspublished by the Labour Bureau (Ministry of Labour and Employment, Government of India)respectively. At this point, data on these variables is available only till 2013-14. This restricts the time period of our empirical analysis, and all stylized facts reported henceforth will correspond to the time period, 2000-01 to 2013-14. Additionally, we also use gross enrolment

[11] There has been much discussion on the classification of the labour regulatory regimes of states. The quantification of labour laws to arrive at LMR indices is indeed an arduous task. Creating a new index is beyond the scope of this paper and therefore we use the Gupta et al., (2009) measure in this study.

[12] Gupta et al. (2009) note that as observed by Bhattacharjea (2006), this is on account of a "solitary amendment passed in 1973, allowing for a penalty of 50 rupees a day on employers for not nominating representatives to firm level joint management councils". They argue that as this amendment is fairly inconsequential in nature, the state's coding can be modified to neutral. They treat Madhya Pradesh also a neutral state. This is because the average of the Besley and Burgess cumulative amendments is very mildly negative (close to zero).

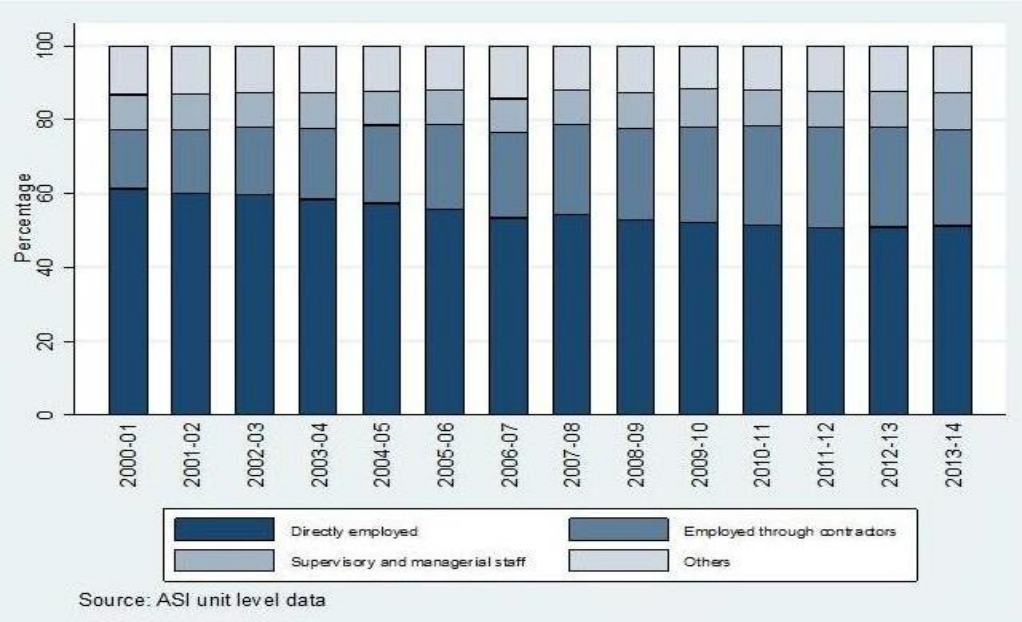
[13] This includes misinterpretation of various amendments, assignment of identical scores to both minor procedural amendments as well as major changes in job security norms, and the use of a "misleading" cumulation of coded amendments over time (Gupta et al., 2009).

data for primary schooling at the state level. This is obtained from the Ministry of Human Resource Development[14], Government of India[15] and the District Information System for Education.[16]

4. Key stylised facts on contract worker usage

Over the first decade of the 21st century, contractual workers have steadily substituted directly hired workers in the organized manufacturing sector. Figure 2 above showed the secular increase in contract worker usage over the years. In a previous study (Kapoor, 2015), one of the authors of this study, notes the rising trend of contractualization and argues that simply looking at aggregate statistics is inadequate. A more disaggregated analysis is required as there are significant differences in trends of contractualization across states and industries. In this paper, we take Kapoor's (2015) discussion forward not only in terms of time frame, but also present a more comprehensive and rigorous analysis of variations in contract worker usage across different states, industries and plant sizes using factory level data.

Figure 4: Composition of workforce in organised manufacturing sector



4.1 All states witnessed an increase in use of contract workers

Table 3 presents the share of contract workers across states in the organised manufacturing sector in 2000-01 and 2013-14. 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, Maharashtra and Odisha. Interestingly, West Bengal,

[14] Data for the year 2000-01 was obtained from Lok Sabha starred questions, Parliament of India(http://164.100.47.194/Loksabha/Questions/QResult15.aspx?qref=26920&lsno=13), accessed on 15th February 2018; and the Population and Projections for India and States 2001-2026, Census of India 2001.

[15] http://mhrd.gov.in/statist?field_statistics_category_tid=33, accessed on 15th February 2018.

[16] http://udise.in/flash.htm, accessed on 15th February 2018.

Maharashtra and Odisha are classified as having inflexible regulations. Even the states classified as having flexible regulations (Rajasthan, Uttar Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu) witnessed sharp increases in contract workers intensity.

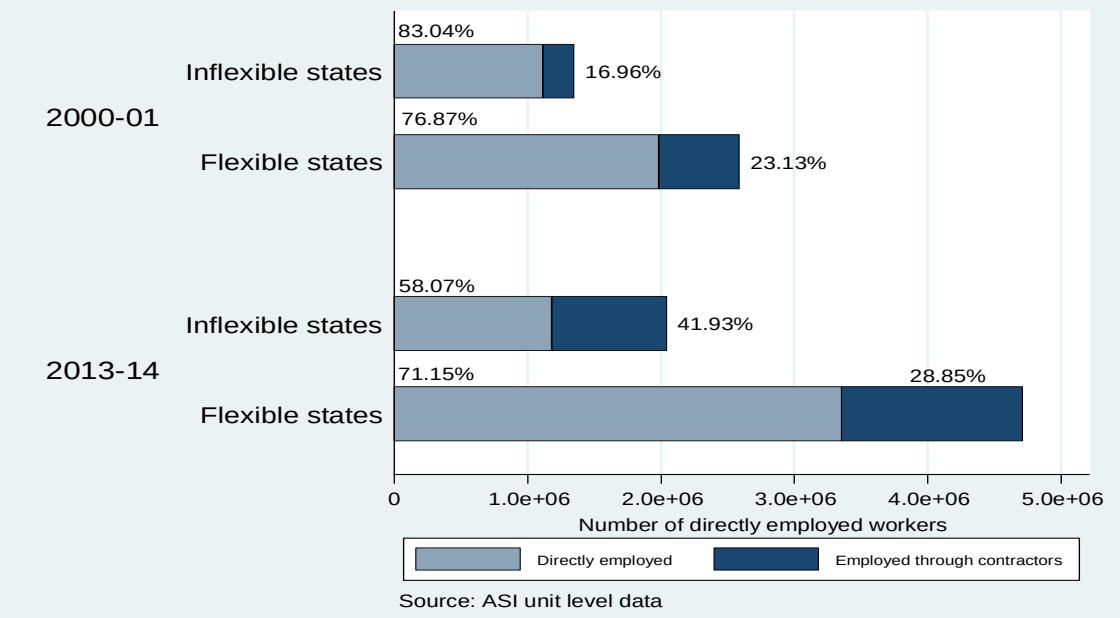
Table 3: Share (%) of contract workers in total workers by state

