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To study The Effects of Minimum Wages in Odisha on Wages, Employment, and Poverty

[1]Prativa Tripathy ,[2]Dr. Prasanta Kumar Parida, [3] Jyotirmayee Pati

[1]Ph.D Scholar at School of Management, KIIT University, Odisha, India.
[2]Associate Professor at School of Rural Management, KIIT University, Bhubaneswar, Odisha, India.
[3]Ph.D Scholar at School of Management, KIIT University, Odisha, India.

Abstract

We study the impact of changes to the legal minimum wage on different labour market outcomes in Odisha, including employment and wages, worker transitions between covered and uncovered sectors, changes in employment status (such as unemployment and leaving the labour force), and c) the entry and exit from poverty, using an individual level panel data set. We find that workers affected by changes in the legal minimum wage are only those whose starting pay was almost at the minimum (prior to the change in minimum wages). For example, private sector workers who were previously paid within 20% of the legal minimum wage find a significant increase in their compensation and a decrease in employment when the minimum wage increases.The estimates produced from the employment transition equations indicate that the reduction in covered private sector employment is primarily the result of hiring freezes and layoffs. The majority of workers who lose their jobs in the covered private sector as a result of higher legal minimum pay either leave the labour force or take on unpaid family work; a smaller percentage of workers work in the public sector. An increase in the legal minimum wage enhances the likelihood that the family of a poor worker will be able to escape poverty, and this is especially true if the increase benefits the head of the household rather than the other members of the family. This is according to our analysis of the relationship between the minimum wage and household income.

Keywords : Minimum wage, Living wage, Poverty, Employment, Odisha

1. Introduction

Redistributing revenue to low-paid workers is the rationale behind minimum wage laws. When emerging nations are rapidly adjusting to the global economy, this policy instrument can be extremely helpful. To allow for more labour market flexibility and enhanced competitiveness in an era of intense global competition, some policy makers, however, argue for the reduction (or even abolition) of minimum wages and other labour market regulations in developing countries (see, for example, Heckman and Pages, 2000). The main argument is that rigidities in the labour market, such as pay rigidities caused by minimum wages, may prevent jobs from being created, which would worsen poverty and unemployment (see, for example, Pagés and Micco, 2006).

But fierce competition in the globalised globe has led to what some have called "the race to the bottom." Laws like minimum wage and labour standards are required to keep wages and working conditions at the bottom since it is believed that global competition will drive down pay and working conditions. In fact, Acemoglu (2011) argues that minimum wages have the ability to shift the labour market in favour of high-paying jobs. If this is the case, increasing the minimum wage could potentially lead to the development of new, higher-paying jobs as well as an increase in the salaries of those affected by the law, thereby reducing poverty and inequality.

In this work, we investigate how minimum salaries affect various labour market outcomes. Initially, we look into the degree to which minimum wages increase earnings and/or decrease employment in the industry that is subject to minimum wage laws. Furthermore, we examine the labour market dynamics that transpire after minimum wage hikes. Do employees who are compelled to leave the covered sector go unemployed or find work in the uncovered sector? Does the decline in employment in the covered sector result from worker layoffs or from fewer new hiring made by employers? We look at employment transitions across employment status (from employment to unemployment and out of the labour force) as well as employment transitions of workers from the public sector and private covered to private uncovered sectors. The amount of these flows will reveal how much the minimum wage affects workers and how much their situation improves or deteriorates. Lastly, we look at how minimum wage laws affect household income and consider whether they are a useful tool for reducing poverty.

Odisha is a great place to study minimum wages because it has a lot going for it: (a) a legal minimum wage level that is higher than average wages, which means that a significant portion of the population could be affected by minimum wages; (b) significant variation in minimum wages over time and across industries; (c) a significant number of self-employed workers who are not legally covered by minimum wages; and (d) a sizable sector of small businesses where employers frequently evade minimum wage laws.

