**UNIVERSITY OF DELHI**
**DELHI SCHOOL OF ECONOMICS**
**DEPARTMENT OF ECONOMICS**

**Minutes of the Meeting**

**Subject**: B.A. (Hons.) Economics, Sixth Semester
**Course**: Indian Economy -II
**Date of Meeting**:21st December 2021 **Venue**: Online (Zoom)
**Chair**: Prof. J.V.Meenakshi & Prof. Aditya Bhattacharjea
Department of Economics, Delhi School of Economics,
University of Delhi

Following is the proposed reading list for Unit -1

1. https://www.foreignaffairs.com/articles/india/2021-12-14/indias-stalled-rise

Complementary material: Arvind Subramanian & Raghuram Rajan (Discussant) – Is the Indian Economy Back? (complementary material for article 1)

2. Chatterjee, Shoumitro, and Arvind Subramanian. India's inward (re) turn: Is it Warranted? Will it Work? *Ashoka Center for Economic Policy, Policy Paper* 01 (2020).

3. Mohan, Rakesh, and Partha Ray. Indian financial sector: Structure, trends and turns. International Monetary Fund, 2017.

4. Trade Policy Review (prepared by secretariat/govt, WTO 2020) chapter 2: Trade and Investment Regimes

5. Harsh vardhan Singh – Trade Policy Reforms since 1991, working paper 02, Brookings India., (excluding annexures starting from pg. 47 & onwards).

6. Bhagwati and Panagariya, 2012, A Multitude of Labour Laws and their Reforms in India's Tryst with Destiny, Collins Business, Noida, Ch. 8.

7. Roychoudhury Anamitra, and Kingshuk Sarkar. "Labour reforms in a neo-liberal setting: Lessons from India." *Global Labour Journal* 12, no. 1 (2021).

## For Teachers

A. Subramanian, Arvind, and Josh Felman. India's Great Slowdown: What Happened? What's the Way Out? *CID Working Paper Series* (2019).Harvard Kennedy School

B. Mohan, Rakesh, and Partha Ray. "Indian monetary policy in the time of inflation targeting and demonetization." Asian Economic Policy Review 14, no. 1 (2019): 67-92

C. Chakraborty, Achin, 2015 Reforming Labour Markets in States- Revisiting the Futility Thesis, Economic and Political Weekly, May 16, 2015

D. Jaivir Singh, Deb Kusum Das, Kumar Abhishek & Prateek Kukreja (2019) Factors influencing the decision to hire contract labour by Indian manufacturing firms, Oxford Development Studies, 47:4, 406-419

E. Goswami and Paul (2021), Labour Reforms in the Indian State of Rajasthan: a boon or a bane. Centre for Sustainable Employment cse.azimpremjiuniversity.edu.in

Note: - **Readings for remaining units will be uploaded in mid-January**.

Azim Premji University

CSE Working Paper

*#33*

# Labour Reforms in the Indian State of Rajasthan: a boon or a bane?

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Centre for Sustainable Employment

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# Labour Reforms in the Indian state of Rajasthan: A boon or a bane?

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The authors examine the impact of labour law deregulations in the Indian state of Rajasthan on plant employment and performance. In 2014, after a long time, Rajasthan was the first Indian state that introduced labour reforms in the Industrial Disputes Act (1947), the Factories Act (1948), the Contract Labour (Regulation and Abolition) Act (1970), and the Apprentices Act (1961). Exploiting this unique quasi-natural experiment, the authors apply a difference-in-difference framework using the Annual Survey of Industries longitudinal data of India's manufacturing establishments. Their results show that reforms had an unintended consequence of the decline in labour use. Also, worryingly, the flexibility resulted in a disproportionate decline in the directly employed worker. Evidence suggests that the reforms positively impact the value-added and productivity of the establishments. The strength of these effects varies depending on the underlying industry and reform structure. These findings prove robust to a set of specifications.

Keywords: labour law reforms, employment, productivity, difference-in-differences, establishment level, India.

Internationally, Indian labour laws are considered rigid and complex. In this vein, recently, the Indian government passed three major labour code bills by the Parliament: The Industrial Relations Code Bill, 2020; the Code on Social Security Bill, 2020; and the Occupational Safety, Health, and Working Conditions Code Bill, 2020 along with the Code on Wages Bill enacted in 2019. After a long time, the government introduced these new laws to reduce complexities, bring more transparency and accountability, and help employers and workers. These reforms in the labour laws with a high degree of political and public interest started back in 2014, with Rajasthan being the first Indian state to deregulate the labour laws in four major Acts (Government of India, 2018).

The reforms in India's labour laws resulted from a rigorous debate. One strand of literature argued the restrictive labour laws hurt the firms by forcing them to remain small and use contractual workers or capital-intensive technologies (Hasan, Kapoor, Mehta, and Sundaram 2017; Ahluwalia, Hasan, Kapoor, and Panagariya 2018; Amirapu and Gechter 2020; Hasan, Mehta, and Sundaram 2020). In contrast, the other strand of literature opined the labour laws could not be held responsible for the Indian economy's sluggish growth (D'Souza 2010; Roychowdhury 2014; Chatterjee and Kanbur 2015; Deakin and Haldar 2015; Roy, Dubey, and Ramaiah 2020). These two strands of opinion on the Indian labour market flexibility differ in various theoretical understanding, methodological details, and empirical ground.

Believing that the strict labour laws are detrimental to the Indian economy, the Indian government started relaxing some of the significant Indian labour laws at the national and sub-national levels (Government of India, 2018). These critical reforms in the Indian labour market require careful, independent evaluation. The labour reforms in 2014 in the Indian state of Rajasthan provide a natural experiment to understand such reforms' impact. In particular, in this paper, we find the causal impact of Rajasthan's labour law reforms on plant employment and performance. Rajasthan deregulated the labour laws in the Industrial

Disputes Act (1947), the Factories Act (1948), the Contract Labour (Regulation and Abolition) Act (1970), and the Apprentices Act (1961). These reforms in the labour laws in Rajasthan allowed us to utilise a quasi-natural experimental research design. We use a difference-in-difference specification to the establishment-level Annual Survey of Industries (ASI) longitudinal data from 2011-12 to 2016-17 to examine the effects of Rajasthan's pro-employer reforms on employees, direct and contractual workers, capital, inputs, gross value added (GVA), total factor productivity (TFP), profits, and workers' emoluments. As the existing literature does not provide any clear-cut opinion of the benefits of the labour market flexibility in the Indian economy, it is not surprising that the empirical outcome of the newly introduced labour reforms on plant employment and performance is ambiguous. Our work contributes to the existing literature by providing evidence on whether the newly introduced flexibility in the labour laws is gainful or not. Our work's novelty is that understanding the impact of deregulations in the Indian state of Rajasthan will help predict the implications of the recent national amendments in labour laws that affect nearly 425 million Indian working-age population. Thus our study on the causal effect of deregulations in the labour laws generates important policy-relevant insights.

Our empirical analysis provides evidence that the reforms had an unintended consequence of the decline in labour use. The implications regarding employment change are similar to D'Souza (2010), Kapoor (2014), Chandru (2014) , Chatterjee and Kanbur (2015), Deakin and Haldar (2015), Roychowdhury (2019a), Roy, Dubey, and Ramaiah (2020) in the sense that higher flexibility causes weaker employment growth. Also, worryingly, the increased flexibility resulted in a disproportionate decline in the directly employed worker. We find the plants that are likely to be affected under the Industrial Disputes Act (1947) reforms experience an expansion in labour compared to the plants that are not under the direct ambit of the Industrial Disputes Act (1947) reforms. Moreover, our data show that the plants that

fall directly under the Contract Labour (Regulation and Abolition) Act (1970) reforms experience greater use of contractual workers than the plants that are likely to be unaffected. We also find reforms to cause the plants in the labour-intensive industries to restructure their production mix by reducing their labour use. In contrast, the newly introduced labour laws' flexibility caused the plants in export-oriented industries to use more contractual workers. Regarding the impact of the reforms on plant inputs and performance, we find the reforms to positively impact the plants' value-added and productivity. Thus we find a tradeoff between employment and performance in Indian manufacturing. The parallel test result indicates no change in the plant outcomes before the reforms in the treatment and control states. Furthermore, the authors find that the reforms did not cause new manufacturing plants in Rajasthan. The findings are robust to a set of specifications.

## Literature Review

Indian labour laws have been the focus of many debates. One strand of literature argues against labour protection on the grounds of strict labour laws; i) directly ii) indirectly reducing the economy's efficiency, and iii) increasing labour substitution with capital or contractual workers. In contrast, the other literature opines that the labour laws could not be held responsible for the Indian economy's sluggish growth.

### *i) Adverse impact of the strict labour regulation: Direct Effect*

Besley and Burgess (2004) find the Indian states' pro-worker regulations to cause lower output, employment, productivity, and investment in the formal manufacturing sector. Another similar study by Ahsan and Pagés (2009), find an adverse impact of employment protection and cost of dispute resolution on employment and output. Moreover, this adverse impact is more for the states and time-frame, where the cost to resolve a dispute is high. Workers do not benefit from these protections as the authors do not find an increase in labour

share or wage bill. Bhattacharya, Narayan, Popp, and Rath (2011) find the rigid labour market in India to hinder the multinationals from operating in the labour-intensive production process compared to countries like China and the Philippines. Also, Lee (2019) finds a lack of labour demand in rigid labour markets in India. This strand of literature opines labour market reforms to arrest high labour costs and rigidity's detrimental effects. The reforms will improve wage share, control the increase of informal employment, and increase aggregate productivity (Dougherty 2009). Amin (2009) analyse the impact of labour laws on the employment of 1948 retail stores in India. He reports that 27 per cent of the stores find labour regulation as a hinder to their business activities. He finds that the labour reforms will increase employment by 22 per cent for an average store. Further, he finds the strict labour laws to increase labour costs, resulting in firms substituting labour with the computer (Amin 2007). Pro-worker legislation or labour unrest also adversely impact the location choice and investments (Sanyal and Menon 2005; Menon and Sanyal 2007). Dougherty, Robles, and Krishna (2011) find that strict labour regulations are likely to harm industries with high labour intensity or high sales volatility. They estimate that firms experience a 14 per cent higher TFP in labour-intensive industries and the states with the flexible labour market than the firms in the labour-intensive but rigid labour market. Similarly, they experience 11per cent higher TFP in a pro-employer state than in the volatile industries' pro-worker state. One recent study by Hasan, Mehta, and Sundaram (2020) finds that rigid labour regulations adversely impact the exporters by reducing the output. The rigid firing restriction reduces the firm's employment responses to temporary shocks (Adhvaryu, Chari, and Sharma 2013). Another impact of rigid labour laws is an increase in corruption. A recent study by Amirapu and Gechter (2020) estimates that regulations increase firms' labour costs by around 35per cent, which increases the possibility of corruption[i].

***ii) Adverse impact of the strict labour regulation: Indirect Effect***

The impact of some policies (like trade liberalisation) can be associated with labour rigidity. Aghion, Burgess, Redding, and Zilibotti (2008) find the dismantling of License Raj helps the industries in pro-employer states to grow more quickly than in pro-worker states. Mitra and Ural (2008) find the positive impact of trade liberalisation on productivity more pronounced for states with a flexible labour market. They also find that trade liberalisation helps the export-oriented industries in states that have flexible labour laws. Labour demand elasticity is also higher with trade liberalisation for the states with flexible labour markets (Hasan, Mitra, and Ramaswamy 2007). Labour regulations are not only limited to generate gains from trade liberalisation and are also crucial in the firm size distribution. Larger sized firms are prevalent in the states with flexible labour regulation. The prevalence of large-sized firms in flexible states is more prominent among the firms that started production after 1982, when labour laws were tightened (Hasan and Jandoc 2012). Thus, Hasan and Jandoc (2012) claim labour regulations to affect the firm's size adversely. Hasan, Kapoor, Mehta, and Sundaram (2017) emphasise that even if India is one of the largest producers and exporter of apparel, the sector is still to operate at its potential. They point to this incapability to the labour regulations that cause the firms to operate at scales that are insufficient to use the advanced techniques. A recent study by Ahluwalia, Hasan, Kapoor, and Panagariya (2018) analyses the impact of labour regulations on employment and wages. They use the 2005 abolition of the quota restrictions on the export of apparel and textile products from developing to developed countries and the variation in the labour regulations across the Indian state as a natural experiment to find the effect of labour regulation. They find significant benefits in employment and wages post 2005 in the apparel and textile industries in states with flexible labour laws.

***iii) Strict labour regulation cause substitution of labour with capital and temporary employment***

Hasan, Mitra, and Sundaram (2013b) find the capital intensity higher for India's firms than other countries with the same economic development level or factor endowments. They find strict labour regulations as one of the primary reasons for the high capital intensity. The rigid labour laws do not help trade gains based on factor abundance comparative advantage (Hasan, Mitra, and Sundaram 2013a). Hasan, Mehta, and Sundaram (2020) find that producers in pro-worker states replace labour with capital. Firms use contractual or fixed-term workers for many reasons (Singh, Das, Abhishek, and Kukreja 2019). Some of the reasons are; to reduce the high labour cost (Sapkal 2016; Basu, Chau, and Soundararajan 2018), reduce the bargaining power of the permanent workers (Saha, Sen, and Maiti 2013), stay away from the legal establishment size threshold of 100 workers (Ramaswamy 2013a; Ramaswamy 2013b), increase flexibility as the employers are free to hire and fire the contract workers (Srivastava 2016), deal with temporary shocks (Chaurey 2015), and many more. Ramaswamy (2013a) finds the strict labour laws to cause the higher intensity of contract workers for the size group of 55-99 workers and in labour-intensive inflexible states. A regional case study by Barnes, Das, and Pratap (2015) in North India's automotive components production shows how a regional contract labour system has helped the employers to keep the wages low, enjoy more flexibility, skip the burden of monitoring and controlling the workers, and weaken the labour rights. However, the use of a contract worker has its demerits. As it is an 'incomplete contract', the workers' underinvest in specific skills (Singh, Das, Kukreja, and Abhishek 2017; Singh, Das, Abhishek, and Kukreja 2019).