State	2000-01	20013-14
Punjab	18.00	35.95
Uttaranchal	23.95	52.16
Haryana	31.33	47.38
Rajasthan	23.81	40.88
Uttar Pradesh	26.00	38.33
Bihar	39.39	69.23
Assam	7.27	19.32
West Bengal	13.57	36.22
Jharkhand	17.93	45.39
Odisha	31.04	51.23
Chhattisgarh	28.76	43.08
Madhya Pradesh	23.68	34.57
Gujarat	27.97	37.74
Maharashtra	20.62	43.10
Andhra Pradesh	27.34	33.11
Karnataka	11.80	26.07
Kerala	4.96	12.59
Tamil Nadu	8.30	20.17

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 (Figure 5), we find that the shares of contract workers in total workforce has increased, while that of directly hired workers has fallen across all state categories. Remarkably, the increase in share of contract workers has been significantly large for inflexible states as well.

Figure 5: Share (%) of different workers across states and years



4.2 Capital intensive industries have seen a larger increase in contract worker use

Table 4 shows the share of contract and directly hired 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.[17] The industries which witnessed particularly large increases were the manufacture of motor vehicles, trailers & semi-trailers; manufacture of other transport equipment; manufacture of electrical machinery and apparatus; manufacture of radio, television and communication equipment; and manufacture of other non-metallic mineral products. Since labour intensive industries are more constrained by labour regulations, and capital intensive industries require relatively more skilled workers, we would not have expected to see a significant increase in contract worker intensity in capital intensive industries. But, this does not appear to be the casein Figure 6. In industries such as manufacturing of coke and refined petroleum products, basic metals and motor vehicles, contract workers accounted for close to half of the total production workers. This reinforces the possibility that there are factors other than labour regulations driving contractualisation.

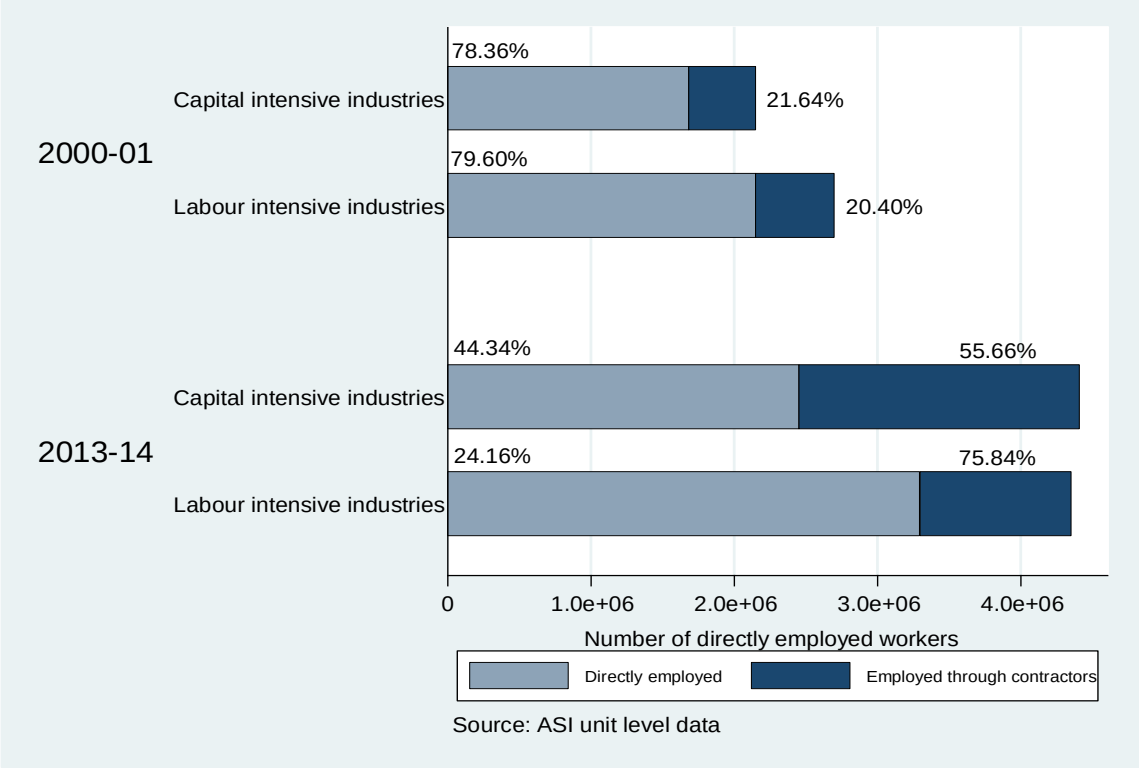
[17] Capital intensity is defined as the ratio of real net value of plant and machinery to total workers (both directly employed and employed through contractors). In order to classify industries as labour or capital intensive, we calculate the labour intensity for all industries in the organised manufacturing sector for every year from 2000-01 to 2013-14.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	2013-14
15	Manufacturing of food products and beverages	21.51	29.44
16	Manufacturing of tobacco products	41.02	36.64
17	Manufacturing of textiles	10.77	16.28
18	Manufacturing of wearing apparels; dressing and dyeing of fur	6.02	16.89
19	Tanning and dressing of leather; Manufacturing of luggage, handbags saddlery, harness and footwear	19.46	23.00
20	Manufacturing of wood and of products of wood and cork, except furniture; Mf of articles of straw and plaiting materials	10.09	31.56
21	Manufacturing of paper and paper products	22.83	30.02
22	Publishing, printing and reproduction of recorded media	5.93	22.50
23	Manufacturing of coke and refined petroleum products and nuclear fuel	19.40	44.47
24	Manufacturing of chemicals and chemical products	20.59	42.91
25	Manufacturing of rubber and plastic products	14.15	37.59
26	Manufacturing of other non-metallic mineral products	34.07	61.45
27	Manufacturing of basic metals	30.09	44.95
28	Manufacturing of fabricated metal products, except machinery and equipment	29.07	43.14
29	Manufacturing of machinery and equipment n.e.c.	11.34	33.03
30	Manufacturing of office, accounting and computing machinery	42.39	37.14
31	Manufacturing of electrical machinery and apparatus n.e.c.	13.45	42.10
32	Manufacturing of radio, television and communication equipment and apparatus	9.60	34.61
33	Manufacturing of medical, precision and optical instruments, watches and clocks	5.46	24.55
34	Manufacturing of motor vehicles, trailers and semi-trailers	13.89	45.73
35	Manufacturing of other transport equipment	14.62	45.05
36	Manufacturing of furniture; manufacturing n.e.c.	16.06	24.35