In recent years, research on the effects of minimum salaries in developing economies has proven to be fruitful. Studies on Brazil, Chile, Colombia, Costa Rica, Honduras, Indonesia, Kenya, Trinidad and Tobago, Turkey, and South Africa are among the recent publications on the subject. Researchers have examined the effects of minimum wages on employment, hours worked, unemployment, average pay, and wage distribution between the formal and informal sectors, as well as poverty in these studies. We expand on this literature in a few different ways in our study. First, we calculate how minimum wages affect earnings and employment in Odisha, a nation that hasn't been the subject of prior research. Secondly, we assess the minimum wage's effect on new hiring and layoffs differently. For the first time, a study of a developing economy specifically demonstrates that low wages lead to workers quitting the covered sector as well as fewer people being hired from the uncovered sector into the covered sector.

Third, we look at how minimum wage adjustments affect workers' movements (transitions) within and outside of the public sector, self-employment, unpaid family work, and the covered sector. For instance, we demonstrate that workers in Odisha who lose their jobs in the covered sector as a result of higher minimum wages are more likely to exit the workforce or take on unpaid family duties (rather than going self-employed or unemployed). Fourth, we examine how increasing minimum wages affect people's ability to enter and exit poverty.

We provide evidence that a raise in Odisha's minimum wage increases the likelihood that a low-wage worker's family will escape poverty.Additionally, we provide evidence showing that minimum wages have different effects on heads of households vs non-heads, and we explain how these disparities

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influence how minimum wages affect poverty. Only because panel data allows us to control for individual-specific fixed effects and to identify employment transitions and changes in the incomes of the same individuals or households before and after the minimum wage change, are we able to make these novel contributions to the literature. An existing household-level panel data set in Odisha was used to create the individual-level panel data set for our investigation.

2. Sources of Data and Methodology

In order to investigate how minimum salaries affect the Odisha labour market, we utilise yearly panel data that is gathered by Authorities. Based on a survey of 2,000 families out of 6,000 total, this data set is thought to be representative of the households in Odisha. The households were chosen with the aid of data on the locations of every residence in every electoral district across the nation and stratified random sampling procedures. A random sub-sample of 1,600 homes—800 urban and 800 rural—from the 2000 survey served as the basis for the study from 2000. Annual interviews with the primary household in each of these residences were conducted between July and September of 2022.

During this time, great effort was taken to trace every household and every member of the household. For instance, the interviewer initially ascertained whether this was the household's first interview or if it had been questioned the year before. 5. Each household member who had been questioned the year before was listed on the questionnaires with their first and last names, along with a line item that was reserved for that household member's use only. To track migration flows, inquiries concerning a household member's whereabouts were made if they departed.Conversely, newly arrived members of the household were assigned a line on the questionnaire and provided an explanation of how they became part of the family (by birth, marriage, etc.). 8,680 people of working age make up our analytical sample, which comprises of 25,000 observations (average: 3.1 observations per person). Of the sample, approximately one-third has two observations, one-fifth has three, and 7% has nine.

The Odishan Ministry of Labor's official minimum wage regulations serve as the second source of data. In addition to setting different minimum wages for workers in free trade zones (special regimes) and the federal and local governments, Odisha also sets minimum pay for all private sector employees in each of the state's twelve industrial sectors. With the exception of 1998 and 2000, new minimum wages are determined annually during the years for which we have panel data. The changes in the hourly legal minimum wage for the years we examined are summarised in Table 1.