***Criticism of the view that Indian labour regulations harm the Indian economy***

The regulations on job security do not negatively affect (D’Souza 2010) as firms transform the work practices and make it flexible through non-compliance or weak enforcement of laws

(Chatterjee and Kanbur 2015). Badigannavar and Kelly (2012) finds that even a pro-worker state like Maharashtra provides weak protection to the formal sector workers and the labour unions. A recent study by Roy, Dubey, and Ramaiah (2020) finds no evidence of the spatial variation in labour regulations flexibility in explaining employment growth variation. They find that higher flexibility associates with weaker employment growth. In a similar vein, Roychowdhury (2019a) and Roychowdhury (2019b) explain that the labour laws cannot be held responsible for the employment stagnation in India's organised manufacturing as it applies to less than 35per cent of aggregate employment. He further finds that the worker's bargaining power is declining in Indian manufacturing. A study on Gujarat's deregulatory reforms by Deakin and Haldar (2015) proposes very little evidence linking law deregulation to growth. In response to the belief that employment protection legislation restricts employment adjustment from demand shock, Sofi and Kunroo (2018) find no evidence from 2000-01 to 2011-12. Moreover, Rodgers and Menon (2013) find that employment adjustment and dispute settlement restrictions cause higher job quality for women.

One of the most influential studies by Besley and Burgess (2004) has been criticised on various conceptual and measurement issues, coding errors, methodological problems, failure to replicate the findings (Bhattacharjea 2006; Jha and Golder 2008; Bhattacharjea 2009; D'Souza 2010; Storm 2019) and, difficulties in the enforcement of the labour laws in India (Fagernäs 2010). Some scholars find the labour laws changes are endogenous to several other economic factors and do not explicitly determine economic indicators (Dutta Roy 2004; Deakin, and Sarkar 2011). Another study that has been severely criticised is Basu, Fields, and Debgupta (2009), which find flexible labour laws beneficial to workers' wages and employment. Roychowdhury (2014) examine their theoretical argument and find their policy conclusion to be unsustainable.

Thus, the impact of strict labour laws on the Indian economy is inconclusive. One group of scholars advocate relaxation in labour laws, while the other group supports labour protection. The differences in opinion stem from both analytical as well as methodological understanding. In this context, the Indian government deregulated the labour laws in recent years, believing that the pre-existing labour laws are detrimental (Government of India, 2018). We analyse the impact of these recent relaxations in labour laws on plant employment and performance. This study adds to the existing literature by finding whether the recent relaxations in the labour laws that one group of scholars have been advocating over the years have been gainful or not. Thus, this paper contributes to the literature on the Indian institutional reform effects, plant employment, and performance in Indian manufacturing, quasi-natural experiment, and the recent developments in the Indian labour market.

## Background

Under the Constitution of India, labour is a subject in the concurrent list where both the Central and the state governments are capable of enacting legislation. After a long time, Rajasthan was the first Indian state that introduced labour reforms in four majors Acts: The Industrial Disputes Act (1947), The Factories Act (1948), The Contract Labour (Regulation and Abolition) Act (1970), and the Apprentices Act (1961) in 2014. Table 1 describes the amendments in each of these Acts.

**Table 1: Labour Reforms in Rajasthan**

| | Major Amendments |
|---|---|
| The Industrial | i. Government approval is not required for companies with 300 or |

| | |
|---|---|
| Disputes Act (1947) | fewer workers to shut down or retrench workers. The earlier limit was 100 workers.<br>ii. The membership requirement to form a union has increased from 15per cent to 30per cent of the total workmen.<br>iii. The time limit for any worker to object has been reduced to three years from an indefinite period. |
| The Factories Act (1948) | i. The threshold limit increased from 10 or more workers with the power to 20 or more workers with power, and 20 or more workers without power to 40 or more workers without power.<br>ii. Any complaint against the employer about the violation of this Act will not receive cognisance by a court without prior permission from the state government. |
| The Contract Labour (Regulation and Abolition) Act (1970) | i. Applicable to establishments that employ 50 or more workers on contract against the former 20 or more workers. |
| The Apprentices Act (1961) | i. Apprentice's stipend will be no less than the minimum wage.<br>ii. Government to bear part of the costs of apprentice training in order to encourage skilling. |

Most of these reforms were pro-employer. These deregulations in the labour laws provide an interesting setup to examine the reforms' impact on plant employment and performance.

Diluting the labour laws can have an ambiguous impact on plant employment and performance. The flexibility in labour laws can increase plant employment as the reform reduces the hiring and firing cost, and therefore, the employers can adjust the labourers according to their requirements and prefer cheap labour. The labour's bargaining power also reduces, and this might act as a catalyst to increase employment. These reforms can also increase contractual workers' use because of their added advantage (Kuroki 2012; Drager and Marx 2017). However, these pro-employer reforms can also cause employment to decline as employers get the authority to shed workers quickly. The lack of powerful labour unions further makes the dismissal process easy (Watanabe 2018; Roychowdhury 2019a; Roychowdhury 2019b). As the labour cost declines with the reforms, plants might increase capital investments to complement the labour. Also, flexible labour laws result in less costly bank loans as the borrower's default risk declines due to the increased flexibility to adjust labour (Alimov 2015). On the contrary, the low cost of labour can cause employers to substitute labour for capital (Hasan, Mitra, and Sundaram 2013a; Hasan, Mitra, and Sundaram 2013b; Hasan, Mehta, and Sundaram 2020). Plant productivity may increase because employers can adjust labourers and lay off unproductive workers resulting in the most productive skill matches (Caballero, Cowan, Engel, Micco 2013; Maida and Tealdi 2020). The worker's effort can also increase because of the fear of dismissal (Bradley, Green, and Leeves 2014). On the contrary, productivity can decrease as low job security might cause the workers to invest less in plant-specific human capital value addition (Acharya, Baghai, and Subramanian 2013), discourage the workers from providing effort, and high wage inequality among the workers (Shimizutani, and Yokoyama 2009; Silva, Martins and Lopes

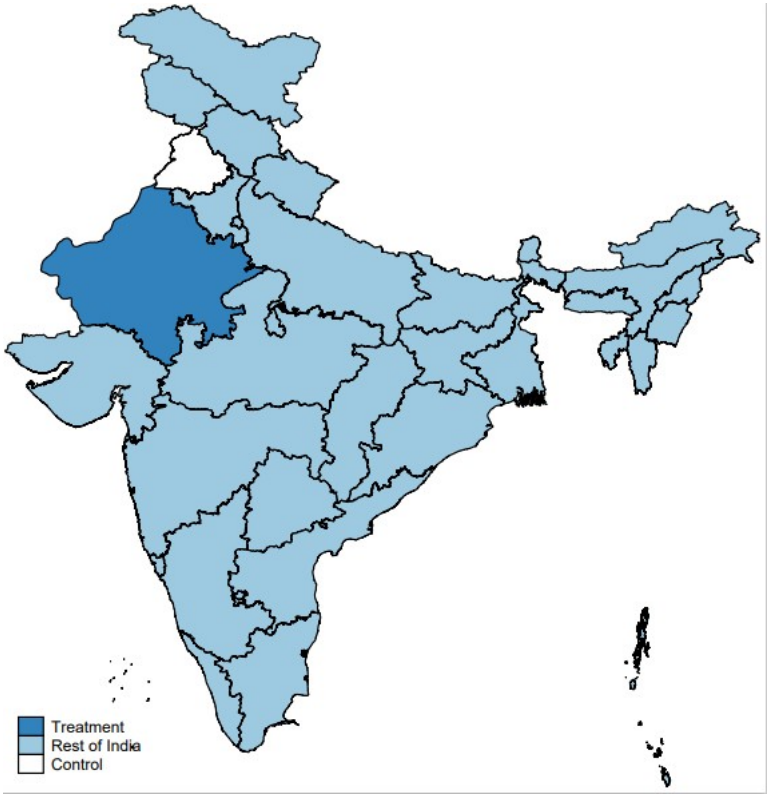
2018). Thus, the effect of the labour laws reforms on plant employment and performance warrants an empirical examination.

## Empirical Methodology

We use the difference-in-difference (DID) framework to compare the plant outcomes before and after the reforms in the treatment and the control state. To the best of our knowledge, we find no other policy or reforms implemented in Rajasthan in 2014 that impacted plant-level outcomes differentially more or less than in the control state. This will help us identify the treatment effect of labour reforms in Rajasthan.

Ideally, we would like to compare the plants in Rajasthan with an observationally similar control group. We choose the establishments in Punjab as a control group because of the following reasons: i) Punjab is a neighbouring state of Rajasthan and have similar characteristics in various aspects ii) Among the other neighbouring states of Rajasthan, i.e., Gujarat, Madhya Pradesh, Uttar Pradesh, and Haryana had also started to think of introducing flexibility in labour laws around 2014 mostly because of the similar political affiliation in those states (ruling party). Thus, we would not get unbiased estimates if we use these states as a control group. iii) Punjab and Rajasthan experience a similar degree of flexibility in labour restrictions before the reform (Government of India, 2018). Furthermore, as a robustness check, we choose establishments from other states as a control group.

**Figure 1: Treatment and the control state in India**




The identifying assumption of the DID estimator is that the treatment and the control group should have similar trends before the reform. In the subsequent section, we show that Rajasthan and Punjab have similar trends in pre-2014. We estimate the following plant level reduced form regression specification in Equation (l) to find the impact of labour laws reforms on various plant outcomes.

$$Y_{ijst} = \beta_0 Treat_i + \beta_1 Post_t + \beta_2 Treat_i * Post_t + X_{ijt} + \kappa_i + \gamma_t + \delta_j t + \epsilon_{ijst} \quad (1)$$

where *i,j,s,t* index plants, industry (2-digit), state and year. $Y_{ijst}$ represents plant-level outcomes like employers, direct workers, contractual workers, capital, inputs, GVA, TFP, profit, and emoluments. $Post_t$ is an indicator variable that takes the value of 1 for the years after the amendments (2014-15 to 2016-17) and 0 otherwise. $Treat_i$ is an indicator variable that takes the value of 1 if the plant is in the treated state Rajasthan and 0 if the plant belongs to Punjab. $\kappa_i$ is the plant fixed effect that controls for any time-invariant unobserved

heterogeneity. $\gamma_t$ is the year fixed effect that controls the year specific unobserved changes. We should keep in mind that $Post_t$ will be completely absorbed by the year fixed effects whereas, $Treat_i$ will be completely absorbed by the plant fixed effects. $X_{ijt}$ are the controls, namely, age of the plant, percentage of the output that the plant export, import dummy trend, GVA, capital, inputs, profit, emoluments, and workers[ii]. $\delta_j t$ represents industry trends and $\epsilon_{ijst}$ is the stochastic error term. We cluster standard errors at the state levels. The coefficient of the interaction of $Treat_i$ and $Post_t$, $\beta_2$ is the coefficient of our interest that captures the causal impact of the labour laws reform on the plant outcomes. We consider the entrants, incumbents, and exiters during the sample period.

The reforms in the labour laws may be more pronounced for the "affected plants". Affected plants are those that are most likely to be affected by the labour laws reforms. We identify affected plants in two ways; i) Plants that fall directly under the Industrial Disputes Act (1947) reforms, and ii) Plants that fall directly under the Contract Labour (Regulation and Abolition) Act (1970) reform, in the pre-treatment period. To find the impact of the reforms on the affected plants, we use triple difference and estimate the following reduced-form regression specification:

$$Y_{ijst} = \beta_0 Treat_i + \beta_1 Post_t + \beta_2 Affected_i + \beta_3 Treat_i * Post_t + \beta_4 Post_t * Affected_i + \beta_5 Treat_i * Affected_i + \beta_6 Treat_i *$$

(2)

The coefficient, $\beta_6$ captures whether the affected and the non-affected plants responded differently after the reform to before in Rajasthan compared to Punjab. A significant $\beta_6$ indicates that the law changes were effective in impacting those plants that were intended to.

We further analyse the impact of the reform on heterogeneous industry categories. Plants in labour-intensive industries or export-oriented industries are more likely to be impacted by increased labour laws flexibility. Many studies find the strict labour regulations to affect the exporters and the labour-intensive industries adversely (Mitra and Ural 2008; Dougherty, Robles, and Krishna 2011; Hasan, Mitra, and Sundaram 2013a; Ramaswamy 2013a; Saha, Sen, and Maiti 2013; Hasan, Mehta, and Sundaram 2020). Therefore, in a similar vein, the increase in flexibility in labour laws should be differentially larger in these types of industries. To test this, we estimate the following regression specification:

$$Y_{ijst} = \beta_0 Treat_i + \beta_1 Post_t + \beta_2 IndustryType_i + \beta_3 Treat_i * Post_t + \beta_4 Post_t * IndustryType + \beta_5 Treat_i * IndustryTyp$$

(3)

$\beta_6$ finds the heterogeneous impact of the changes in labour laws on plant outcomes. $IndustryType_i$ is an indicator variable that takes a value of 1 if a plant is in labour-intensive/export-oriented industries and zero otherwise.

## Data

We use the Indian manufacturing sector's plant-level longitudinal data from the Annual Survey of Industries (ASI) provided by the Ministry of Statistics and Programme Implementation, Government of India. The ASI is a nationally representative survey of plants/establishments registered under The Factories Act, 1949. The Factories Act, 1949, is important legislation that regulates India's manufacturing activities and includes all establishments that employ 10 or more workers (with electricity) or 20 or more workers (without electricity). Our data set covers India's formal manufacturing. The establishments in ASI data are divided into a census sector and a survey sector. The plants with more than 100 workers or that file joint returns in the ASI survey or are situated in some industrially

backward states like Manipur, Meghalaya, Nagaland, Tripura, Andaman, and Nicobar Island are surveyed every year and hence are called census sector. Plants that do not fall in the census sector are randomly sampled using a systematic circular sampling technique within each state*Industry*Sector*4 digit stratum and form the survey sector. We use the information from both the census and the sample sector for manufacturing plants. Furthermore, as a robustness check, we restrict our sample with the census sector's establishments and use a balanced panel. Table 2 presents the number of observations by the census and the sample sector in the treatment and control group.

**Table 2:Number of Observations**

| | Rajasthan(Treatment) | | Punjab(Control) | |
|---|---|---|---|---|
| | Census | Sample | Census | Sample |
| 2011-12 | 638(34.71) | 1200 | 731(27.02) | 1974 |
| 2012-13 | 1726(72.12) | 667 | 1568(65.33) | 832 |
| 2013-14 | 1462(67.03) | 719 | 1392(58.14) | 1002 |
| 2014-15 | 683(29.21) | 1655 | 684(27.15) | 1835 |
| 2015-16 | 1810(66.27) | 921 | 1200(46.11) | 1402 |
| 2016-17 | 1608(60.47) | 1051 | 1215(43.37) | 1586 |

Source: Authors' calculation based on ASI data.

Notes: The bracketed number is the observation percentage in the census sector in that particular group year.