Source: ASI unit-level panel data

Figure 6: Share (%) of different workers across industries and years



4.3 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. This is pertinent as several studies have attempted to look at the distribution of contract workers across different size bins and argued that if firms were hiring contract workers to circumvent rigidities in labour regulations, we should observe the highest intensity of contract worker usage in the size bin with 50-99 workers i.e., the threshold below which IDA kicks in. In this study, we do not attempt to do such an analysis. The purpose of this exercise is simply to understand how trends in contract worker usage varied across firms of different sizes. We are cognizant of Bhattacharjea's observation that the way in which employment is supposed to be calculated for the purpose of determining whether or not it meets IDA thresholds does not correspond to employment levels reported in ASI. Factories covered by ASI cannot be accurately divided into size classes that match the coverage of different chapters of IDA.

Furthermore, we divide firms into size bins on the basis of total number of directly hired workers and not total workers. The reason for this is as follows. As noted by Bhattacharjea (2017) using the data for total workers would include contract workers, who are in fact not protected by IDA and not borne on the rolls of the factory. Using the total workers figure to classify firms may well mislead our analysis. We divide firms into the following three bins-- 0 to 49, 50-99, 100 plus directly hired workers. In Figure 7, we find that the share of contract workers in total workforce has increased across all size bins. Thus, firms across all size bins are increasingly more reliant on contract workers to expand employment.

Next, we examine firms in labour and capital-intensive industries in these three size bins separately(Figure 8). The reliance of large firms in capital intensive industries on contract workers is indeed striking. This is in sharp contrast to large labour intensive firms, where the share of contract workers is lower than all other sub-groups. 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(Figure 9). 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. The share of contract workers in large labour intensive firms in flexible states has in fact declined over the time period under study.

Figure 7: Share (%) of different workers across firms of different sizes

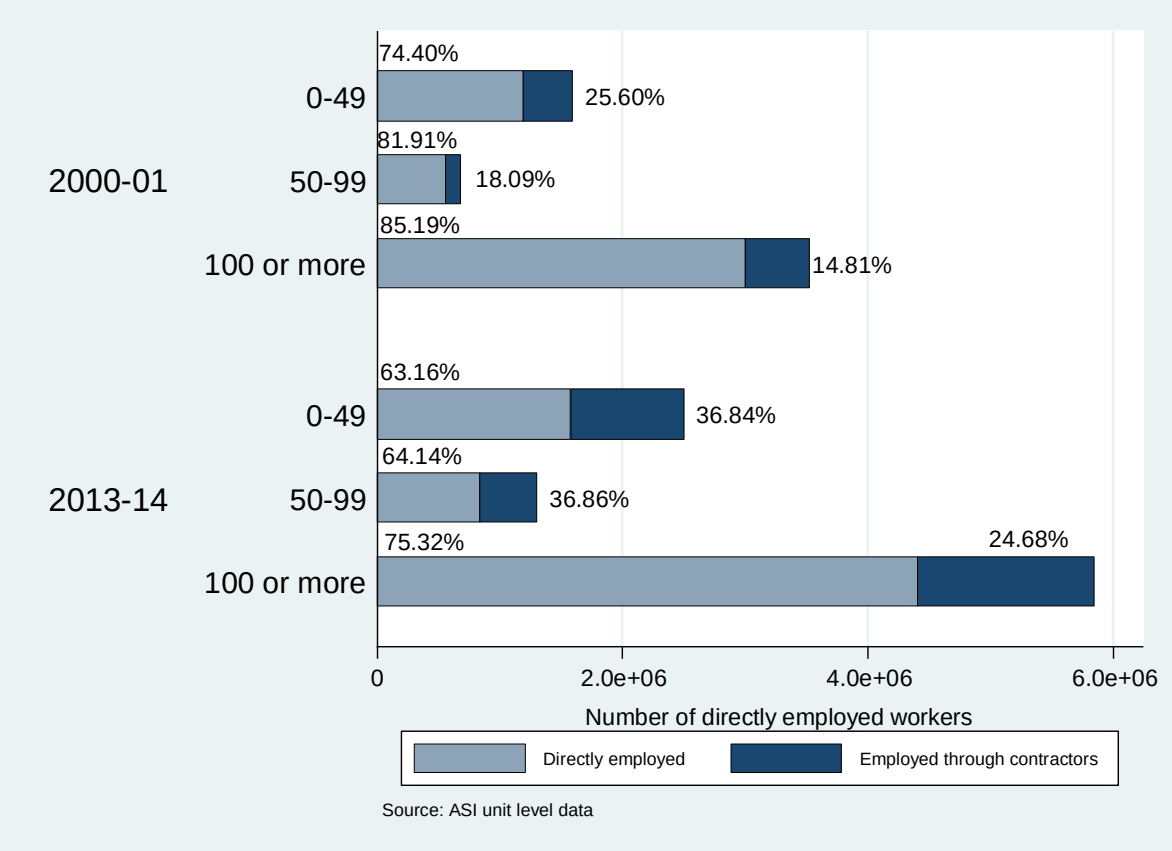


Figure 8: Share (%) of different workers across firms of different sizes and labour intensity