Table 1: Real minimum wage (per hour) in Odisha,

Area-wise Basic Rates of Minimum Wages (Old and Revised) for Scheduled Employments in Central Sphere in India (As on 01.04.2022)				
				(Wages in Rs. per Day)
Scheduled Employment	**Category of Workers**	**Area-A**	**Area-B**	**Area-C**
Agriculture	Unskilled	423	385	382
	Semi-skilled/Unskilled Supervisory	461	425	389
	Skilled/Clerical	502	461	424
	Highly-skilled	554	516	461
Sweeping and	Unskilled	663	553	443

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Cleaning[1]				
Watch and Ward	Without Arms (Upgraded to Skilled with Training)	806	734	625
	With Arms (Upgraded to Highly Skilled for Supervision)	876	806	734
Loading & Unloading[6]	Unskilled	663	553	443
Construction[3]	Unskilled	663	553	443
	Semi-skilled/Unskilled Supervisory	734	625	519
	Skilled/Clerical	806	734	625
	Highly-skilled	876	806	734
Workers Engaged in Stone Mines for Stone Breaking and Stone Crushing	1. Excavation & Removal of over Burden with 50 Meters Lead/1.5 Meters Lift[1]			
	(a) Soft Soil	447	-	-
	(b) Soft Soil with Rock	672	-	-
	(c) Rock	890	-	-
	2. Removal and Staking of Rejected Stones with 50 Metres Lead/1.5 Metres Lift[1]	359	-	-
	3. Stone Breaking or Stone Crushing for the Stone Size of Category[2]		-	-
	(a) 1.0 Inch to 1.5 Inches	2736	-	-
	(b) Above 1.5 Inches to 3.0 Inches	2340	-	-
	(c) Above 3.0 Inches to 5 Inches	1374	-	-
	(d) Above 5.0 Inches	1129	-	-
Non - Coal Mines[4]		**Above Ground**	**Below Ground**	
	Unskilled	443	553	-
	Semi-skilled/Unskilled Supervisory	553	663	-
	Skilled/Clerical	663	772	-
	Highly-skilled	772	862	-

We discover that, over the time period under consideration, the minimum wage is high in comparison to the mean and median earnings of workers in the private sector. The mean minimum wage to mean wage ratio is 0.53, while the mean wage to median wage ratio is 0.81. With exception of two years in which the minimum wage was not raised, the trend over this time has been largely stable.

3. Compliance issues

All employees in Odisha, whether in the public or private sectors, are required by law to receive at least the minimum wage. The self-employed (which includes small business owners) and unpaid family workers are the workers not protected by minimum wage laws; together, they make up the uncovered sector. It is crucial to identify the segments of the labour market where minimum wage laws are followed before analysing the effects of such laws. We verify that the data is compliant in a number of ways.

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3.1. Comparing the distribution of wages and legal minimum wages

Finding spikes in the wage distribution at or near the minimum wage is an easy way to go about it. We depict the log wage minus the log minimum pay for each worker as a way to simplify the graphical analysis in light of Odisha's various minimum salaries. The employee is receiving the legal minimum wage if there is a zero in these figures. To test for varied degrees of compliance, we compile these statistics for five unique categories: the covered public sector, small firms in the covered private sector, large organisations in the covered private sector, the covered private sector, and the uncovered self-employed. The three covered sector groupings will be examined separately in order to ascertain the level of small-scale industry compliance with the minimum wage and to separate out public sector workers, who normally make more money in the majority of Central American countries.

We compare monthly wages to the minimum wage for full-time workers in order to create the kernel density estimates. We evaluate the hourly pay of part-time employees against the hourly minimum wage. In data, the kernel density estimates are shown on the same scale to facilitate cross-sector comparisons. The workers who earn over or below the legal minimum wage are shown with a value that is neither zero nor below it. These numbers imply that both the public and covered private sectors are impacted to some extent by legally mandated minimum salaries. In those two covered industries, we find distributional spikes close to zero, and the distributions suggest some evidence of censorship below the minimum wage. Nonetheless, there isn't much proof of censorship because most employees in the industries surveyed make less than the minimum wage. For large private sector enterprises compared to small covered private sector firms, the filtering and distribution spike at zero are more noticeable. This could imply that larger private sector companies have higher levels of compliance than smaller ones. There are some spikes in the distribution close to the minimum wage, but there is no evidence of censorship in the unreported self-employed sector.