In this study, we utilise the ASI dataset from 2011-12 to 2016-17. The reference period of the ASI data is a fiscal year between April to March. We use plant-level information on employees, direct and contractual labour, capital, inputs, profits, emoluments, GVA, and TFP. Capital is measured as the average of fixed capital's net book value at the beginning and the end of the fiscal year. The labour input is measured as the average number of person worked. The average number of person worked is the ratio of total person-days to the number of working days. We estimate TFP using the methodologies proposed by Woolridge (2009) and Levinsohn and Petrin (2003) refereed in this paper as TFP (method 1) and TFP (method 2), respectively. The procedure for estimating the TFP is presented in the Appendix. GVA is deflated by the suitable wholesale price index (WPI) by groups using 2005 as the base year.

Matching the detailed categories of WPI with the 2-digit industry classification was impossible due to data limitations. However, a close and mindful comparison of the groups was undertaken to choose appropriate price deflators. Fixed capital is deflated using WPI for machinery and equipment. The consumer price index (CPI) of rural labourers and industrial workers is used as a deflator for workers' emoluments. We classify an industry as labour intensive if the capital intensity[iii] is below the total manufacturing median (Kapoor 2015). To find the export-oriented industries, we use the 2 digit industry trade information from U.N. Comtrade and calculate the value of T, where $T = \frac{M - X}{Q - X + M}$ M is import, X is export, and Q is production. If T's values are negative, then that particular industry is export-oriented (Erlat 2000; Krueger, Lary, Monson, and Akrasanee 1981). We use the output data (Q) from the United Nations Industrial Development Organization. We use the information from the pre-treatment years (2011-12 to 2013-14) to categorise the industries. The industries in each category are mentioned in the Appendix. Table 3 summarises the data used in our analysis for the treatment and the control groups pre and post-reform.

**Table 3: Summary Statistics**

| | Treatment | | Control | |
|---|---|---|---|---|
| | Pre Treatment | Post Treatment | Pre Treatment | Post Treatment |
| Observations | 6,412 | 7,728 | 7,499 | 7,922 |
| ***Panel A: Plant Employment*** | | | | |
| Log Employees | 3.120 | 0.700 | 3.134 | 0.004 |

| | | | | |
|---|---|---|---|---|
| | [1.214] | [0.150] | [1.165] | [0.124] |
| Contractual to Total Workers Ratio | 0.213<br>[0.382] | 0.195<br>[0.368] | 0.294<br>[0.413] | 0.322<br>[0.430 ] |
| Direct to Total Workers Ratio | 0.923<br>[0.212] | 0.882<br>[0.284] | 0.858<br>[0.276] | 0.785<br>[0.361] |
| Log Contractual Workers | 3.433<br>[1.210] | 3.590<br>[1.306] | 3.043<br>[1.143] | 3.111<br>[1.108] |
| Log Direct Workers | 2.579<br>[1.148] | 2.541<br>[1.191] | 2.504<br>[1.244] | 2.459<br>[1.301] |
| ***Panel B: Plant Performance and Inputs*** | | | | |
| Log Capital | 10.220<br>[3.017] | 7.549<br>[1.184] | 9.845<br>[2.229] | 9.355<br>[1.482] |
| Log Inputs | 11.811<br>[2.171] | 11.819<br>[2.242] | 11.324<br>[2.011] | 4.602<br>[1.607] |
| Log GVA | 10.485<br>[1.612] | 10.902<br>[1.838 ] | 10.165<br>[1.383] | 10.568<br>[1.554] |
| Log TFP (Method 1) | 7.364<br>[0.987] | 7.735<br>[1.159] | 7.122<br>[0.771] | 7.487<br>[0.914] |
| Log TFP (Method 2) | 7.476<br>[1.000] | 7.850<br>[1.173] | 7.227<br>[0.782] | 7.593<br>[0.926] |
| Log Profit | 8.720<br>[2.011] | 9.705<br>[2.338] | 8.298<br>[1.602] | 9.184<br>[1.865] |
| Log Emolument | 9.234<br>[1.545] | 3.139<br>[0.353] | 9.017<br>[1.394] | 5.203<br>[0.391] |

Source: Authors' calculation based on ASI data.

Notes: The main entries and the brackets' entries are the mean and the standard deviation of each variable. We use the sample weights provided by ASI in the calculation.

## Results

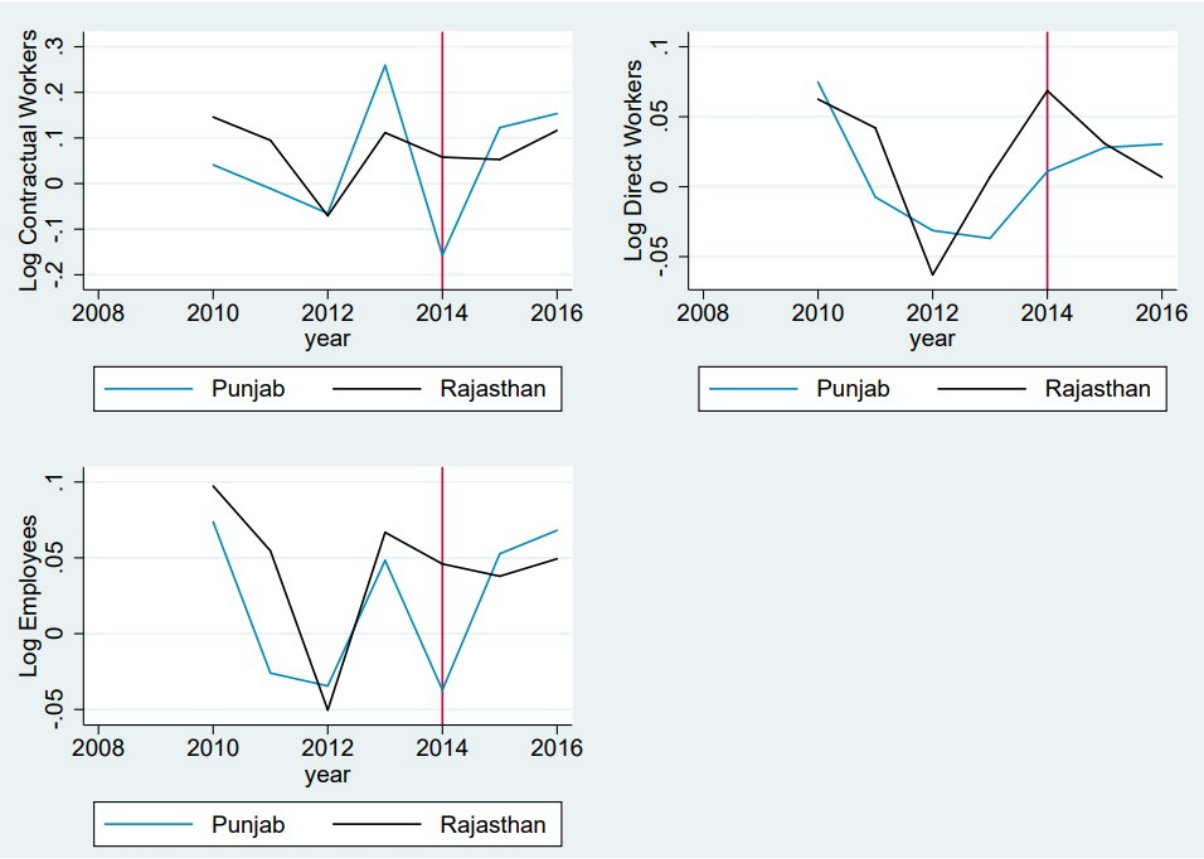
### Parallel Trends

We establish that the parallel trends assumption between the treatment and the control group holds using two approaches. First, we graphically inspect the parallel trend assumption. Figure 2 provides the detrended values of employees, both directly employed and contractual workers, for treated and the control states. Visually, the trends are parallel until 2014-15 and diverge after that. Second, we use a formal placebo regression to check the potential treatment effects before the reforms (2011-12 to 2013-14).

$$Y_{ijst} = \beta_0 Time_t + \beta_1 Treat_i * Time_t + X_{it} + \kappa_i + \gamma_t + \delta_j t + \epsilon_{ijst} \quad (4)$$

where $Time_t$ is a continuous variable (0,1,2) for the years 2011-12, 2012-13 and 2013-14 respectively. If the treatment and the control state hold parallel trends, then $\beta_1$ should be zero. In and Table 5, we find the coefficient of the interaction term $Treat_i * Time_t$ to be statistically insignificant. Thus the parallel trend assumption holds and confirms that the results are not driven by spurious effects.

**Figure 2: Employment by treatment status**




Source: Authors' calculation based on ASI data.

Notes: The values are detrended using first-order differencing.

**Table 4: Testing the Parallel Trends for Plant Employment**

| | Log Employees | Log Contractual Workers | Log Direct Workers | Contractual to Total Workers Ratio | Direct to Total Workers Ratio |
|---|---|---|---|---|---|
| ***Treat * Time*** | -0.008 | -0.036 | -0.020 | 0.001 | -0.002 |
| | (0.004) | (0.007) | (0.005) | (0.000) | (0.002) |
| N | 9981 | 3043 | 8764 | 9914 | 8775 |

| | | | | | |
|---|---|---|---|---|---|
| r2 | 0.46 | 0.32 | 0.26 | 0.06 | 0.08 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. All regressions include Treat and Time as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

**Table 5: Testing the Parallel Trends for Plant Inputs and Performance**

| | Log Capital | Log Inputs | Log GVA | Log TFP (Method 1) | Log TFP (Method 2) | Log Profit | Log Emoluments |
|---|---|---|---|---|---|---|---|
| ***Treat* Time*** | 0.005 | -0.010 | -0.001 | -0.000 | -0.000 | -0.086 | -0.007 |
| | (0.005) | (0.007) | (0.004) | (0.002) | (0.002) | (0.024) | (0.002) |
| N | 9922 | 9922 | 9922 | 9917 | 9917 | 9930 | 9930 |
| r2 | 0.13 | 0.23 | 0.64 | 0.48 | 0.48 | 0.07 | 0.50 |
| Plant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. All regressions include Treat and Time as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

## Effect of Labour Law Amendments on Employment

Table 6 presents the baseline results of the impact of labour reforms on employment outcomes. The outcome variables are log employees, log contractual workers, log direct workers, contractual to total workers, and direct to total workers. We find that Rajasthan's establishments differentially reduced total employees by around 3per cent compared to plants in Punjab, after relative to before the reforms. Furthermore, the plants responded to the reforms by decreasing the number of direct workers by around 2per cent, whereas the decline in contract workers is insignificant. We notice that the ratio of both contractual to total workers and direct to total workers declined significantly by around 1per cent in Rajasthan after the reforms.

**Table 6: Effect on Employment**

| | Log Employees | Log Contractual Workers | Log Direct Workers | Contractual to Total Workers | Direct to Total Workers |
|---|---|---|---|---|---|
| ***Post* Treat*** | -0.029*** | 0.056 | -0.020** | -0.009*** | -0.005** |
| | (0.000) | (0.020) | (0.001) | (0.000) | (0.000) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. All regressions include Post and Treat as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

The impact of the reforms is different for the plants that are most likely to be "affected" from the "unaffected". According to the Industrial Disputes Act (1947) reforms, we notice that the plants with workers greater than 100 and less than 300, and plants with less than or equal to 100 workers in 2014 are most likely to be affected. The triple difference estimates from Equation 2 in panel A of Table 7 indicate that the plants that had workers between 100 and 300 in 2014 experienced a significant increase in total employment and contractual workers, compared to the plants that had greater than 300 workers in Rajasthan compared to Punjab, in post compared to pre-treatment period. However, worryingly, these types of plants experienced a significant decline in direct to total workers. The plants with less than 100 workers in 2014 experienced a significant increase in total employment and direct employment compared to the plants with greater than 300 workers in Rajasthan compared to Punjab, in post compared to the pre-treatment period. Thus, the Industrial Disputes Act (1947) reforms successfully impacted those targeted plants.

According to the Contract Labour (Regulation and Abolition) Act (1970) reforms, we find that the plants with contractual workers more than 20 and less than 50 in 2014 are most likely

to be "affected". Consistent with the hypothesis, the affected plants experienced a significant increase in the ratio of contractual to total workers compared to the "unaffected" in Rajasthan compared to Punjab in post compared to the pre-treatment period (panel B of Table 7). The reforms caused these "affected" plants to have a higher proportion of contractual workers. In the Appendix, we notice a significant decline in workers and insignificant impact on contractual workers. Also, these affected plants experienced a significant decline in both log direct and log contractual workers. Thus the impact on the "affected" plants is twofold i) experienced a decline in both contractual and direct workers (total workers) ii) The decline in total workers is such that the proportion of contractual workers to total workers increased, which means the employers prefer more of contractual workers.

**Table 7: Heterogeneity in Employment for Affected Plants**

| | Log Employees | Log Contractual Workers | Log Direct Workers | Contractual to Total Workers | Direct to Total Workers |
|---|---|---|---|---|---|
| ***Panel A: Based on Changes in the Industrial Disputes Act (1947)*** | | | | | |
| ***Treat* Post* 1. Affected*** | 0.061** | 0.055* | -0.004 | 0.015 | -0.024*** |
| | (0.003) | (0.007) | (0.007) | (0.003) | (0.000) |
| ***Treat*Post*2.Affected*** | 0.037* | -0.002 | 0.016** | 0.005 | 0.004 |
| | (0.438) | (0.695) | (0.590) | (0.082) | (0.074) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.28 | 0.26 | 0.05 | 0.07 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |
| ***Panel B: Based on Changes in the Contract Labour (Regulation and Abolition) Act (1970)*** | | | | | |
| ***Treat*Post*Affected*** | -0.035 | -0.154** | -0.115*** | 0.034* | -0.008 |
| | (0.006) | (0.008) | (0.000) | (0.005) | (0.005) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. "1.Affected" in Panel A are the plants with workers greater than 100 and less than 300, "2.Affected" in Panel A are the plants with less than equal to 100 workers, and the base is greater than 300 workers in 2014. All regressions in Panel A include Treat*Post, Post*Affected, Treat*Affected, Treat, Post, and Affected as control variables apart from various other plant controls. "Affected" in Panel B are the plants with contractual workers greater than 20 and less than 50 in 2014. All regressions in Panel B include Treat*Post, Post*Affected, Treat*Affected, Treat, Post, and Affected as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

## Heterogeneity in Industry Characteristics

Table 8 presents the estimates of the reforms' heterogeneous impact based on industry characteristics. The results indicate that total employees and contractual to total employees declined whereas direct to total workers increased for the plants in labour-intensive industries compared to capital intensive industries in Rajasthan versus Punjab, and after compared to before the reform. These industries are preferring direct workers. This might be because of the plant-specific skill that the direct workers involve. Thus, the reforms helped the plants in the labour-intensive industries restructure the production factors according to their requirements.