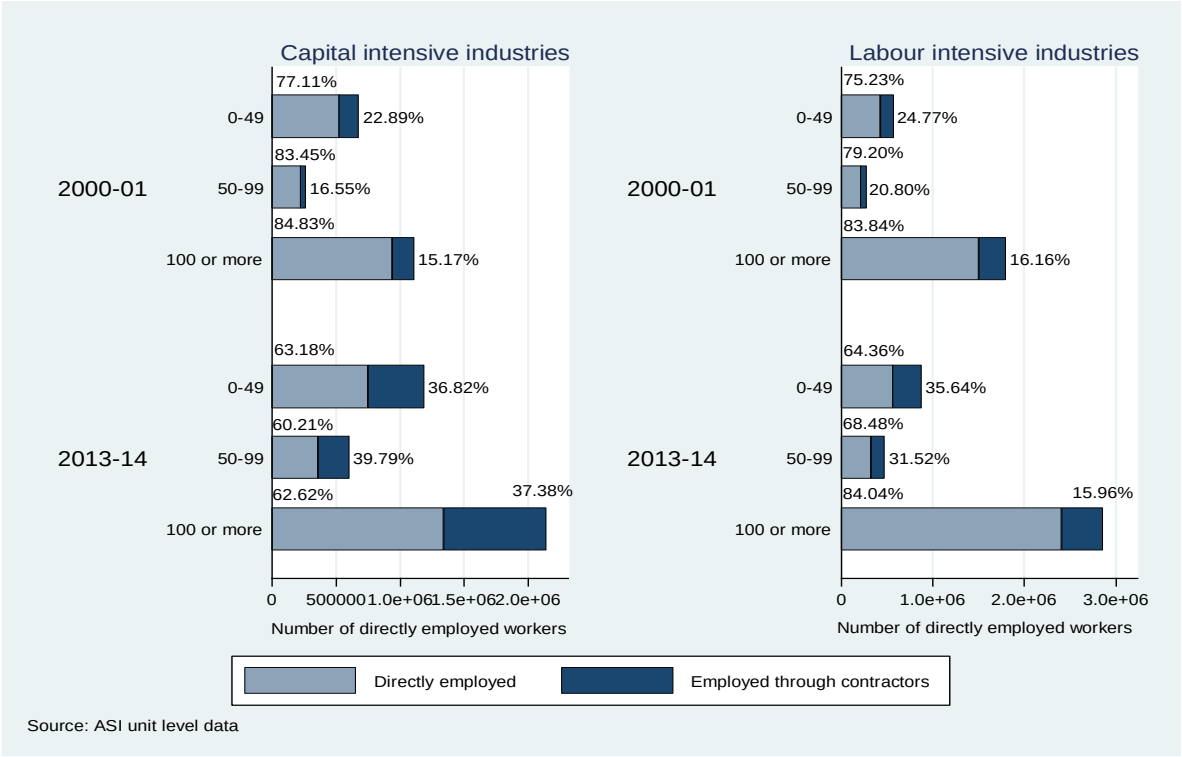
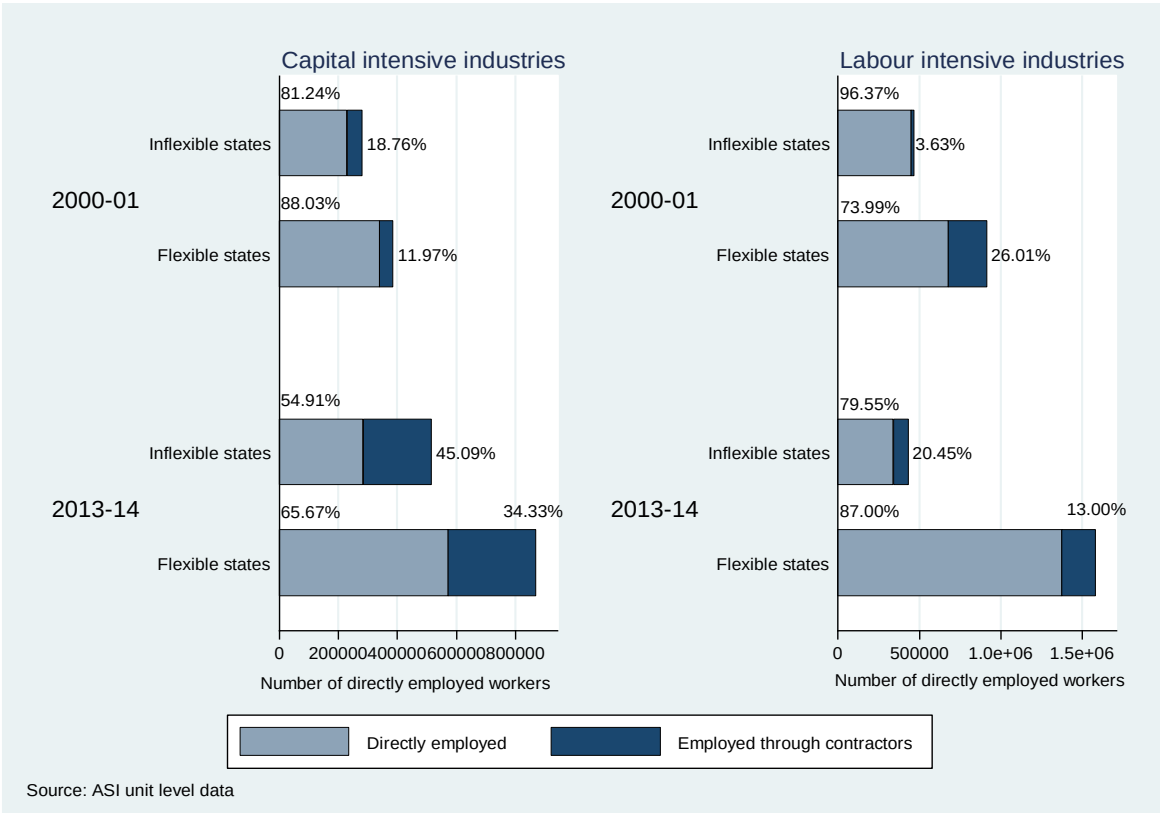