We employ hourly wage and hourly minimum wage variables for part-time workers; however, there is a concern as to whether or not these variables have possible measurement error that prevents data from accurately reflecting compliance. (This is because there can be a significant measurement error in the hourly measures since they are derived from monthly values that are divided by the stated number of hours worked.) As a result, we also provide kernel density estimates for the full-time employee subsample exclusively in Fig. 2. These estimations clearly show that the results shown in Fig. 1 are valid and unaffected by measurement error.In conclusion, the kernel density estimates provide some indication of non-compliance with minimum wages in the uncovered (self-employed) sector and compliance in the covered sector, particularly major enterprises, in Odisha. This evidence is weak, though.

3.2. Proportion of workers earning the minimum wage by sector of employment

Another method to get compliance statistics is to find the average percentage of workers in each of these four sectors that make less than the minimum wage, close to the minimum wage, or more than the minimum wage. To confidently estimate the fraction earning less than 0.8 of the minimum wage, between 0.8 and 1.2 of the minimum wage, and more than 1.2 of the minimum pay, we set a threshold of 20% to allow for measurement error. Table 2 displays these numbers independently for the public, private covered, and uncovered self-employed sectors. We further categorise large and small businesses within the covered private sector.

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Some data indicates that the covered private sector has higher compliance rates than the uncovered self-employed sector: only 15.6% of self-employed workers earn 20% or less of the minimum wage, but 25.5% of workers in the private covered sector do. Even in the industries where minimum wages are legally required, a sizable portion of workers—up to 23% of those in the private covered sector—still earn less than the federal minimum wage. This suggests that compliance in the covered sector is higher than in the uncovered sector. 4.1% of public sector employees earn less than the legally mandated minimum wage.