As expected, plants in export-oriented industries experienced an increase in contractual to total workers than non-exporting industries in Rajasthan versus Punjab, and after compared to before the reform. The flexibility in the labour laws caused the plants in export-oriented industries to use contractual workers. The export market volatility causes this type of plant to choose contractual workers and reduce labour's fixed cost.

**Table 8: Heterogeneity in Employment based on Industry Characteristics**

| | Log Employees | Log Contractual Workers | Log Direct Workers | Contractual to Total Workers | Direct to Total Workers |
|---|---|---|---|---|---|
| ***Panel A: Labour Intensive Industries*** | | | | | |
| ***Treat*Post*LI*** | -0.046* | -0.150 | 0.019 | -0.053** | 0.036* |
| | (0.004) | (0.027) | (0.015) | (0.004) | (0.004) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |

| | | | | | |
|---|---|---|---|---|---|
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |
| ***Panel B: Export Oriented Industries*** | | | | | |
| ***Treat*Post*EO*** | -0.010 | 0.026 | -0.007 | 0.019*** | -0.003 |
| | (0.007) | (0.052) | (0.012) | (0.000) | (0.003) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |
| Plant FE | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. LI= labour Intensive industries. All regression in Panel A includes Treat*Post, Post*LI, Treat*LI, Treat, Post, and LI as control variables apart from various other plant controls. EO= export-oriented industries. All regressions in Panel B include Treat*Post, Post* E.O., Treat* E.O., Treat, Post, and E.O. as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

## Effect of Labour Law Amendments on Plant Performance and Inputs

We estimate Equation 1 to find the effect of deregulating the labour laws on various plant inputs and performance like capital, inputs, GVA, TFP, profits, and emoluments. The estimates are presented in Table 9. We find that the value added and productivity increased significantly by around 3 per cent due to the new flexibility in labour laws in Rajasthan compared to Punjab. We present the estimates of the impact of the reform on plant inputs and performance by "affected" plants and industry heterogeneities in the Appendix.

**Table 9: Effect on Plant Inputs and Performance**

| | Log Capital | Log Inputs | Log GVA | Log TFP (Method 1) | Log TFP (Method 2) | Log Profit | Log Emoluments |
|---|---|---|---|---|---|---|---|
| ***Post*Treat*** | -0.026 | -0.045 | 0.013* | 0.030* | 0.030* | 0.025 | -0.011 |
| | (0.006) | (0.008) | (0.002) | (0.003) | (0.003) | (0.014) | (0.002) |
| N | 20020 | 20020 | 20020 | 20015 | 20015 | 20037 | 20037 |
| r2 | 0.10 | 0.28 | 0.77 | 0.70 | 0.70 | 0.38 | 0.55 |
| Plant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year F.E. | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Plant Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. All regressions include Post and Treat as control variables apart from various other plant controls. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

**Plant Entry**

Is there more new plants' entry due to the increased flexibility in labour laws post 2014 in Rajasthan? To examine this change at the extensive margin, we estimate Equation 5 at the 2-digit industry*state*year level. We identify a plant birth from the "year of initial production" in the ASI data.

$$Entry_{jst} = \beta_0 Treat_s + \beta_1 Post_t + \beta_2 Treat_s * Post_t + X_{jt} + \delta_j + \theta_t + \alpha_s + \omega_j t + \gamma_s t + \epsilon_{jst} \quad (5)$$

where $Entry_{jst}$ is the total entry of new plants in a year *t*, state *s*, and industry *j*. $Treat_s$ is an indicator variable that takes on the value 1 if the plant is in the treated state Rajasthan and 0 if the plant belongs to Punjab. $Post_t$ is an indicator variable that takes on the value 1 for the years after the amendments (2014-15 to 2016-17) and 0 otherwise. $\delta_j$ is the industry fixed effect that control for any time invariant unobserved heterogeneity at the industry level. $\theta_t$ is the year fixed effect and $\alpha_s$ is the state fixed effects. $\omega_j t$ is the industry trend and $\gamma_s t$ is the state trend. $X_{jt}$ are the control variables, namely, age of the plant, percentage of the output that the plant export, import dummy trend, gva,capital, inputs, profit, emoluments and workers. $\beta_2$ is the coefficient of interest that finds the impact of the reforms on the entry of new plants. We find from Table 10 that $\beta_2$ is statistically insignificant, and thus the impact of the reforms on plant employment and performance is from the incumbent plants in Rajasthan. We do not find the reforms to cause entry of new plants.

**Table 10: Effect on the number of plant entry**

| | Plant Entry | Plant Entry |
|---|---|---|
| ***Post*Treat*** | -0.160 | -0.463 |
| | (0.552) | (0.543) |
| N | 300 | 300 |
| r2 | 0.78 | 0.82 |
| Industry F.E. | Yes | Yes |
| Industry Trends | Yes | Yes |
| Year F.E. | Yes | Yes |
| State F.E. | Yes | Yes |
| State Trends | Yes | Yes |
| Control Variables | No | Yes |

Source: Authors' calculation based on ASI data.

Notes: This regression is estimated at a two-digit industry*state*year level. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%.

## Robustness Checks

In this section, we test the robustness of the impact of the reforms in Rajasthan on employment. We use the establishments in the Indian states of Gujarat, Madhya Pradesh, Haryana, Uttar Pradesh as a control group (Panel A, B, C, D, and E of Table 11). We also estimate the DID in Equation 1 by assuming the control group as all the formal manufacturing establishments in India except those in Rajasthan (Panel F of Table 11). The results indicate that Rajasthan's labour reforms negatively impacted the total number of employees in an establishment. Moreover, this decline in employment is primarily through the decline in employment for directly employed workers. These results are qualitatively and quantitatively, similar to the main results in Table 6, which indicate the labour laws' deregulations to cause a decline in employment.

We also limit the sample of establishments to the census sector and a balanced panel (Panel G and Panel H of Table 11). These establishments are larger, with greater than 100 employees. We do not notice a significant fall in the number of employees, but we notice a shift in the usage from directly employed workers to contractual workers. Worryingly, we find the labour deregulations in Rajasthan cause a decline in the direct workers and an increase in the

contractual workers in these types of establishments. Further, in panel I of Table 11, we control a treatment group-specific trend for further robustness (Bossler and Hans-Dieter Gerner 2020). Similar to the baseline results, we find the reforms to cause a decline in employment by 3.2per cent after controlling for treatment-specific trends. We further perform a regression-based placebo test and artificially assign the treatment period in 2012-13 and find the opposite sign of our baseline results (Panel J of Table 11).

**Table 11: Effect of the labour reforms on employment for various specifications and various samples**

| | Log Employees | Log Contractual Workers | Log Direct Workers | Contractual to Total Workers Ratio | Direct to Total Workers Ratio |
|---|---|---|---|---|---|
| ***Panel A: Control group are the establishments in Gujarat*** | | | | | |
| ***Post*Treat*** | -0.028** | -0.003 | -0.048* | 0.000 | -0.009 |
| | (0.001) | (0.002) | (0.004) | (0.001) | (0.002) |
| N | 29236 | 10272 | 26801 | 29118 | 27196 |
| r2 | 0.50 | 0.27 | 0.20 | 0.05 | 0.07 |
| ***Panel B: Control group are the establishments in Madhya Pradesh*** | | | | | |
| ***Post*Treat*** | -0.067** | -0.052** | -0.088* | -0.004 | -0.003 |
| | (0.002) | (0.001) | (0.011) | (0.004) | (0.000) |
| N | 15937 | 5177 | 14409 | 15823 | 14677 |
| r2 | 0.48 | 0.29 | 0.23 | 0.06 | 0.08 |
| ***Panel C: Control group are the establishments in Haryana*** | | | | | |
| ***Post*Treat*** | -0.082* | -0.057* | -0.092** | -0.027 | 0.006 |
| | (0.009) | (0.006) | (0.002) | (0.011) | (0.010) |
| N | 19651 | 7999 | 17184 | 19510 | 17651 |
| r2 | 0.48 | 0.25 | 0.19 | 0.05 | 0.06 |
| ***Panel D: Control group are the establishments in Uttar Pradesh*** | | | | | |
| ***Post*Treat*** | -0.024* | 0.063 | -0.077* | 0.007* | -0.023** |
| | (0.003) | (0.017) | (0.006) | (0.001) | (0.001) |
| N | 26608 | 9446 | 24425 | 26487 | 24791 |
| r2 | 0.50 | 0.23 | 0.19 | 0.05 | 0.06 |
| ***Panel E: Control group are the establishments in all the neighbouring states of Rajasthan*** | | | | | |
| ***Post*Treat*** | -0.041** | 0.011 | -0.068*** | -0.004 | -0.010 |
| | (0.011) | (0.024) | (0.012) | (0.005) | (0.005) |
| N | 73328 | 26089 | 67122 | 73054 | 68204 |
| r2 | 0.50 | 0.23 | 0.19 | 0.03 | 0.05 |
| ***Panel F: Control group are the establishments in all the Indian states except Rajasthan*** | | | | | |
| ***Post*Treat*** | -0.042*** | -0.017 | -0.059*** | -0.005* | -0.006** |
| | (0.004) | (0.012) | (0.006) | (0.003) | (0.002) |
| N | 209474 | 74889 | 191922 | 208572 | 194956 |

| | | | | | |
|---|---|---|---|---|---|
| r2 | 0.49 | 0.21 | 0.20 | 0.02 | 0.04 |
| ***Panel G: Establishments in the census sector*** | | | | | |
| ***Post*Treat*** | -0.024 | 0.107** | -0.037* | -0.004 | -0.012* |
| | (0.006) | (0.005) | (0.004) | (0.001) | (0.002) |
| N | 10300 | 3737 | 9346 | 10259 | 9530 |
| r2 | 0.53 | 0.24 | 0.26 | 0.07 | 0.08 |
| ***Panel H: Balanced panel*** | | | | | |
| ***Post*Treat*** | -0.020 | 0.056* | -0.058** | 0.012* | -0.025* |
| | (0.003) | (0.005) | (0.003) | (0.002) | (0.002) |
| N | 5107 | 2102 | 4826 | 5104 | 4873 |
| r2 | 0.50 | 0.23 | 0.30 | 0.10 | 0.11 |
| ***Panel I: Controlling Treatment group-specific trends*** | | | | | |
| ***Post*Treat*** | -0.032*** | -0.043 | -0.013 | -0.008** | -0.004 |
| | (0.000) | (0.007) | (0.004) | (0.000) | (0.002) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |
| ***Panel J: Placebo test: Treatment period artificially assigned as 2012-13*** | | | | | |
| **Treat*2012dummy** | 0.011* | -0.054 | 0.020 | 0.008 | 0.005 |
| | (0.002) | (0.050) | (0.005) | (0.001) | (0.002) |
| N | 20128 | 6411 | 17579 | 20012 | 18021 |
| r2 | 0.51 | 0.27 | 0.26 | 0.05 | 0.07 |

Source: Authors' calculation based on ASI data.

Notes: Robust standard errors clustered at the state level in parentheses. *** statistical significance at 1%; ** statistical significance at 5%; * statistical significance at 10%. We have controlled Post, Treat, plant fixed effects, year fixed effects, industry trends, and various other plant controls in all the regressions.

## Conclusion

In this paper, we empirically examined the impact of the 2014 labour laws deregulations in the Indian state of Rajasthan on plant employment and performance. The reform in the labour laws allowed us to utilise a quasi-natural experimental research design. We use a difference-in-difference specification to the establishment-level ASI panel data to examine the effects of Rajasthan's labour reforms.

Our empirical analysis shows the reforms to have an unintended consequence of the decline in labour use. The implications regarding employment are similar to those presented by

D’Souza (2010); Kapoor (2014); Chandru(2014); Chatterjee and Kanbur (2015); Deakin and Haldar (2015); Roychowdhury (2019a); Roy, Dubey, and Ramaiah (2020) in the sense that higher flexibility is associated with weaker employment growth. Also, worryingly, the increased flexibility results in a disproportionate reduction in the directly employed workers. Heyes and Lewis (2015) and Avdagic (2015) find similar results for the European Union. If we consider plants as those affected under the Industrial Disputes Act (1947) reforms, then we find these "affected" plants expand in labour use due to the reforms. If we consider the plants that fall directly under the Contract Labour (Regulation and Abolition) Act (1970) reforms, then we find that these "affected" plants experience greater use of contractual workers proportion. We also find the reforms to cause the plants in the labour-intensive industries to restructure its production mix by reducing the labour use and preferring more directly employed workers. On the other hand, the labour laws' flexibility caused the plants in export-oriented industries to use more contractual workers. We also evaluate labour laws' reforms on the plants' outcomes beyond the employment effects and find a positive impact on GVA and productivity.

**References**


Acharya, Viral V., Ramin P. Baghai, and Krishnamurthy V. Subramanian. "Labor laws and innovation." *The Journal of Law and Economics* 56, no. 4 (2013): 997-1037.

Adhvaryu, Achyuta, Amalavoyal V. Chari, and Siddharth Sharma. "Firing costs and flexibility: evidence from firms' employment responses to shocks in India." *Review of Economics and Statistics* 95, no. 3 (2013): 725-740.

Aghion, Philippe, Robin Burgess, Stephen J. Redding, and Fabrizio Zilibotti. "The unequal effects of liberalization: Evidence from dismantling the License Raj in India." *American Economic Review* 98, no. 4 (2008): 1397-1412.

Ahluwalia, Rahul, Rana Hasan, Mudit Kapoor, and Arvind Panagariya. "The Impact of Labor Regulations on Jobs and Wages in India: Evidence from a Natural Experiment." (2018).

Ahsan, Ahmad, and Carmen Pagés. "Are all labor regulations equal? Evidence from Indian manufacturing." *Journal of Comparative Economics* 37, no. 1 (2009): 62-75.

Alimov, Azizjon. "Labor protection laws and bank loan contracting." *The Journal of Law and Economics* 58, no. 1 (2015): 37-74.

Amin, Mohammad. *Are labor regulations driving computer usage in India's retail stores?*. The World Bank, 2007.

Amin, Mohammad. "Labor regulation and employment in India's retail stores." *Journal of Comparative Economics* 37, no. 1 (2009): 47-61.

Amirapu, Amrit, and Michael Gechter. "Labor regulations and the cost of corruption: Evidence from the Indian firm size distribution." *Review of Economics and Statistics* 102, no. 1 (2020): 34-48.

Avdagic, Sabina. "Does deregulation work? Reassessing the unemployment effects of employment protection." *British Journal of Industrial Relations* 53, no. 1 (2015): 6-26.