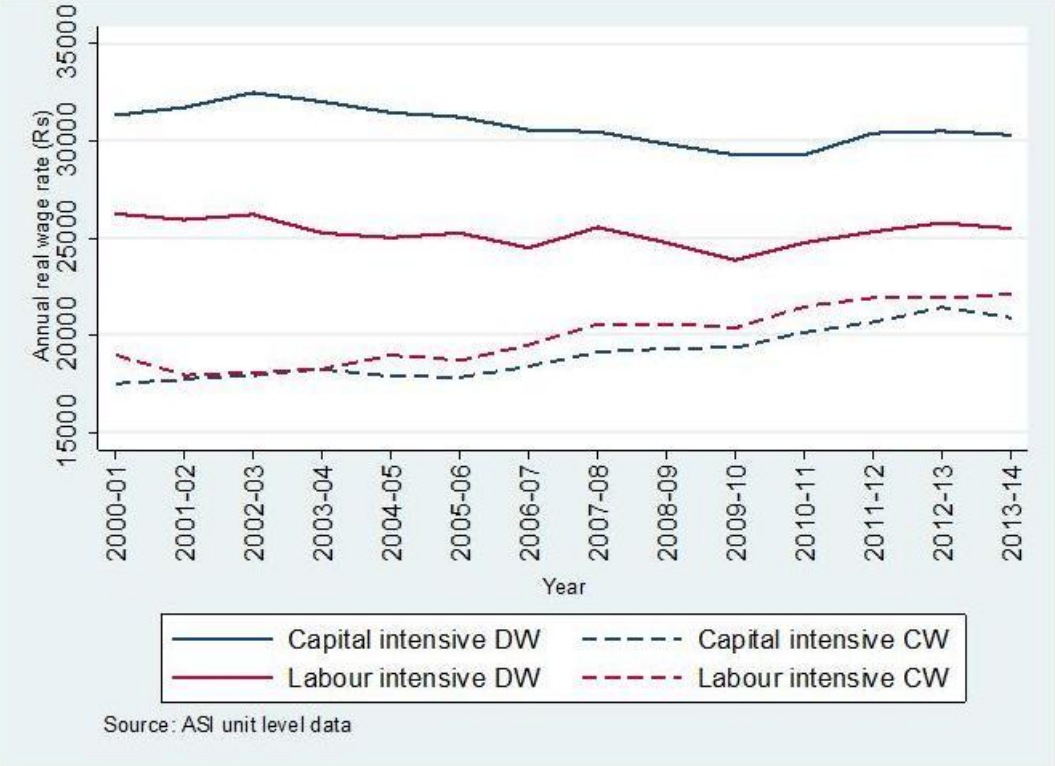
Figure 9: Share (%) of different workers across different industries and states



4.4 Wages of contract workers are significantly lower than those of directly hired workers

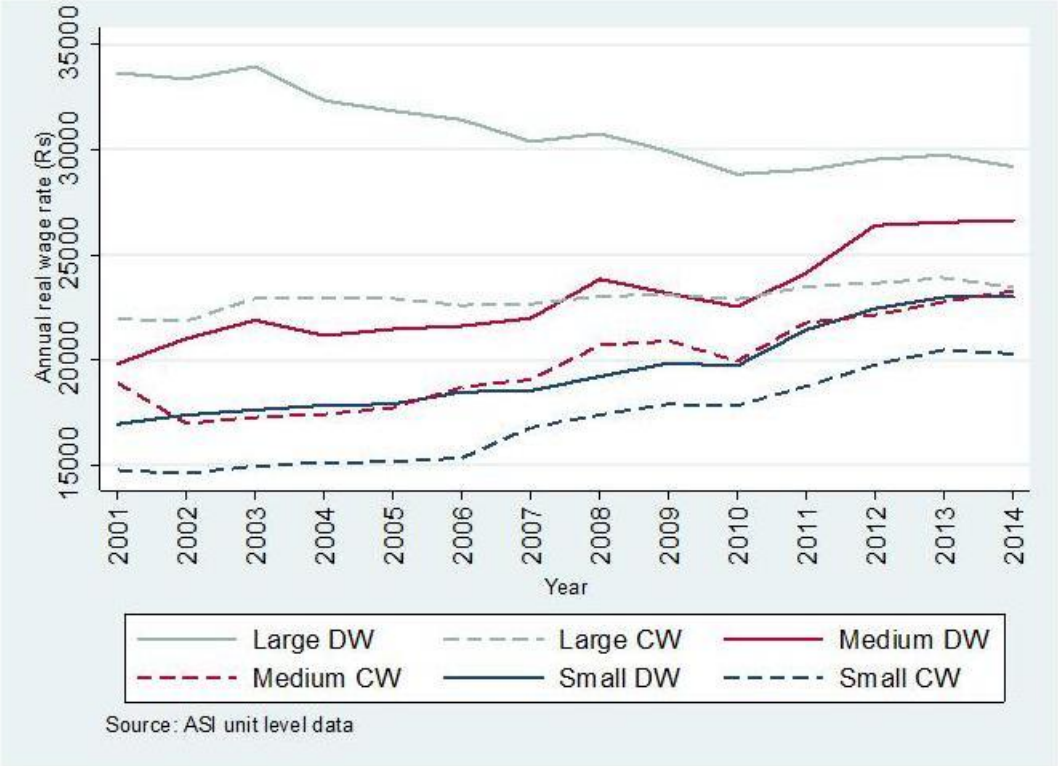
As discussed in Section 2, the wages of contract workers are significantly lower than those of directly hired workers, although the wage differential between the two has narrowed with wages of contract workers growing faster than those of directly hired workers. Thewage differential has narrowed in both labour and capital intensive industries (Figure 10). Wages paid to directly hired workers in labour intensive industries have typically been lower compared to capital intensive industries. On the other hand, contract worker wages in capital and labour intensive industries have been roughly comparable. Importantly, the decline in the wage differential in both industry types has been driven by the rise in (real) wages of contract workers, while the (real) wages of directly hired workers has remained virtually stagnant.