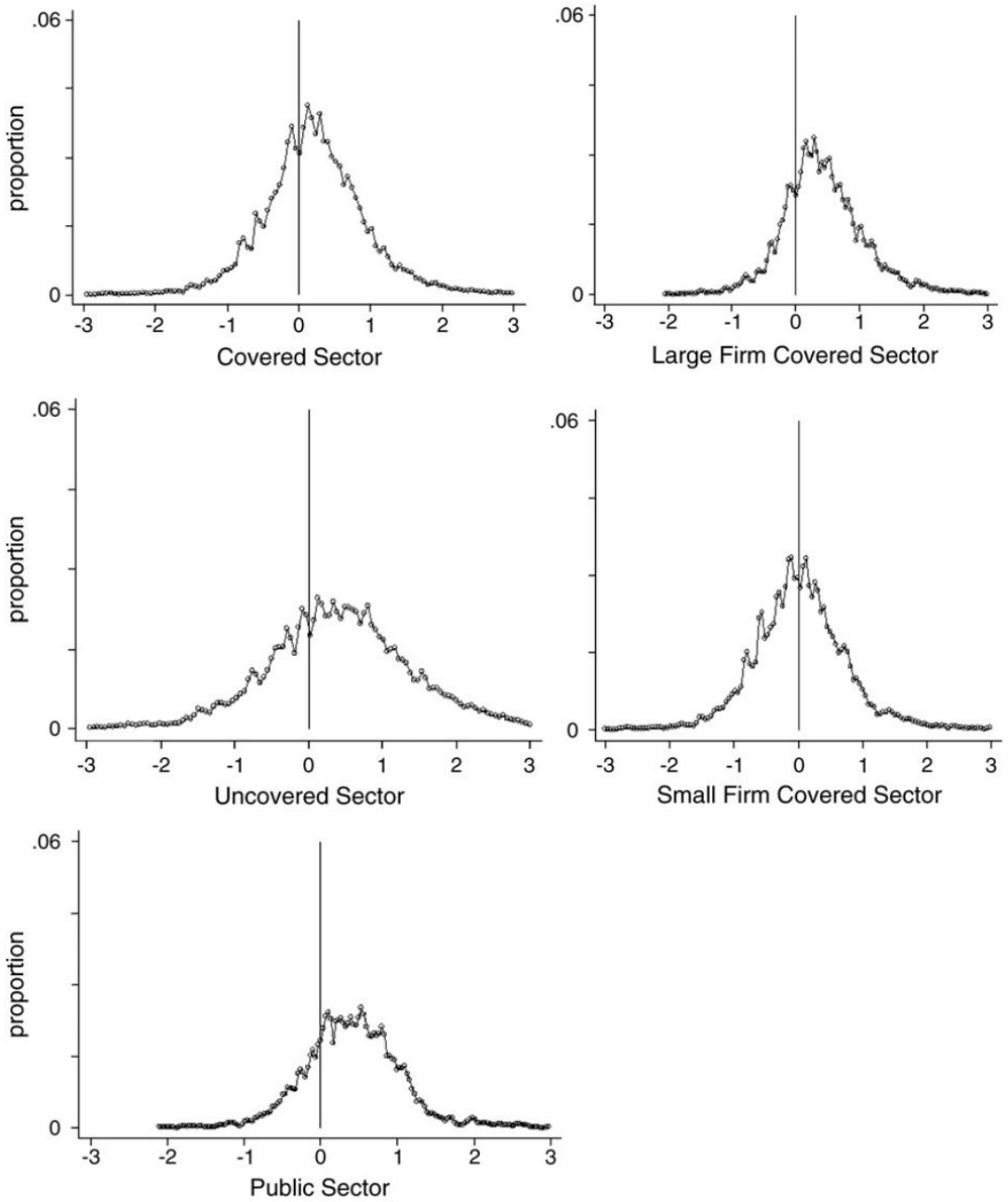

Fig 1 : shows the graphical representation of data of all sector 2022

We additionally calculate these percentages using the monthly wage and minimum wage for the subsample of full-time workers, who make up around 50% of all workers, in order to account for measurement error in the hourly wage and minimum wage variables. The amount of Odisha workers,

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especially in the major business sector, who make less than the minimum wage surprises a lot of people. Similar to our previous findings, the percentages in Table 2's second panel demonstrate that a comparable number of full-time workers in the covered industry earn less than the minimum wage. Moreover, the proportion of full-time unemployed self-employed workers earning less than the minimum wage is noticeably higher than that of all self-employed people (including freelancers).

4. Effect of Wage and disemployment for various sector

This section looks at how much the labour market's competitive model predicts minimum wage increases will raise salaries and drive out workers from the covered industry.

4.1. The effect of Wage

Next, we calculate the wage's elasticity in relation to the covered sector's minimum wage. We estimate the following salary equation on all workers who stay in the covered sector from year to year using the panel data set of workers.:

$$\Delta \ln Wit = \alpha o + a1\Delta \ln MWIt + \Delta X'it\beta + a2\Delta \ln GDPIt + \Sigma_{t=1}{}^{T}\gamma tYRt + \mu it;\eth 1Þ$$

where the change in the log of individual I's real wages between time t and time t+1 is the dependent variable, ΔlnWit. ΔlnMWit, the change in the log of the real minimum wage for worker's industry category i in time t between time t and time t+1, is one of the explanatory variables.

The coefficient α1 provides an approximation of the impact of changes in the legal minimum wage on actual wages. Furthermore, the explanatory variables of further significance are the vector Xit of individual specific human capital elements (differences in years of schooling and if the worker dwells in an urban location) and the change in the log of real value-added in industry I between time t and t+1 (lnGDP).11 In order to account for endogenous variations in the annual average minimum wage (as well as other year-specific factors like changes in aggregate supply and demand or the timing of minimum wage increases), we lastly incorporate a dummy variable for each year, YRt. All regression estimates (wage, employment, transition, and poverty equations) in this research have estimated standard errors that are resilient to heteroskedasticity and account for error clustering in the worker's industry (which also happens to correspond to the minimum wage category).

Since we expect that legal minimum wages will have a greater influence on the wages of individuals who earn close to the minimum wage, we also estimate the impact of minimum wages on the earnings of workers who were within 20% of the legal minimum pay at time t (prior to the minimum wage change).