Badigannavar, Vidu, and John Kelly. "Do labour laws protect labour in India? Union experiences of workplace employment regulations in Maharashtra, India." *Industrial Law Journal* 41, no. 4 (2012): 439-470.

Baek, Jisun, and WooRam Park. "Firms' adjustments to employment protection legislation: Evidence from South Korea." *ILR Review* 71, no. 3 (2018): 733-759.

Barnes, Tom, Krishna Shekhar Lal Das, and Surendra Pratap. "Labour contractors and global production networks: the case of India's auto supply chain." *The Journal of Development Studies* 51, no. 4 (2015): 355-369.

Basu, Arnab K., Nancy H. Chau, and Vidhya Soundararajan. "Contract Employment as a Worker Discipline Device." (2018).

Basu, Kaushik, Gary S. Fields, and Shub Debgupta. "Labor retrenchment laws and their effect on wages and employment: A theoretical investigation." In *New and enduring themes in development economics*, pp. 181-205. 2009.

Besley, Timothy, and Robin Burgess. "Can labor regulation hinder economic performance? Evidence from India." *The Quarterly journal of economics* 119, no. 1 (2004): 91-134.

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.

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

Bhattacharya, Mita, Paresh Kumar Narayan, Stephan Popp, and Badri Narayan Rath. "The productivity-wage and productivity-employment nexus: a panel data analysis of Indian manufacturing." *Empirical Economics* 40, no. 2 (2011): 285-303.

Bossler, Mario, and Hans-Dieter Gerner. "Employment effects of the new German minimum wage: Evidence from establishment-level microdata." *ILR Review* 73, no. 5 (2020): 1070-1094.

Bradley, Steve, Colin Green, and Gareth Leeves. "Employment protection, threat and incentive effects on worker absence." *British Journal of Industrial Relations* 52, no. 2 (2014): 333-358.

Caballero, Ricardo J., Kevin N. Cowan, Eduardo MRA Engel, and Alejandro Micco. "Effective labor regulation and microeconomic flexibility." *Journal of Development Economics* 101 (2013): 92-104.

Chandru, K. "Ad-hocism in the decisions to modify labour laws." *Economic and Political Weekly* (2014): 15-18.

Chatterjee, Urmila, and Ravi Kanbur. "Non-compliance with India's Factories Act: Magnitude and patterns." *International Labour Review* 154, no. 3 (2015): 393-412.

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

D'Souza, Errol. "The employment effects of labour legislation in India: A critical essay." *Industrial Relations Journal* 41, no. 2 (2010): 122-135.

Deakin, Simon, and Prabirjit Sarkar. *Indian labour law and its impact on unemployment, 1970-2006: a leximetric study*. Cambridge: Centre for Business Research, University of Cambridge, 2011.

Deakin, Simon, and Antara Haldar. "How should India reform its labour laws?." *University of Cambridge Faculty of Law Research Paper* 25 (2015).

Dougherty, Sean M. "Labour regulation and employment dynamics at the state level in India." *Review of Market Integration* 1, no. 3 (2009): 295-337.

Dougherty, Sean, Verónica C. Frisancho Robles, and Kala Krishna. *Employment protection legislation and plant-level productivity in India*. No. w17693. National Bureau of Economic Research, 2011.

Dräger, Vanessa, and Paul Marx. "Do firms demand temporary workers when they face workload fluctuation? Cross-country firm-level evidence." *ILR Review* 70, no. 4 (2017): 942-975.

Roy, Sudipta Dutta. "Employment dynamics in Indian industry: Adjustment lags and the impact of job security regulations." *Journal of development Economics* 73, no. 1 (2004): 233-256.

Erlat, Guzin. "Measuring the impact of trade flows on employment in the Turkish manufacturing industry." *Applied Economics* 32, no. 9 (2000): 1169-1180.

Fagernäs, Sonja. "Labor law, judicial efficiency, and informal employment in India." *Journal of Empirical Legal Studies* 7, no. 2 (2010): 282-321.

Government of India. 2018. *Economic Survey 2018-19 Volume 1*. New Delhi: Ministry of Finance.

Hasan, Rana, and Karl Robert L. Jandoc. 2012. *Labour Regulations and the Firm Size Distribution in Indian Manufacturing.* School of International and Public Affairs, Columbia University.

Hasan, Rana, Nidhi Kapoor, Aashish Mehta, and Asha Sundaram. "Labor regulations, employment and wages: Evidence from India's apparel sector." *Asian Economic Policy Review* 12, no. 1 (2017): 70-90.

Hasan, Rana, Aashish Mehta, and Asha Sundaram. "The Effects of Labor Regulation on Firms and Exports: Evidence from Indian Apparel Manufacturing." *Journal of Comparative Economics* (2020).

Hasan, Rana, Devashish Mitra, and Krishnarajapet V. Ramaswamy. "Trade reforms, labor regulations, and labor-demand elasticities: Empirical evidence from India." *The Review of Economics and Statistics* 89, no. 3 (2007): 466-481.

Hasan, Rana, Devashish Mitra, and Asha Sundaram. "The determinants of capital intensity in manufacturing: the role of factor market imperfections." *World Development* 51 (2013b): 91-103.

Hasan, Rana, Devashish Mitra, and Asha Sundaram. "What explains the high capital intensity of Indian manufacturing?." *Indian Growth and Development Review* (2013b).

Heyes, Jason, and Paul Lewis. "Relied upon for the heavy lifting: can employment protection legislation reforms lead the EU out of the jobs crisis?." *Industrial Relations Journal* 46, no. 2 (2015): 81-99.

Ingham, Hilary, and Mike Ingham. "Job creation and labour market flexibility: miracle or mirage on the Polish labour market?." *Industrial relations journal* 42, no. 4 (2011): 339-357.

Jha, Praveen, and Sakti Golder. *Labour Market Regulation and Economic Performance*. 2008.

Kapoor, Radhika. "Creating 'Good Jobs': Assessing the Labour Market Regulation Debate." *Economic and Political Weekly* (2014): 16-18.

Kapoor, Radhicka. "Creating jobs in India's organised manufacturing sector." *The Indian Journal of Labour Economics* 58, no. 3 (2015): 349-375.

Krueger, Anne O., Hal B. Lary, Terry Monson, and Narongchai Akrasanee. *Trade and Employment in Developing Countries, Volume 1: Individual Studies*. Vol. 1. University of Chicago Press, 1981.

Kuroki, Masanori. "The deregulation of temporary employment and workers' perceptions of job insecurity." *ILR Review* 65, no. 3 (2012): 560-577.

Lee, Woong. "The Role of Labor Market Flexibility in the Job Matching Process in India: An Analysis of the Matching Function Using State-Level Panel Data." *Emerging Markets Finance and Trade* 55, no. 4 (2019): 934-949.

Levinsohn, James, and Amil Petrin. "Estimating production functions using inputs to control for unobservables." *The review of economic studies* 70, no. 2 (2003): 317-341.

Maida, Agata, and Cristina Tealdi. "Does Employment Protection Affect Qualification Mismatch?." *British Journal of Industrial Relations* (2020).

Menon, Nidhiya, and Paroma Sanyal. "Labor conflict and foreign investments: an analysis of FDI in India." *Review of Development Economics* 11, no. 4 (2007): 629-644.

Mitchell, Richard, Petra Mahy, and Peter Gahan. "The evolution of labour law in India: an overview and commentary on regulatory objectives and development." *AsianJLS* 1 (2014): 413.

Mitra, Devashish, and Beyza P. Ural. "Indian manufacturing: A slow sector in a rapidly growing economy." *The Journal of International Trade & Economic Development* 17, no. 4 (2008): 525-559.

Pal, Rupayan, and Udayan Rathore. "Estimating workers' bargaining power and firms' markup in India: Implications of reforms and labour regulations." *Journal of Policy Modeling* 38, no. 6 (2016): 1118-1135.

Ramaswamy, K. V. *Size-Dependent Labour Regulations and Threshold Effects: The Case of Contract-worker Intensity in Indian Manufacturing.* Indira Gandhi Institute of Development Research, Mumbai, India, WP: 2013-012 (2013a).

Ramaswamy, K. V. *Understanding the 'missing middle' in Indian Manufacturing: The role of size dependent labour regulations and fiscal incentives.* Institute of Developing Economies Japan External Trade Organisation, VRF Series No. 480 (2013b).

Riphahn, Regina T., and Rebecca Schrader. "Institutional reforms of 2006 and the dramatic rise in old-age employment in Germany." *ILR Review* 73, no. 5 (2020): 1185-1225.

Roy, Gopal Krishna, Amaresh Dubey, and Suresh Ramaiah. "Labour Market Flexibility and Changes in Employment: Spatial and Temporal Evidence from Indian Manufacturing." *The Indian Journal of Labour Economics* 63, no. 1 (2020): 81-98.

Roychowdhury, Anamitra. "The labour market flexibility debate in India: Re-examining the case for signing voluntary contracts." *International Labour Review* 153, no. 3 (2014): 473-487.

Roychowdhury, Anamitra. "Application of job security laws, workers' bargaining power and employment outcomes in India." *The Economic and Labour Relations Review* 30, no. 1 (2019): 120-141.

Roychowdhury, Anamitra. "An inquiry into the theoretical structure underlying the labour market flexibility argument in India." *Economic and Political Weekly* 54, no. 18 (2019): 4.

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

Sanyal, Paroma, and Nidhiya Menon. "Labor disputes and the economics of firm geography: A study of domestic investment in India." *Economic Development and Cultural Change* 53, no. 4 (2005): 825-854.

Sapkal, Rahul Suresh. "Labour law, enforcement and the rise of temporary contract workers: empirical evidence from India's organised manufacturing sector." *European Journal of Law and Economics* 42, no. 1 (2016): 157-182.

Shimizutani, Satoshi, and Izumi Yokoyama. "Has Japan's long-term employment practice survived? Developments since the 1990s." *ILR Review* 62, no. 3 (2009): 313-326.

Silva, Marta, Luis Filipe Martins, and Helena Lopes. "Asymmetric Labor Market Reforms: Effects on Wage Growth and Conversion Probability of Fixed-Term Contracts." *ILR Review* 71, no. 3 (2018): 760-788.

Singh, Jaivir, Deb Kusum Das, Kumar Abhishek, and Prateek Kukreja. "Factors influencing the decision to hire contract labour by Indian manufacturing firms." *Oxford Development Studies* 47, no. 4 (2019): 406-419.

Singh, Jaivir, Deb Kusum Das, Prateek Kukreja, and Kumar Abhishek. "Law, skills and the creation of jobs as ‘contract’work in India: exploring survey data to make inferences for labour law reform." *The Indian Journal of Labour Economics* 60, no. 4 (2017): 549-570.

Sofi, Irfan Ahmad, and Mohd Hussain Kunroo. "Demand shocks and employment adjustments: Does employment protection legislation create rigidity?." *International Labour Review* 157, no. 3 (2018): 461-480.

Srivastava, Ravi S. "Myth and reality of labour flexibility in India." *The Indian Journal of Labour Economics* 59, no. 1 (2016): 1-38.

Storm, Servaas. "Labor Laws and Manufacturing Performance in India: How Priors Trump Evidence and Progress Gets Stalled." *Institute for New Economic Thinking Working Paper Series* 90 (2019).

Van der Meulen Rodgers, Yana, and Nidhiya Menon. "Labor regulations and job quality: Evidence from India." *ILR Review* 66, no. 4 (2013): 933-957.

Watanabe, Hiroaki Richard. "Labour market dualism and diversification in Japan." *British journal of industrial relations* 56, no. 3 (2018): 579-602.

Wooldridge, Jeffrey M. "On estimating firm-level production functions using proxy variables to control for unobservables." *Economics letters* 104, no. 3 (2009): 112-114.

Yoo, Gyeongjoon, and Changhui Kang. "The effect of protection of temporary workers on employment levels: evidence from the 2007 reform of South Korea." *ILR Review* 65, no. 3 (2012): 578-606.

[i] The adverse impact of the strict labour laws have been discussed for other countries also; like Yoo and Kang (2012) and Baek and Park (2018) for South Korea, Ingham and Ingham (2011) for Poland, Bossler and Gerner (2020) for Germany .

[ii] We exclude the variable as a control that is the dependent variable for a particular regression specification.

[iii] Capital intensity is the ratio of fixed capital to total persons engaged.

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# Factors influencing the decision to hire contract labour by Indian manufacturing firms

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**ABSTRACT**

Over a third of workers employed in the Indian formal manufacturing sector are 'contract' workers – hired through the services of labour contractors, facing lower wages and no job security in relation to regular workers. We investigate the role of a variety of factors that influence the decision of employers to hire in contract workers, using information from a specially commissioned survey of manufacturing firms. While there are immediate cost advantages that tilt firms towards hiring in contract labour, a counterforce has employers favouring regular workers in firms that have a large proportion of their workforce concentrating on production activity – probably instances where long-term human capital investment by regular workers is important for the firm.

**Abbreviation**: CLA: Contract Labour (Regulation and Abolition) Act, 1970 ASI: Annual Survey of Industries NIC: National Industrial Classification MSME: Micro, Small and Medium Enterprises SEZ: Special Economic Zone ICRIER: Indian Council for Research on International Economic Relations

**KEYWORDS**

Employment; contract worker; manufacturing; labour laws; survey; probit

## 1. Introduction

Non-standard employment has burgeoned around the world in recent decades, replacing erstwhile long-term jobs with arrangements that include part-time work, on-call work, and temporary agency work that involves contractual relationships across multiple parties (ILO, 2016). Workers that are employed under such non-standard terms end up having fewer rights, particularly job security, compared to those enjoyed by directly-employed workers, and they typically receive lower wages. Keeping in tandem with this worldwide trend, currently at least 35% of the workers employed in the Indian formal manufacturing sector are 'contract' workers – the Indian term for agency labour, i.e. these are workers that are not directly hired by employers but rather through labour contractors. This has been enabled largely by the judgments of the Indian Supreme Court, attempting to encourage flexibility in the Indian labour market. Given this background, we seek to discern the impulses behind the mix of workers (contract and regular) hired by employers. Given the ubiquity of agency work around the world, it is hoped the insights gathered from the present study of the Indian case are able to speak across jurisdictions.

Our empirical study uses information from a specially commissioned survey of manufacturing firms to construct a series of explanatory variables that may be influencing the choice of

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employers. We model the hiring choices of employers as being based on cost considerations. Since such costs cannot be observed, we treat cost as a latent variable residing behind the observed action as to whether a firm hires contract labour or not. This generates a binary dependent variable that records whether a firm hires contract labour or not, and this variable, in turn, is linked to a set of explanatory variables using a probit model.