Figure 10: Real wages (in Rs) of different workers across different industries



Next, we examine the wage differential between contract and directly hired workers across different sized firms (Figure 11). Here the wage differential appears to have narrowed only in large firms. This decline has largely been driven by a fall in the real wages of directly hired workers in large firms. For both small and medium sized firms, the gap has remained almost constant over time. It is also worth noting that wages in medium sized firms (both to contract and directly hired workers) are higher than wages in small sized firms. In fact, contract wages paid in medium sized firms are roughly comparable to wages paid to directly hired workers in small firms.

Figure 11: Real wages (in Rs) of different workers across different firm sizes



5. Theoretical framework

Bargaining models have been often used in the literature for explaining negotiations between firms and labour unions. Most of these pertain to situations where all workers hired by the firm are unionised. However, in the Indian scenario, the existence of dualism in the nature of contracts and the partial unionisation of the workforce may result in different outcomes. Saha et al. (2013) explore this issue to some extent 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 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 labour and other intermediate inputs vary in the short run. The production function is given as:

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

where, L_d represents directly hired workers; L_c, workers hired through contractors and y is twice differentiable concave function in its arguments. We assume a Cobb-Douglas production function which is commonly used in the literature.

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

Output elasticity of directly hired workers, workers hired through contractors and other inputs are given by η, γ and β respectively. These capture the productivity of these inputs and therefore we use the terms "output elasticity of input" and "productivity of input" interchangeably in the text. 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, we assume that the firm operates in perfectly competitive markets for workers hired through contractors. Therefore, the price of contract workers is taken to be fixed at w_c. Wages of directly hired workers are given by w_d.We assume$w_d \geq w_c$and following the study by Maiti et al. (2014), we further assume $\eta \geq \gamma$. The firm's short-run profit, π is characterised by the following, where $R(y)$ is the revenue function that firm faces in the output market. We assume $R(y)$ increasing, twice differentiable and concave in in y.

$$\pi(L_d, L_c, I) = R(y) - w_d L_d - w_c L_c - rI$$

Labour union

Turning to the labour unions' objectives, 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. We endogenise the membership of the trade union in this model. 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 $0 \leq \alpha \leq 1$. There is an asymmetry in the objectives of the firms and the union since the firm's objective is to maximise its profit, π whereas union aims to maximise the wage bill of the directly hired workers. We use a simple bargaining model to express our firm-union bargaining problem in partial equilibrium framework. In this set up, firms and union bargain over the number of workers to be hired directly. Wages of these directly hired workers is an outcome of the resulting bargaining outcome such that $w_d = w_d(w_c, L_c, L_d)$.

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

Differentiating with respect to L_d, $L_c$and I, we get the following first order conditions.

$$\frac{\partial \varphi}{\partial L_d} = \alpha R'(y)\left(\eta A L_d^{\eta} L_c^{\gamma} I^{\beta} - w_d L_d\right) + (1-\alpha)(R(y) - w_d L_d - w_c L_c - rI) = 0 \ \ (FOC\ 1)$$

$$\frac{\partial \varphi}{\partial L_c} = \alpha R'(y)(A\gamma L_d^{\eta} L_c^{\gamma-1} I^{\beta} - w_c) = 0 \qquad (FOC\ 2)$$

$$\frac{\partial \varphi}{\partial I} = \alpha R'(y)(\beta A L_d^{\eta} L_c^{\gamma} I^{\beta-1} - r) = 0 \qquad (FOC\ 3)$$

Using these first order conditions, we obtain the following expression.

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

The sufficient condition for the ratio of contract workers to directly hired workers, $\left(\frac{L_c}{L_d}\right)$ to be inversely related their wage ratio $\left(\frac{w_c}{w_d}\right)$ isthat the productivity of contract workers is below a certain threshold, $\bar{\gamma} = 1 - \beta$. However, if $\gamma > \bar{\gamma}$, there exists a critical value,$\alpha^c = \frac{\gamma+\beta-1}{\eta+\gamma+\beta-1}$, below which the ratios are positively related to each other. In what follows, if firm's bargaining power is low enough, in order to curb union's bargaining power, it starts hiring more contract workers relative to directly hired workers even when wages of contract workers increase vis-à-vis their regular counterparts. The value of this threshold varies depending on the productivity wedge between the contract workers and the directly hired workers and is bounded by $\frac{\gamma+\beta-1}{2\gamma+\beta-1}$. This implies that in industries where the directly hired workers are more productive as compared to the contract workers, the firm's bargaining power has to be low enough for it to employ more contract workers than directly hired workers even if contract workers become relatively more expensive. Conversely, in industries where the productivity differences are not so stark, a low enough firm's bargaining power is enough to induce hiring of contract workers. To sum up, we establish that besides wages, the decisions of hiring contract workers critically depends on the productivity differences between the contract and directly hired workers and the relative bargaining power of the firms. Therefore, although contract workers can be hired in place of directly hired workers, they may not perfect substitutes due to possible differences in productivity.

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 hired workers. Our basic premise is that it is not labour market rigidities alone which are driving contractualisation of the workforce. Two other factors also matter. First that contract workers receive lower wages helping firms reduce their wage bill and second that they help the firm's management diminish the bargaining power of directly hired workers. The basic specification proposed to evaluate this is as follows:

$$\ln\left(\frac{CW}{TW}\right)_{fist} = \theta_0 + \theta_1 T + \theta_2 LMR_s + \theta_3 \left(\frac{W_c}{W_d}\right)_{fist} + \theta_4\, GPER_{st} + Z_{fist}\kappa + \upsilon_i + \varepsilon_{fist}(1)$$

CW/TW is the ratio of contract workers to total workers in factory *f* in industry *i* in states at time *t*. LMR is the state level index of labour market regulations. These are time invariant and state specific. $GPER$is gross primary school enrollment ratios which vary over state and time. W_c and W_d are the average wage rates paid to contract and directly hired workers respectively. We also control for the time variant-plant specific characteristics, Z, such as the age of the factory and fuel intensity. We compute estimates of firm's imported input intensity and fuel intensity following Ghose (2016) and Gupta, Hasan and Kumar (2009). Imported input intensity is constructed by dividing the cost of imported inputs by the gross value of output. Fuel intensity is computed by dividing costs of energy input by gross value of output.[18] The fuel intensity measure is a proxy for the infrastructure input intensity of the firms. We use these variables as firm specific time variant controls in our regression. We include industry fixed effects, υ_i, which may influence the ease of substitution between contract and directly hired workers. We refrain from using year-fixed effects as we introduce time trend, *T*, in the specification. As discussed in the previous section, the wage differential between contract and directly hired workers, and the share of contract workers are determined jointly through an equilibrium mechanism and there exists an endogeniety problem[19]. The above equation cannot be estimated using the ordinary least squares and therefore we use the instrumental variables approach 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[20] 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 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. As in the case of wages from the ASI data, we deflate minimum wages using the CPIIW. The other instrument is the rate of absenteeism of directly employed workers. This variable represents the percentage of man-days lost due to absence to the corresponding total man-days scheduled to work[21]. 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.