Finally, we use the equation provided above for the aforementioned categories to get the hourly minimum wage and hourly wage data for all workers (full-time and part-time), as well as for those who are within 20% of the minimum wage at time t. We also estimate the pay equation using the monthly wage and monthly minimum wage for those full-time employees who were within 20% of the minimum wage at time t in order to account for measurement error.

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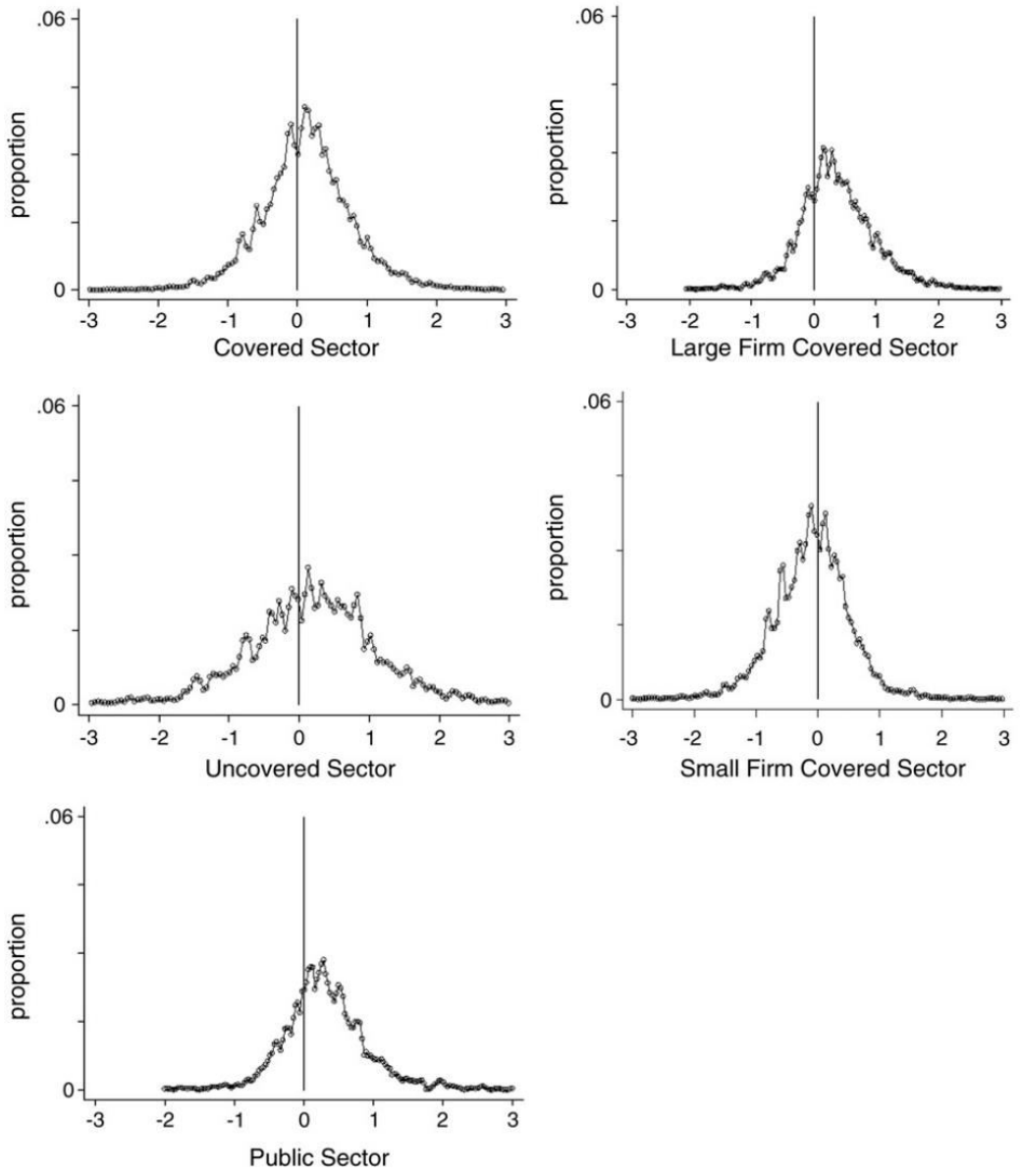