To this end, we begin in Section 2 with a brief (and necessarily selective) review of the relevant literature to provide the broad context within which we locate our study. Section 3 follows with a description of the survey. In Section 4, we describe the model and the explanatory variables. Section 5 discusses the results of our estimation and we conclude in Section 6.

## 2. Context

If we go back to the seminal formulations associated with the development paradigm, a variety of structural transformations in the developing economy were envisioned: whether via Kuznets (1971) or Lewis (1954), the process of development was expected to expand the secondary sector and provide employment to increasing populations. As time has gone by, the secondary sector has somewhat expanded in India, but the expansion of employment has been particularly minuscule. Currently, only about 10% of the workforce is employed in the organised[1] sector, of which those employed in the manufacturing sector are even a smaller subset. A prominent discourse has been to attribute this to the constriction in the demand for labour caused by restrictive labour laws. Starting with the earliest paper on the issue (Fallon & Lucas, 1991), almost all the subsequent work on this issue in India has emphasized the *Industrial Disputes Act* as the source of the rigidity in law. A much-cited paper (Besley & Burgess, 2004) related pro-labour/pro-employer legislative changes made by Indian states to the *Industrial Disputes Act* to both levels of output and employment, concluding that pro-labour states perform poorly on both counts. While some successive work has argued that the methods for creating this typology were flawed (Bhattacharjea, 2006, 2009), others have pushed the same measure (Ahsan and Pagés, 2009; Aghion, Burgess, Redding, & Zilibotti, 2008) or expanded the measure to include state-level changes in other labour laws (Dougherty, 2009; OECD, 2007) to reinforce the view that the more pro-labour states have worse labour and output outcomes (Dougherty, Robles, & Krishna, 2011). In much of this work there is at the best passing reference to the growth of *contract labour* in India, which is ironic because in contrast to relatively small legislative changes in labour law that have taken place over time, the most dramatic change is sourced in the judicial interpretation of how contract labour should be governed.

To understand the legal regimes governing contract workers it may be noted that such workers are covered by the Contract Labour (Regulation and Abolition) Act, 1970 (hereafter, CLA).[2] The Act is applicable to establishments employing a minimum of 20 contract workers and it regulates the work conditions of contract workers by requiring the registration of the principal employer and licensing of labour contractors. The CLA was also legislated to abolish contract labour – Section 10 of the CLA empowers the government to prohibit the use of contract labour if it believes that contract workers are being used for perennial[3] jobs, regular workers are doing the same job, or the work is necessary for the industry. Central and state governments have issued notifications prohibiting the employment of contract workers, however the statute is silent on what is to be done with the abolished contract labour – do they lose their jobs or are principal employers obliged to hire them as permanent labour? Since the statute is silent on the matter, the issue of what is to be done with such-abolished contract labour was decided by the Indian Supreme Court. In an initial judgment (Air India Statutory Corporation v. United Labour Union (1997) (9) SCC 377), the court required the principal employer to absorb such labour as regular workmen but a later judgment (Steel Authority of India v. National Union Water Front Workers AIR 2001 SC 3527), which consisted of a larger Division Bench, said that there was no obligation on the part of the principal employer to

absorb abolished contract labour. The Steel Authority judgment enabled employers to use contract labour for a variety of jobs without the fear that they would have to absorb them into permanent jobs. There has been a substantial rise in contract workers since the judgment and by 2011, around 34% of labour employed in the manufacturing sector was categorised as contract labour (see Das, Choudhury, & Singh, 2018).

The bulk of the economic literature sees the expansion of contract labour as a reaction to the strength of the employment protection legislation. For instance, evidence has shown that firms facing more stringent labour regulations hire more contract labour than firms situated in states facing more relaxed regulations (Chaurey, 2015). Further, other work shows that firms in states that have legislated stronger employment protection laws *and* implement them more strictly tend to hire more contract labour (Sapkal, 2016). It has also been shown that while labour productivity of regular workers is higher than that of contract workers, firms in states with stronger employment protection legislation use more contract labour, and such labour exhibits lower productivity (Sofi & Sharma, 2015). While some empirical work suggests that other factors, such as product market regulations, infrastructural bottlenecks and differences in bargaining power, also contribute to explaining differential state outcomes (Kapoor, 2014; Kapoor & Krishnapriya, 2019), a persistent strand of literature not only continues to link inflexible labour regulation and poor performance, but also suggests that contract labour is used to overcome labour market rigidities. A different emphasis in some of the literature says that apart from a positive relationship between the use of contract labour and pro-worker labour institutions, firms hiring in contract labour are also linked to the degree of trade exposure of firms (Maiti & Marjit, 2009; Sen, Saha, & Maiti, 2013).

These views have been somewhat countered in a recent work that uses plant-level data (drawn from the ASI data set) to conclude that while the increasing use of contract workers was perhaps a reaction to labour market rigidities in the early 2000s, this is not a suitable explanatory factor to account for the increasing proportion of contract workers hired more recently (Goldar, 2016). Furthermore, the study notes a negative relationship between import competition and the use of contract labour, contrary to some of the literature. The study also finds a positive relationship between the proportion of contract workers and plant size, and a negative relationship between the proportion of contract workers and capital intensity (i.e. greater share of contract workers in labour-intensive industries). Finally, the study finds that plants located in rural areas employ higher shares of contract labour than their urban counterparts.

Our paper aims to contribute to these debates by using a primary survey of firms. It is quite possible that the flexibility offered by the Steel Authority judgment has worked itself out and wherever it made sense for employers to use contract labour, such adjustment has been made. It is therefore important to understand current patterns of contract labour usage by looking at the characteristics of firms that hire in contract labour. While a good deal of information can be gleaned from the rich Annual Survey of Industry (ASI) data set, a comprehensive and pointed survey is also helpful to discover patterns associated with the hiring of contract labour in the Indian manufacturing sector, both to locate new factors as well as to see if some of the factors mentioned in the existing literature on the subject are recurrent or not. We were thus able to gather information on variables such as the presence of trade unions, financial size of firms and the skill profiles of the workforce – information not available from the ASI data set.

## 3. Survey description

The data used in this paper draws from a specially commissioned survey of manufacturing firms undertaken by the Indian Council for Research on International Economic Relations (ICRIER), as part of a World Bank funded project 'Jobs and Development' 2014–2016. The objective of the survey was to undertake a comparative study between regular workers and contract workers while focusing primarily on issues concerning contract workers. The selected 500 firms, chosen out of the larger ASI frame 2013–14 (the choice of firms is described below), were located in five states,

namely Haryana, Tamil Nadu, Maharashtra, Gujarat and Karnataka. They were additionally spread across eight industry divisions according to National Industrial Classification (NIC) 2008; viz. Manufacture of Food Products; Manufacture of Textiles; Manufacture of Wearing Apparel; Manufacture of Leather and Leather Products; Manufacture of Computer, Electronic and Optical Products; Manufacture of Electrical Equipment; Manufacture of Motor Vehicles, Trailers and Semi-Trailers; and Manufacture of Other Transport Equipment. The selection of the industries and the states for the survey followed the overall employment and output figures pertaining to the Indian manufacturing sector, attempting to capture states and industries that contribute the most to both output and employment.

Having decided on the States and industries to be covered, the enterprises covered by the survey were chosen using random sampling technique drawing from the population of ASI frame of 2013–14 of registered manufacturing firms across different size classes. Using the list of the firms located in each of the chosen states pertaining to the chosen industry, firms were classified into three employment size classes. The firms employing less than 100 workers were classified in first class, the next class consisted of firms employing 100 or more workers but less than 500, and the last class included firms employing more than 500 workers. Given the distribution of the firms across each employment size class, 20 firms were selected for each industry in each state in proportion to the employment levels associated with each class, giving us 500 observations.

## 4. Model and explanatory variables

We assume that the cost faced by an employer that hires contract and regular labour can be represented as $C_C = f_1(x_1) + \varepsilon_1$ where $C_C$ is the cost of hiring in a mix of both contract as well as regular labour and $x_1$ represent labour market and output market conditions. Similarly, the cost faced by an employer who hires only regular labour is given by the expression $C_R = f_2(x_2) + \varepsilon_2$ where $C_R$ is the cost of hiring in only regular labour and $x_2$ represents labour and output market conditions. It is clear that firms will hire in both categories of labour – contract and regular, if and only if $C_C < C_R$. We cannot of course easily observe these costs and instead only observe whether the contract labour is hired alongside regular labour ($y = 1$) or not ($y = 0$). Thus, an employer hires in contract labour only if $C_C < C_R$, or to state it otherwise $C_R - C_C > 0$ – i.e. contract labour is hired to work alongside regular labour only if there is some cost advantage. We can represent the relationship between this cost differential and the factors that influence it in the form[4]:

$$C_R - C_C = x^T\beta + u$$

where $u = \varepsilon 2 - \varepsilon 1$ (a random term) and $x = (x_1, x_2)$ is a vector of k explanatory variables and $\beta$ is a k x 1 vector of unknown parameters. Since we cannot observe $C_R - C_C$ and the expression $C_R - C_C > 0$ must hold, we can say that

$$\Pr(y = 1|X = x, \theta) = \Pr\left(u > -x^T\beta|x, \theta\right) = F\left(x^T\beta|x, \theta\right)$$

Thus, y takes the value 1 if an enterprise reports hiring contract labour and zero otherwise, $x = (x_1, \ldots x_k)^T$ is a vector of explanatory variables, $(\beta, \theta)$ is a vector of unknown parameters that must be estimated (where $\beta$ refers to the coefficients of the equation and $\theta$ refers to the parameters of the underlying distribution) and $F(\cdot)$ is the conditional distribution function of the random term. In other words, the probability of observing the event ($y = 1$) is given by the cumulative density function $F(\cdot)$ and if we assume $F(\cdot)$ can be represented by a probit distribution then the maximum likelihood method can be used to obtain estimates of $\beta$.

Table 1. Descriptive statistics of variables.

| S.No. | Variable | Unit | Obs | Mean | Std. Dev. | Min | Max | Variable Type |
|---|---|---|---|---|---|---|---|---|
| 1 | Age of firm | Year | 464 | 21.655 | 14.705 | 0.000 | 120.000 | Discrete |
| 2 | Turnover (in logs) | | 420 | 2.573 | 1.821 | −0.609 | 8.517 | Continuous |
| 3 | MSME | Dummy | 474 | 0.812 | 0.391 | 0.000 | 1.000 | Dummy |
| 4 | Export | Dummy | 493 | 0.519 | 0.500 | 0.000 | 1.000 | Dummy |
| 5 | Labor intensive | Dummy | 493 | 0.602 | 0.490 | 0.000 | 1.000 | Dummy |
| 6 | **Rigidity of the Labour Law Regime** | Dummy | 493 | 0.432 | 0.495 | 0.000 | 1.000 | Dummy |
| 7 | TU | Dummy | 493 | 0.093 | 0.291 | 0.000 | 1.000 | Dummy |
| 8 | **Ratio of Labour Costs to Total Costs** | Ratio | 419 | 0.336 | 0.185 | 0.020 | 1.000 | Continuous |
| 9 | Wage Difference | Rupees | 491 | 12.940 | 80.743 | −193.62 | 272.42 | Continuous |
| 10 | SEZ | Dummy | 465 | 0.109 | 0.312 | 0.000 | 1.000 | Dummy |
| 11 | **Skill1** | Ratio | 440 | 0.117 | 0.114 | 0.000 | 0.843 | Continuous |
| 12 | **Skill2** | Ratio | 489 | 0.433 | 0.249 | 0.000 | 0.949 | Continuous |
| 13 | **Skill3** | Ratio | 444 | 0.360 | 0.212 | 0.000 | 0.900 | Continuous |
| 14 | **Skill4** | Ratio | 489 | 0.750 | 0.171 | 0.000 | 1.000 | Continuous |

*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

### 4.1 Explanatory variables

A set of 14 variables is included in the estimations as explanatory variables. Table 1 provides the descriptive statistics on these.

**1. Age of the firm** – is the number of years since the firm was founded. It is included to see whether older firms that may have a tradition of employing regular labour persist in doing so.

**2. Output** – The variable is based on the turnover figures reported by the firms and taking the logarithmic value. It is expected to have a direct effect on costs of hiring in contract labour. It is also the case that often levels of output are also used as a measure of size.

**3. Micro, Small, and Medium Enterprises (MSME) –** This dummy variable, is also a measure of size in the sense it captures units below certain stated thresholds of investment (as per the scheduled list in the MSME Development Act 2006). Such units are targeted by government policy, typically provided with incentives so that they may consolidate and grow.

**4. Exports** area dummy variable, capturing whether the firm manufactures for export or not. It indicates connections with international markets.

**5. Labour Intensity –** This variable classifies industries as labour intensive or capital-intensive. This division is made on the basis of the capital-labour ratio value of these industries between 2009 and 2014. The industries that have a capital-labour ratio value higher than the average value of the five industries combined are classified as capital intensive industries, whereas the industries, having a lower average capital-labour ratio value than the overall average are classified as labour-intensive industries. Food Processing, Leather Products and Textiles, and Garments are labour intensive, while Electricals and Electronics, and Auto Components are capital intensive.

**6. Rigidity of the Labour Law Regime** – We classified a state as having a rigid labour regime on the basis of labour market rigidity index constructed by Ramaswamy (2015), modifying the initial classification used by Besley and Burgess (2004). As noted much of the literature around the impact of labour law on employment and output is located around the state level variation in labour legislation with some states classified as pro-labour and others as pro-employer. This variable is included partially to be able to place our results in the context of existing studies, as well as to capture the general variation in the legislated labour law regime across the states. Gujarat, Karnataka and Tamil Nadu are classified as pro-employer and Haryana and Maharashtra as pro-worker.

**7. Trade Union Activity –** The firms were asked whether there was a trade union that was active in relation to their enterprise and a binary variable was constructed using this information. The degree of trade union activity is probably best understood as an index of labour bargaining power prevalent in relation to each firm canvassed in the sample.

**8. Ratio of Labour Costs to Total Costs** – This variable is the amount firms expend on labour in proportion to total costs., which we included as an exploratory exercise to see whether a larger ratio pushes firms to hire contract labour.

**9. Wage Differential** – This is the wage differential between contract labour and regular labour. To remedy the lack of data from the survey with regard to wages paid to contract labour and regular labour, we turn to data from ASI (Annual Survey of Industry). To construct values that would be compatible with the survey, we went back to the list of firms covering the five industries and five states by the ASI in 2013–14 from which we constructed the sample for the survey. Since we have five states (i = 1 … 5) five industries (s = 1 … 5) and three employment classes (e = 1 … 3), we were able to specify a wage differential between regular and contract workers in the ith industry, sth state and eth employment class, which we then matched to the appropriate set of firms when we estimated parameters.