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[18] It is calculated as a ratio of expenditure on energy inputs, storage and transportation to current value of gross output.

[19] Intuitively, the endogeneity can be explained as follows: When contract workers become more expensive relative directly hired workers increase (i.e., the ratio of wages of contract to directly hiredworkers 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 directly hired workers, resulting in an increase in their wages and consequently a decline in the ratio of the wages of contract to directly hired workers.

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

[21] 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.

They capture the bargaining power of directly employed workers and therefore serve as a suitable instrument for wages of directly employed workers.[22]

Table 5 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 directly hired 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 directly hired 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 directly hired 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 directly hired workers.

Columns 2 and 3 report the results of the regression for capital and labour intensive industries separately. In capital intensive industries, 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 negative and statistically significant, though on LMR it is statistically insignificant. This reflects the fact that for labour intensive industries, circumventing rigidities in labour regulations is perhaps not the main motivation behind hiring contract workers and the existence of a wage differential between the two types of work has a significant effect on the share of contract workers. Next, we breakdown firms by size i.e. small (those having less than 20 directly hired workers), medium (those having 20-99 directly employed workers) and large (those having greater than 100 directly employed workers) .In the case of small firms (Column 4), we find the coefficient on the wage differential and labour market regulations to be negative and statistically significant. 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. Likewise, we find the LMR to be insignificant since for such small firms the labour market regulations do not have a bite. 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 directly hired 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 directly hired

[22] We conduct tests to check issues of weak instrument (Cragg and Donald), Durbin and Wu-Hausman endogneity test and Sargan and Bassman's χ^2tests of over-identification.

workers outweighs the costs arising from the relative increase in their wages over time. We also disaggregate the sample of large firms into largelabour 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. That the effect of the bargaining channel plays out in large capital and not labour-intensive firms may be a consequence of the fact that the former have a greater incentive to cut costs as compared to the latter.

Common wisdom suggests that in firms with a high share of contract workers, the bargaining channel should not be present. Since such firms already have a substantially large share of contract workers that help suppress the bargaining power of directly hired 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 directly hired workers. In order to test this, we classify the plants in the sample into different categories depending on the intensity of contract worker use. More specifically, first, we compute the 25^{th}, 50^{th} and 75th percentile for the share of contract workers in the total number of workers across firms for each year under study. We then classify these firms into the respective categories depending on which quartile the share of contract workers in the firms lies. The estimates from this exercise confirm the above hypothesis. 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 insignificant.

Further, in all our regressions, we control for firm specific time variant characteristics such as the age of the firm, fuel intensity and import intensity of the firm. Additionally, we also control for the gross primary school enrollment ratio of the state to account for changes in the education level of state.

Table 5: Instrumental variable regression results

	ln(CW/TW)									
Category	All (1)	K-intensive (2)	L-intensive (3)	Small (4)	Medium (5)	Large (6)	Large K-intensive (7)	Large L-intensive (8)	Low CW (9)	High CW (10)
ln(WC/WD)	0.653***	0.337***	-0.834**	-1.003***	0.146	0.707***	0.372*	1.125	0.662***	-0.083
	(0.101)	(0.125)	(0.411)	(0.239)	(0.128)	(0.227)	(0.203)	(1.470)	(0.100)	(0.091)
time trend	0.010***	0.014***	0.010***	0.000	0.016***	0.018***	0.023***	0.016	0.015***	0.008***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)	(0.005)	(0.024)	(0.001)	(0.001)
LMR-GHK	-0.060***	-0.067***	0.031	0.008	-0.030**	-0.070***	-0.058***	-0.153	-0.062***	0.003
	(0.008)	(0.010)	(0.031)	(0.011)	(0.010)	(0.019)	(0.022)	(0.140)	(0.008)	(0.003)
N	110,238	46,325	34,985	36,670	40,760	32,808	14,545	10,762	107,782	2,456
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RMSE	0.901	0.751	1.007	0.737	0.692	1.091	0.878	1.331	0.904	0.051

Source: ASI unit-level panel data;

Note: Standard errors clustered at plant level are given in parentheses; (*p<0.10; ** p <0.05; *** p<0.01); the dependent variable is ln(CW/TW); control variables include firm specific characteristics such as ln(age of firm in years), ln(firm's fuel intensity) and year wise ln(state level gross enrollment ratio).

Next, we attempt to examine if contract workers are indeed less productive than directly hired 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).

$$Y_{it} = A_{it} L_{d,it}^{\eta} L_{c,it}^{\gamma} K_{it}^{\beta}$$

Where, Y_{it}, $L_{d,it}^{\eta}$, $L_{c,it}^{\gamma}$, K_{it}^{β} 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,

$$y_{it} = \alpha_0 + \eta l_{d,it} + \gamma l_{c,it} + \beta k_{it} + \varepsilon_{it}$$

where lower case letters refer to natural logs and

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

$\alpha_0$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:

$$y_{it} = \alpha_0 + \eta l_{d,it} + \gamma l_{c,it} + \beta k_{it} + \vartheta_{it} + u_{it}^{q}$$

$\omega_{it} = \alpha_0 + \vartheta_{it}$ 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 6). 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 6.

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 first differenced errors at order one 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. Results from the Arellano-Bond test indicate that we can reject the null of serial correlation at the second order (Column 4). 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 capital and labour intensive industries separately (Table 7). Here, we once again observe both worker types to have a positive and significant effect on firm productivity. However, productivity of directly employed workers is found to be significantly higher than contract workers. Thus, it appears that despite the existence of a significant productivity differential between the two types of workers, firms continue to hire contract workers for the above-mentioned reasons.