Fig 2 : Log wage on Minimum wage of full time workers 2022

As a placebo test, we additionally estimate the salary equations for people who continue to work for themselves year after year, in addition to the wage equations for those who are in the covered industries at time t and time t+1. Changes in the minimum wage should have a beneficial impact on the earnings of those who continue to work in the covered sector and no direct positive impact on the wages of those who continue to work for themselves from t to t+1 if minimum wages are enforced in the covered sectors but not the uncovered sector.

Table 2:Elasticity of the wage with respect to the minimum wage in the covered sector.

For workers who remain in the following sectors at time t and t+ 1	All Workers		All Workers within 20% of MW at time t		Full-time Workers within 20% of MW at time t	
	Coeff.	Standard Error	Coeff.	Standard Error	Coeff.	Standard Error
Private covered	0.247	0.237	0.579	0.267**	0.651	0.084***

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Large-firm private	−0.222	0.355	0.651	0.414	1.036	0.365**
Small-firm private	0.094	0.588	0.302	0.117**	0.702	0.204**
Self-employed	0.094	0.420	0.652	0.493	0.107	0.202

Notes: ***= significant at 1%, **= significant at 5%, *= significant at 10%.

The dependent variable is the change in the log of hourly wage and the key independent variable is the change in the real minimum wage; we report the estimated coefficients for α1 in Eq. (1) for samples identified by row and column.
Reported standard errors are robust to heteroskedasticity and corrected for clustering of errors in the industry of the worker (which also corresponds to the minimum wage category)

Table 3 presents the estimated coefficients for these regressions. They can be used as proof that minimum wage rules are being followed as well as elasticities, which measure the percentage change in real earnings given a one percent rise in the legally required minimum wage. The coefficients are statistically significant only for workers whose incomes were close to the minimum wage, but they are positive nonetheless. For all covered private sector workers whose earnings fall within 20% of the minimum wage in time t, we estimate an elasticity of 0.58. This elasticity increases to 0.65 for full-time covered sector workers whose wages fall within 20% of the minimum wage. The expected elasticities are near to the minimum for full-time employees and are positive and statistically significant for both large and small enterprises.Although the difference in the coefficients is not statistically significant, the relative size of these coefficients suggests that the large-firm private sector may be more affected by the minimum wage than the small-firm private sector.

Changes in the minimum wage have no statistically significant effect on the earnings of private sector employees whose pay is not 20% or less than the minimum wage (not indicated in table). Indicating that legal minimum wages are not being met in this industry, the coefficient on the minimum wage variable in the pay equations for unemployed self-employed workers is never statistically significant. 14 In conclusion, the wage equations indicate that while minimum wage regulations in Odisha are observed in the protected private sector, they have little effect on the pay of employees in the unregulated self-employment sector.

4.2. Disemployment effects

Next, we look at how minimum wage adjustments affect the employment of workers in the private covered industries. We estimate the following employment equations for all workers who were in the private covered sectors at time t using the panel data set of workers using binomial probit analysis:

$$\text{Prob EMPit} = 1\ \eth\ Þ = \alpha o + a1\Delta \ln MWIt + \Delta X'it\beta + a2\Delta \ln GDPIt + \sum T\ t = 1\gamma tYRt + \mu it;\ \eth 2Þ$$

where the dependent variable, Prob(EMPit=1), is equal to zero if individual i loses his or her private covered sector employment between time t and time t+1 (and becomes either an unpaid family worker, self-employed worker, or out of the labour force) and one if individual i continues to work in the covered sector between time t and time t+1. The wage question's explanatory variables are the same as this one. We may calculate the effect of a change in the legally mandated minimum wage on the likelihood that an employee will continue to work in the private covered industries using the coefficient α1.