**10. SEZ** – This variable indicates whether the firms are located in Special Economic Zone (SEZ). Firms located in SEZs are given special infrastructural support, fiscal incentives and are subject to de facto looser labour regulation (Singh, 2009).

**11. Level of Skill** – The firms canvassed were asked to divide their workforce into four categories: professional, skilled, unskilled production, and unskilled non-production. Using this information, we calculate a**) Skill1** the ratio of the number of unskilled non production workers to total workers), b) **Skill2** the ratio of number of unskilled production workers to total workers, c) **Skill3** the ratio of the sum of unskilled production and non-production workers to total workers and d) **Skill4** the ratio of skilled and unskilled production workers to total workers. As per standard expectations, it has been conjectured that much of the hiring in of contract workers is confined to tasks requiring lower levels of skill. In addition to this, we also investigate whether the number of workers involved in production activity to the total workers has a bearing on the decision to hire in contract workers.

## 5. Results

We have estimated four variants of the probit model using the maximum likelihood method. The specifications differ from each other in terms of the variable used to capture the skills of the workforce. Initially in Specification I, we include the basic set of explanatory variables and estimate the model using the skill variable skill1; in Specification II, we change the skill variable by replacing skill1 with skill2; in Specification III the skill variable is specified by skill1 and skill3; and finally, in Specification IV the skill variable is specified by skill4.

The diagnostic tests associated with the four specifications are displayed in Table 2. The Mean Variance Inflation Factor across all four specifications ranges from 1.17 to 1.21 indicating a low level of association between the variables and therefore an absence of multicollinearity. The Link Test results tell us that there is no overt specification error since the P values associated with the predicated values are very low, and the P values associated with predicted values squared are

Table 2. Results of diagnostic tests.

| Diagnostic | Specification I | Specification II | Specification III | Specification IV |
|---|---|---|---|---|
| Log likelihood | −173.52,865 | −184.14,051 | −169.68,756 | −180.82,872 |
| Likelihood Ratio chi2 | 65.17*** | 67.40*** | 65.16*** | 74.02*** |
| Pseudo R2 | 0.1581 | 0.1547 | 0.1611 | 0.1699 |
| Mean VIF (Variance Inflation factor) | 1.21 | 1.17 | 1.21 | 1.19 |
| Link Test – P Values for predicted values and predicted values squared | 0.000, 0.887 | 0.000, 0.555 | 0.000, 0.573 | 0.000, 0.323 |
| Hosmer Lemesow Chi2(8) | 8.36 | 8.25 | 20.23*** | 4.53 |
| Hosmer-Lemeshow P > chi2 | 0.3989 | 0.4096 | 0.0095 | 0.8068 |

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level
*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

sufficiently high across all four specifications. Goodness of fit measures is always difficult to interpret in limited dependent variable models; nevertheless, it may be noted that the Pseudo R Square is more or less similar across the four specifications ranging between 0.1699 and 0.1547, while the Hosmer Lemeshow test statistic varies across the models. The P values across the four specifications range from 0.0095 (Specification III) to 0.8068 (Specification IV) encouraging us to think that Specification IV fits the data best and Specification III is a particularly poor fit.

The results of the estimated parameters are displayed in Table 3 – both the estimated coefficients of the probit models and marginal coefficients evaluated at their mean value. are provided.

The first point to note is that six of the explanatory variables, age of the firm, MSME, labour intensity, SEZ, ratio of labour costs to total costs, and rigidity of the labour law regime, are statistically insignificant across all four specifications. Thus, the age of the firm and the financial size of the firm do not influence the decision to hire in contract labour. Furthermore, to one's surprise labour intensity and ratio of labour costs to total costs also do not appear to impact the decision either – the former result is perhaps explained by the low level of variability on account of a simple bifurcation of a few industries. Also insignificant across all specifications is the variable capturing the rigidity of the labour law regime. As mentioned earlier, our classification used the modified classification of the Besley and Burgess (2004) index, suggested by Ramaswamy (2015), and we find little support for the view that firms located in states that have enacted pro-worker laws exhibit greater propensity to hire in contract labour. It just could be the case that the set of five states is too small to make this inference but it is also possible that the 'rigidity' of labour laws may have reached a limit as an overwhelming explanatory factor – the labour market is by now de facto sufficiently flexible everywhere (see Goldar, 2016).

Turning to the significant variables, the variable related to output turnover is positive and statistically significant (at 5% level of significance in all specifications except Specification III where it is at 10% level of significance). This is in line with our expectations, as turnover is taken as a measure of the size of a firm and recent findings suggest that large firms tend to hire in proportionally more contract labour than do smaller firms (Goldar, 2016). It could also be inferred that larger firms (in terms of value of turnover) may find it easier to enter into a contract with a labour contractor than a smaller firm, perhaps because contractors prefer to enter into a contract with well-established firms with a high turnover, rather than small and not-so established units. The average marginal effects are shown in Table 3: a unit increase in size increases the chance of hiring in contract labour by 4.3%.

The export variable is positively signed and is significant across two model specifications – Specification I and III but not Specification II and IV. This suggests that there is some chance that firms producing for the export market choose to hire contract labour. This is in tune with some of the earlier work that suggests that pressures of international competition compel employers to hire contract labour (Maiti & Marjit, 2009; Sen et al., 2013). Also, the uncertainty in foreign demand makes hiring of contract labour a convenient choice for the employers, given that this form of employment provides a relatively greater amount of flexibility. Goldar (2009), on the other hand, finds an inverse relationship between export intensity and use of contract labour, emphasising the fact that at lower levels of export intensity, cost and flexibility seem important for the industrial firm, which is reflected in the use of contract labour. This difference in the results may be attributed to the fact that the export variable enters the two models differently. While in our model, the exports variable is introduced as dummy, Goldar uses the ratio of aggregated export sales to total firm sales. The average marginal effects across the four specifications vary between 7% and 12%.

Also corroborating the standpoint taken by Sen et al. (2013), we find that the Trade Union variable is positively signed and very significant across all model specifications. The average marginal effects consistently show that the presence of a trade union increases the probability of an employer-hiring contract labour by about 35% to 38%. This tells us that the presence of trade union activity (and therefore the presence of greater labour bargaining power) substantially increase

**Table 3.** Factors influencing the decision to hire contract labour by Indian manufacturing firms: maximum likelihood estimation.

| | Specification I | | | Specification II | | | Specification III | | | Specification IV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Explanatory Variable | Coefficients | Marginal Effects dy/dx | Mean Value X | Coefficients | Marginal Effects dy/dx | Mean Value X | Coefficients | Marginal Effects dy/dx | Mean Value X | Coefficients | Marginal Effects dy/dx | Mean Value X |
| Age of firm | 0.002 | 0.001 | 20.708 | 0.003 | 0.001 | 21.033 | 0.003 | 0.001 | 20.828 | 0.003 | 0.001 | 21.033 |
| | (0.006) | (0.002) | | (0.005) | (0.002) | | (0.006) | (0.002) | | (0.005) | (0.002) | |
| Turnover (in logs) | 0.116*** | 0.038*** | 2.514 | 0.118*** | 0.039*** | 2.522 | 0.110** | 0.036** | 2.536 | 0.131** | 0.043** | 2.522 |
| | (0.045) | (0.015) | | (0.044) | (0.015) | | (0.046) | (0.015) | | (0.045) | (0.015) | |
| MSME | 0.014 | 0.004 | 0.866 | −0.006 | −0.002 | 0.869 | −0.064 | −0.021 | 0.869 | 0.071 | 0.024 | 0.869 |
| | (0.234) | (0.076) | | (0.229) | (0.076) | | (0.239) | (0.078) | | (0.231) | (0.077) | |
| Labour intensive | −0.200 | −0.065 | 0.601 | −0.144 | −0.048 | 0.607 | −0.213 | −0.069 | 0.605 | −0.067 | −0.022 | 0.607 |
| | (0.174) | (0.057) | | (0.167) | (0.056) | | (0.176) | (0.057) | | (0.172) | (0.057) | |
| export | 0.319** | 0.104** | 0.557 | 0.227 | 0.076 | 0.554 | 0.358** | 0.117** | 0.564 | 0.255 | 0.084 | 0.554 |
| | (0.163) | (0.053) | | (0.157) | (0.052) | | (0.165) | (0.054) | | (0.159) | (0.052) | |
| **Rigidity of the Labour Law Regime** | 0.279 | 0.091 | 0.405 | 0.277 | 0.092 | 0.409 | 0.270 | 0.088 | 0.412 | 0.199 | 0.066 | 0.409 |
| | (0.177) | (0.058) | | (0.173) | (0.057) | | (0.181) | (0.059) | | (0.176) | (0.058) | |
| TU | 1.110*** | 0.364*** | 0.090 | 1.054*** | 0.351*** | 0.095 | 1.129*** | 0.369*** | 0.092 | 1.123*** | 0.372*** | 0.095 |
| | (0.266) | (0.089) | | (0.257) | (0.087) | | (0.268) | (0.089) | | (0.260) | (0.087) | |
| **Ratio of Labour Costs to Total Costs** | −0.518 | −0.170 | 0.335 | −0.522 | −0.174 | 0.330 | −0.546 | −0.178 | 0.332 | −0.602 | −0.199 | 0.330 |
| | (0.507) | (0.166) | | (0.460) | (0.153) | | (0.518) | (0.169) | | (0.456) | (0.151) | |
| Wage Difference | 0.00326*** | 0.001*** | 6.737 | 0.00317*** | 0.001*** | 7.011 | 0.00269** | 0.001** | 5.625 | 0.00343*** | 0.001*** | 7.011 |
| | (0.001) | (0.000) | | (0.001) | (0.000) | | (0.001) | (0.000) | | (0.001) | (0.000) | |
| SEZ | 0.136 | 0.044 | 0.122 | 0.194 | 0.065 | 0.120 | 0.132 | 0.043 | 0.125 | 0.100 | 0.033 | 0.120 |
| | (0.249) | (0.081) | | (0.239) | (0.080) | | (0.248) | (0.081) | | (0.245) | (0.081) | |
| **Skill1** | 0.751 | 0.246 | 0.113 | | | | 0.991 | 0.323 | 0.113 | | | |
| | (0.796) | (0.261) | | | | | (0.803) | (0.262) | | | | |
| **Skill2** | | | | 0.263 | 0.088 | 0.443 | | | | | | |
| | | | | (0.338) | (0.113) | | | | | | | |
| **Skill3** | | | | | | | 0.640 | 0.209 | 0.344 | | | |
| | | | | | | | (0.402) | (0.131) | | | | |
| **Skill4** | | | | | | | | | | −1.384*** | −0.458*** | 0.753 |
| | | | | | | | | | | (0.520) | (0.172) | |
| _cons | −1.194*** | | | −1.206*** | | | −1.395*** | | | −0.150 | | |
| | (0.343) | | | (0.349) | | | (0.369) | | | (0.488) | | |

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level
Note: Figures in parenthesis represent standard errors.
*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

the chances of a firm hiring in contract labour. It is fairly well known that a regular worker has a greater chance of joining a trade union (if a trade union has been able to establish itself in the firm) compared to a worker hired through a contractor. Therefore, the employer may prefer to employ a contract worker, rather than a regular worker, in an attempt to weaken the bargaining strength of the trade union (Kumar & Singh, 2018). In this context, we were suspicious that the trade union variable is endogenous to the model but this turned out not to be the case because the model was separately estimated as a bivariate probit with the hiring of contract labour and the presence of trade union as two dependent binary variables. In all specifications, the value of rho (the correlation between the error terms of the two equations) was insignificant suggesting that the two equations could be estimated separately with no endogeneity issues (Knapp & Seaks, 1998).[5]

The same high level of significance across all specifications is shared by the variable that captures the wage difference between the wages paid to regular workers and contract workers. This finding complements the fact that contract workers (who are kept outside of formal trade unions) offer employers the chance to terminate the relationship easily and pay lower wages. As can be seen in the table, while highly significant, the average marginal effects are small – across all specifications, a rupee increase in the wage difference on the average leads to 0.1% increase in the chance of hiring in a contract worker. This result hides the interaction with the presence of a trade union. It turns out that the wage differential is very differently related to the dependent variable, depending on whether a union is present in the firm or not.

In Figure 1, we have plotted the probability of hiring contract worker by employers against the increase in the wage differential for firms who have a union present and those that do not. (Figures 1 and 2, both use estimates associated with Specification IV – these figures do not vary much across all specifications.) It is immediately obvious that at all levels of wage difference, the presence of a trade union leads to a much greater chance that contract labour will be hired in by the employer. In the figure, this is dramatically demonstrated by highlighting the point that if there is no difference between wages paid to contract or regular workers then the probability of hiring contract worker would increase by 42% due to presence of trade union. In Figure 3, the previous figure is reproduced, to highlight the point that given an equal probability of hiring in contract labour, if a union is present, the wage differential associated with this chance is far lower than if a union were not present. This suggests that if a union is present then contract labour is perhaps used to bargain down wages of regular workers.