Table 6: Productivity regression results

	ln(output) (t)			
Category	Pooled OLS (1)	Fixed effect OLS (2)	SYS1-GMM (3)	SYS2-GMM (4)
ln(output) (t-1)	0.753***	0.277***	0.090***	0.132***
	(0.006)	(0.009)	(0.012)	(0.014)
ln(CW)	0.085***	0.132***	0.131***	0.100***
	(0.002)	(0.004)	(0.005)	(0.006)
ln(DW)	0.059***†	0.176***†	0.172***†	0.142***†
	(0.003)	(0.007)	(0.008)	(0.009)
ln(plant and machinery)	0.100***	0.107***	0.140***	0.139***
	(0.003)	(0.006)	(0.009)	(0.016)
N	79,946	79,946	79,946	79,946
Time fixed effects	Yes	Yes	Yes	Yes
AR(1)			0.000	0.000
AR(2)			0.012	0.237

Source: ASI unit-level panel data;

Note: Robust standard errors are given in the parentheses;(*p<0.10; ** p <0.05; *** p<0.01); † the coefficient of ln(DW) is significantly different from that of ln(CW); 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.

Table 7: SYS2-GMM productivity regression results for capital and labour intensive industries

	ln(output) (t)	
Category	K-intensive (1)	L-intensive (2)
ln(output) (t-1)	0.118***	0.152***
	(0.019)	(0.030)
ln(CW)	0.100***	0.096***
	(0.008)	(0.009)
ln(DW)	0.126***†	0.148***†
	(0.012)	(0.016)
ln(plant and machinery)	0.090***	0.214***
	(0.016)	(0.034)
N	35,540	25,715
Time fixed effects	Yes	Yes
AR(1)	0.000	0.000
AR(2)	0.854	0.144

Source: ASI unit-level panel data;

Note: Robust standard errors are given in the parentheses;(*p<0.10; ** p <0.05; *** p<0.01); † the coefficient of ln(DW) is significantly different from that of ln(CW); 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. Conclusion

Much of the existing literature attributes the increasing use of contract workers across the organized manufacturing sector to rigid labour regulations. Our analysis in this paper suggests that this is not the sole factor responsible for these trends. Contract workers are cheaper than directly hired workers, and their presence in the plant's workforce helps diminish the bargaining power of the latter. Thus, contract workers enable firms to reduce their wage bill through both the direct and indirect channels i.e. the price and bargaining effects outlined in this paper. It is no surprise that most of the growth in employment in the organized manufacturing sector has come via the growth of contract workers. Importantly, since contract workers can be easily shed due to the weak contracts under which they are employed, the sustainability of employment growth driven by growth of contract workers is questionable (Sood et al., 2014).

Given that it is largely profit motive that is driving firms' decisions to hire contract workers, it is important to ensure that wages of contract workers are at par with directly hired workers when performing the same tasks. This is necessary not just from the lens of contract workers, but also directly employed workers who have experienced negligible growth in their real wages

as the pool of contract workers expands. However, policy decisions such as one to hike minimum wages of contract workers to Rs 10,000 a month at the national level (implemented via an executive order in 2016) may well aggravate the problem[23].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.

In another significant step, the government has recently introduced the facility of fixed term employment across all sectors. This attempts to create additional jobs by imparting flexibility to enterprises to adjust their workforce and at the same time enhance worker's job security. According to the draft notification on fixed term employment put out by the Ministry of Labour and Employment, workers are ensured same work hours, wages, allowances and other benefits as that of permanent workers along with all statutory benefits available according to period of service. Further, employers can directly hire fixed term workers from the market without mediation by a contractor and start disbursing wages and enforce social security themselves. However, employers are not mandated to give notice to a fixed term worker on non-renewal or expiry of his or her contract. Thus, by making it easier for firms to lay off workers, this move is expected to trigger job creation. Nonetheless, it is important to have an appropriate framework to regulate fixed term employment. The key safeguards include defining the maximum duration of successive fixed term contracts, defining the number of renewals of these contracts and requiring objective reasons to justify their renewal. Such safeguards are necessary to ensure that fixed term employment does not simply foster employment growth in the short run, but also serve as a pathway to productive and permanent employment in the long run.

[23] The Hindu, Business Line (January 27, 2018)https://www.thehindubusinessline.com/economy/govt-hikes-minimum-wage-for-contract-workers-to-rs-10000/article8519755.ece Last accessed on January 24, 2019

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Appendix

Table A1: 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	32,038	26.93
2001-02	32,365	20.48
2002-03	31,912	17.92
2003-04	42,084	19.49
2004-05	36,092	19.12
2005-06	41,962	23.34
2006-07	42,829	23.76
2007-08	38,795	26.5
2008-09	37,438	23.04
2009-10	41,067	23.75
2010-11	33,938	4.16
2011-12	34,421	3.42
2012-13	37,954	5.99
2013-14	38,597	4.06

Source: ASI unit-level panel data

Table A2: State-wise classification of Labor Market Regulations (LMR) as per each of various studies and the final classification reported in this study

State	BB*	AB-permission	AB-threshold	AB-composite	OECD	LMR
Andhra Pradesh	Flexible	0	0	0	Flexible	1
Assam	0	0	0	0	Inflexible	0
Bihar	0	0	0	0	Inflexible	0
Gujarat	0*	0	0	0	Flexible	0
Haryana	0	0	0	0	Flexible	0
Karnataka	Flexible	Flexible	0	Flexible	0	1
Kerala	Flexible	0	0	0	Inflexible	0
Madhya Pradesh	0*	0	0	0	0	0
Maharashtra	Inflexible	Inflexible	Inflexible	Inflexible	Inflexible	-1
Odisha	Inflexible	Inflexible	Inflexible	Inflexible	0	-1
Punjab	0	0	0	0	0	0
Rajasthan	Flexible	0	0	0	Flexible	1
Tamil Nadu	Flexible	Flexible	0	Flexible	0	1
Uttar Pradesh	0	Flexible	Flexible	Flexible	Flexible	1
West Bengal	Inflexible	Flexible	Inflexible	0	Inflexible	-1

Note: *Original coding was changed on the basis of narrative/evidence from other studies. In the last column, '1' refers to flexible, '0' to neutral and '-1' to inflexible labor market regulations.

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