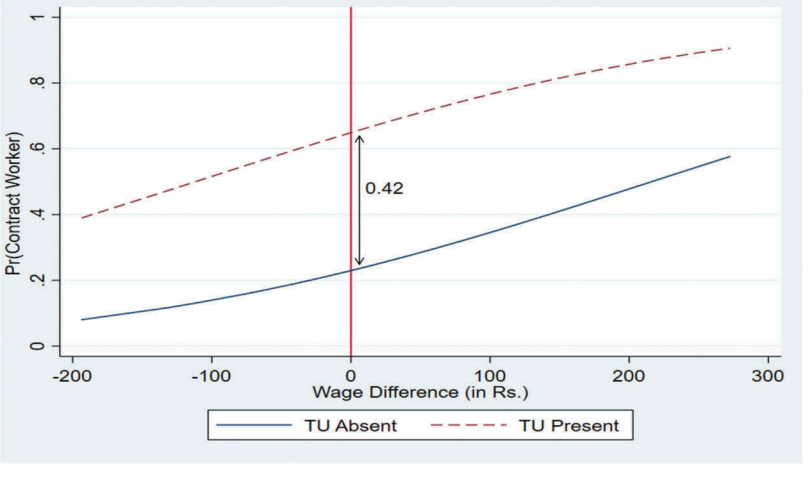


**Figure 1.** Difference in the probability of hiring contract workers based on presence of a trade union.
*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

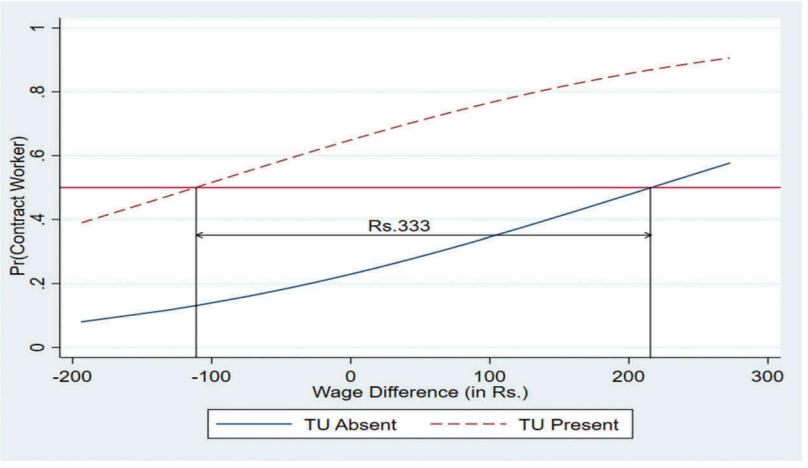


**Figure 2.** Wage differentials, based on proportion of contract workers and the presence of a trade union.
*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

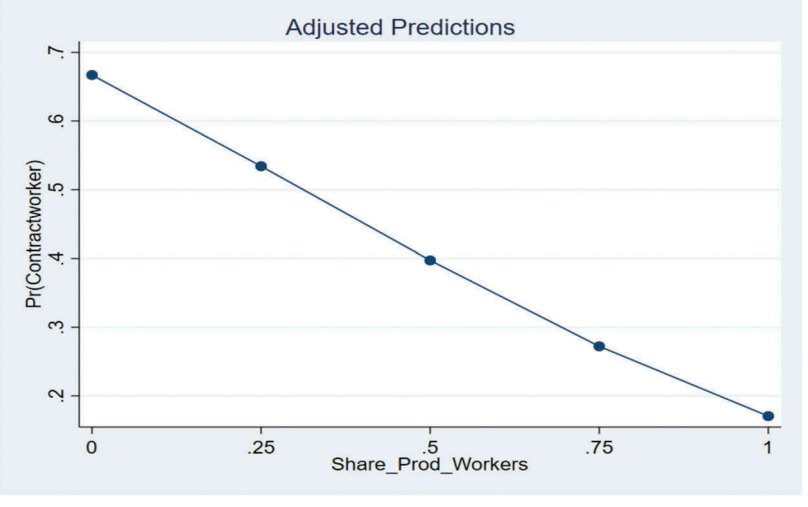


**Figure 3.** Share of production workers in total workforce and probability of hiring contract workers.
*Source*: ICRIER Survey on labour issues in Indian Manufacturing sector 2015

Aside from easily discernible cost advantages explored above, we also locate newer findings from the survey data. The firms canvassed were asked to divide their workforce into four categories – professional, skilled, unskilled production and unskilled non-production. Using this information, we estimated a series of ratios that capture the skill profile of sampled firms. The broad impulse behind asking this question was to see whether the traditional association of contract labour being used for unskilled peripheral work held or whether contract workers were used in core activities as well. In Specification I we take the skill variable to be the ratio of unskilled non-production workers to total labour and find the coefficient to be insignificant. This tells us the hiring in of contract labour is not in any significant way related to peripheral activities of firms. Next, we explore the question as to whether contract labour is hired by firms that use larger proportion of unskilled labour. Thus, in Specification II we take the skill variable as the ratio of unskilled workers (i.e. unskilled production and unskilled non-production) to total

workers and find the coefficient to be again insignificant. This seems broadly to tell us that the use of unskilled labour is not directly associated with the hiring in of contract labour. We have modified this approach in Specification III where we take the ratio of both unskilled production workers and unskilled non-production to total workers separately in the equation to check whether some disaggregation can give us some insight. Instead, we find both the variables capturing unskilled production workers to total workers are not only insignificant but as we can see in the table on diagnostic tests, this specification of the model fares very badly in terms of goodness of fit. This tells us that there is no clear relationship between being unskilled and being hired as contract labour – at least some contract workers are doing 'skilled' jobs (see Kumar & Singh, 2018; Singh, Das, Kukreja, & Abhishek, 2018).

This lack of linkage between unskilled workers and the decision to hire in contract labour is perhaps better understood when we look at the specification in which the variable in question is strongly significant. In Specification IV, we include the ratio of skilled and unskilled production workers to total. This specification does not emphasize skill levels of workers but rather the number of workers, skilled or unskilled that are involved in production work. As can be seen in Table 3 the coefficient on this variable is highly significant. The negative coefficient tells us that in firms with a large share of workers devoted to production activities are less likely to hire in contract labour. It is when the ratio of workers involved in production activity to the total is lower that it is likely that the firm hires in contract labour. The marginal effects indicate that, on average, as the ratio of production workers to the total decreases by a unit, there is a 46% increase in the chance of employers hiring in contract labour. In Figure 3, it can be seen that as share of production workers increases up the probability of a firm hiring in contract labour steadily declines. Sitting in this finding is perhaps a ratification of the *incomplete contract* formulation of labour markets,[6] which would suggest that firms that concentrate relatively large amounts of their workforce in production activities may be foregoing some of the direct cost advantages of hiring contract workers and instead hiring in regular workers. This is because the terms of employment available to regular workers presumably allow them to invest in the job because there is some guarantee of permanent/long term tenure. Thus, the cost advantage of contract workers may be fine up to a point, but in tasks that require persistent investment in the job, there may be a counter force that indicates a preference for more permanent workers.

## 6. Discussion and conclusion

In recent years, the labour market in Indian manufacturing has seen an increase in the employment of workers supplied by labour contractors with the relationship being governed by the Contract Labour (Regulation and Abolition) Act, 1970. Such workers are employed by firms in the organised sector on a temporary basis through a government-licensed intermediary or contractor. The share of these workers in the organised manufacturing sector has increased substantially from 13% in 1995 to 34% in 2011 (Das et al., 2018). This increasing use of contract workers in the formal sector calls for a closer investigation into the factors that influence the firms' decision to hire contract workers. In the present study, we have explored these factors using the responses from a specially commissioned survey of manufacturing firms.

We find that the firms with higher turnover, and therefore larger firms, are more likely to engage with contract workers. Also, there is a high probability that firms that produce for the export market will hire in contract labour. Further, our results indicate that the presence of trade union activity substantially increase the chances of a firm hiring in contract labour. Put together with the result that the difference in wages paid to regular and contract workers significantly influences the chances of hiring in contract labour, we conclude that in the presence of trade unions employers may be using contract workers to bargain down the wages of regular workers.

These results corroborate earlier findings but the two new results are worthy of some note. First, labour market rigidity, captured as legislative variation across states, in influential literature

on the Indian labour market is insignificant in explaining contract labour use. This could perhaps be viewed as evidence supporting the view that the effects of protective labour legislation on flexibility in the labour market are diminishing. The second and particularly interesting results pertain to skills and contract labour. The results across the first three specifications of the model indicate that is contract labour not associated with peripheral activities of the firm nor is there is a significant link between the proportion of unskilled workers and the probability of employers hiring in contract labour. This finding allows us to speculate that at least some contract workers are doing skilled jobs, and further research needs to investigate the precise substitution between contract and regular workers. The most interesting finding is that we find the ratio of production workers (skilled and unskilled) to total workers is negatively (and very significantly) related to the probability of employers hiring in contract labour. This may indicate that while there may be immediate cost advantages to hiring in contract labour, in situations where labour is vital for production (reflected in the greater share of production workers), employers choose to work with workers with whom they have a long-term relationship. To phrase this differently, drawing on the incomplete contracts theory applied to labour markets, our results conceivably tells us that cost advantages of hiring contract labour are overshadowed in cases where labour is very important for production and long-term human capital investment put in by regular workers is important.

## Notes

1. This term refers to economic activity that is captured by Indian government records.
2. For a more complete description see Das et al. (2018) and Singh et al. (2018).
3. As per Section 10 (2) (b) of the Contract Labour Act the term perennial is explained in the following manner 'whether it is of perennial nature, that is to say, it is of sufficient duration having regard to the nature of industry, trade, business, manufacture or occupation carried on in that establishment'.
4. It may be noted that we assume cost to be static in this model because our data from the primary survey is a cross-section and therefore it is not possible for us to account for inter-temporal changes. However, in reality, the adjustment costs involved in hiring and firing of regular workers will be dynamic in nature. Nevertheless, we assume that our specification provides a broad insight into how cost differential (whether static or dynamic) affects a firm's decision to hire contract workers.
5. This encouraged us to use the same data set to explore the interesting relationship between the establishment of trade unions and the characteristics of manufacturing firms (see Singh, Das, Abhishek, & Kukreja, 2019).
6. For an early exposition on this line of thinking see Klein, Crawford, and Alchian (1978), for a survey Malcomson (1997) and for a recent work Bentley and Nakavachara (2007), the latter one among a large literature.

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## References

Aghion, P., Burgess, R., Redding, S. J., & Zilibotti, F. (2008). The unequal effects of liberalization: Evidence from dismantling the License Raj in India. *American Economic Review*, *98*(4), 1397–1412.

Ahsan, A., & Pagés, C. (2009) Are all labor regulations equal? Evidence from Indian manufacturing. *Journal of Comparative Economics*, *37(1)*, 62–75

Arthur, L. W. (1954). Economic development with unlimited supplies of labor. *Manchester School of Economic and Social Studies*, *22*, 139–191.

Bentley, M. W., & Nakavachara, V. (2007). Can wrongful discharge law enhance employment? *The Economic Journal*, *117*(521), F218–F278.

Besley, T., & Burgess, R. (2004). Can regulation hinder economic performance? Evidence from India. *Quarterly Journal of Economics*, *119*(1), 91–134.

Bhattacharjea, A. (2006). Labour market regulation and industrial performance in India: A critical review of the empirical evidence. *Indian Journal of Labour Economics*, *49*(2), 211–232.

Bhattacharjea, A. (2009). The effects of employment protection legislation on Indian Manufacturing. *Economic and Political Weekly*, *44*(22), 55–62.

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

Das, D. K., Choudhury, H., & Singh, J. (2018). Judicial production of labour market flexibility: Contract labour employment in Indian organised manufacturing. In E. Hill & A. Palit (Eds.), *Employment policy in emerging economies: The Indian case* (pp. 42–63). London: Routledge.

Dougherty, S., Robles, V. C. F., & Krishna, K. (2011) Employment protection legislation and plant-level productivity in India, NBER Working Paper No. 17693.

Dougherty, S. M. (2009). Labour regulation and employment dynamics at the state level in India. *Review of Market Integratin*, *1*(3), 295–337.

Fallon, P. R., & Lucas, R. E. B. (1991). The impact of changes in job security regulations in India and Zimbabwe. *The World Bank Economic Review*, *5*(3), 395–413.
Fallon, P. R., & Lucas, R. E. (1993). Job security regulations and the dynamic demand for industrial labor in India and Zimbabwe.*Journal of Development Economics*,*40*(2),241–275.
Goldar, B. (2009) Impact of trade on employment generation in manufacturing in India, IEG Working Paper Series No. E/297/2009
Goldar, B. (2016, January 4-5). "Use of contract labour in India's organized manufacturing: Role of import competition and labour regulations. Paper presented at the National Seminar on "Role of Public Policy in Development Process: Emerging Economic/Social Scenario in the Indian Economy. Ahmedabad: Sardar Patel Institute of Economic and Social Research.
International Labour Office (ILO). (2016). Non-Standard Employment Around the World: Understanding Challenges, Shaping Prospects.
Kapoor, R., & Krishnapriya, P. P. (2019) Explaining the contractualisation of India's workforce, *ICRIER Working Paper No. 369*
Kapoor, R. (2014). Creating'Good jobs': Assessing the labor market regulation debate. *Economic and Political Weekly*, *49*(46), 16–18.
Klein, B., Crawford, R. G., & Alchian, A. A. (1978). Vertical integration, appropriable rents, and the competitive contracting process. *Journal of Law and Economics*, 297–326.
Knapp, L. G., & Seaks, T. B. (1998). A Hausman test for a dummy variable in probit. *Applied Economic Letters*, *5*(5), 321–323.
Kumar, P., & Singh, J. (2018) Issues in Law and Public Policy on Contract Labour in India: Comparative Insights from China Springer Singapore
Kuznets, S. (1971). *Economic growth of nations: Total output and production structure*. Cambridge (USA): Harvard University Press.
Maiti, D., & Marjit, S. (2009) Institutional determinants of informalisation and its effects on growth and poverty in India IPPG Discussion Papers, 30, Retrieved from www.ippg.ac.uk
Malcomson, J. M. (1997). Contracts, hold-up, and labor markets. *Journal of Economic Literature*, *35*(4) Dec., 1997, 1916–1957.
OECD. (2007). *OECD economic surveys: India*. Paris: Organization for Economic Cooperation and Development.
Ramaswamy, K. V. (2015). Employment protection and threshold effects: How firms are staying below the legal size threshold in Indian manufacturing. In K. V. Ramaswamy (Ed.), *Labour, employment and economic growth in India* (pp. 239–264). Delhi: Cambridge University Press.
Sapkal, R. S. (2016). Labour law, enforcement and the rise of temporary contract workers: Empirical evidence from India's organised manufacturing sector. *European Journal of Law and Economics*, *42*(1).
Sen, K., Saha, B., & Maiti, D. (2013). Trade, labour institutions and flexibility in Indian manufacturing. *Labour Economics*, *24*, 180–195.
Singh, J. (2009) *Labour law and special economic zones in India*, CSLG Working Paper Series, CSLG/WP/08 Jawaharlal Nehru University
Singh, J., Das, D. K., Abhishek, K., & Kukreja, P. (2019). Exploring the pattern of trade union activity in the indian manufacturing sector. In K. R. Shyam Sundar (Ed.), *Globalization, labour market institutions, processes and policies in India* (pp. 87–107). Singapore:Palgrave Macmillan.
Singh, J., Das, D. K., Kukreja, P., & Abhishek, K. (2018). Law, skills and the creation of jobs as 'contract' work in India: Exploring survey data to make inferences for labour law reform. *Indian Journal of Labour Economics*, *60* (4), 549–570.
Sofi, I. A., & Sharma, P. (2015). Labour regulations, contractualization and industrial performance: Three-dimensional panel evidences from Indian manufacturing sector. *South Asia Economic Journal*, *16*(1), 122–144.