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Table 4 presents our estimates of how changes in the legally mandated minimum wage affect the likelihood that an employee will stay in the private covered sector. Table 4 shows that a negative number means that a worker's chances of remaining employed in the private covered sector are decreased by an increase in the minimum wage; in other words, a negative number means that a worker is more likely to lose their job in the private covered sector.

These findings suggest that raising the legal minimum wage will lead to a statistically significant decline in employment in the private covered sector. For example, a 10% increase in the legal minimum wage will decrease the likelihood that all workers will remain in the private covered sector by 3.1 percentage points, all workers with wages close to the minimum wage by 5.2 percentage points, and full-time employment near the minimum by 5.1 percentage points. These results suggest that a 10% rise in the legal minimum wage results in about 5% of private covered sector employees losing their jobs in that sector when evaluated at the average proportion of workers in the private covered sector. It is found that there is a statistically significant negative impact on employment caused by raising the minimum wage in large private covered sector enterprises, but not in small ones.In conclusion, our data is consistent with the theory that Odisha's higher legal minimum wages result in employment losses for those employed in the private covered sector. The decline is more pronounced and statistically significant in the large-firm private sector, where the minimum wage's wage impact—or compliance—is stronger.

5. Dynamic effects: employment transitions

Increased minimum salaries may result in fewer people being hired into the private covered sector or in workers losing their positions in the private covered sector. Tracing the effects of minimum wages on employment flows into and out of the private covered sector, as well as from the private covered sector into other sectors (like self-employment) and status in the labour market (unemployment and the labour force), is one of our work's original contributions. This is made possible by the panel data we create. We demonstrated in Subsection 4.2 that some workers lose their jobs in the private covered sector as a result of higher minimum wages.

When an employee leaves the private covered sector, this subsection examines where they go first. These areas include self-employment, the public sector, unemployment, unpaid family work, and falling out of the labour market. Next, we look into whether there is evidence linking an increase in the minimum wage to a decline in employment in the private covered sector by analysing the rates of new hiring into the covered sectors from the uncovered sectors.

Using the sample of all workers employed in the private covered sector at time t, we first estimate a multinomial logit model in which workers may start out in the private covered sector and end up in one of the following sectors in time t+1: self-employment, family work performed for pay, public sector, stay in the private covered sector, become unemployed, or leave the labour force. The worker's movement from sector k (the private covered sector) to sector z (z= remain in the private covered sector, self-employment, unpaid family work, the public sector, unemployment, or leave the labour force) is specifically indicated by a variable we define, TRANSikz,t. The base category is that a worker stays in the private covered sector. Thus, the probability that individual i leaves the private covered sector (sector k) for sector/state z, conditional on starting in sector k (k=private covered sector) is characterized by:

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$$Prob(TRANS_{ikz,t} = 1) = exp(\theta_{ikz,t}) / (1 - exp((\theta_{ikz,t}))$$

where

$$\theta_{ikz,t} = \alpha_{okz} + a_{1kz}\Delta \ln MW_{It} + \Delta X'_{it}\beta_{kz} + a_{2kz}\Delta \ln GDP_{It} + \sum_{t=1}^{T} \gamma_{zt} YR_t + \mu_{ikz,t}$$

The explanatory variables include the change in the log of the real minimum wage that applies to that worker's industry I at time t, ΔMWIt.

α1kz is used to quantify the effect of minimum wages on the likelihood of transitioning from the private covered sector into sector z. We estimate how much a change in the legally mandated minimum wage will affect the likelihood that employees will leave the private covered sector and enter the public sector, self-employment, the unpaid family worker sector, unemployment, or the labour force altogether. The remaining explanatory factors are the same as those found in the employment and wage equations.

Our estimates of the marginal impact of changes in the legal minimum wage on the likelihood that workers will leave the private covered sector and enter another sector are shown in Table 5; a positive number in the table indicates that there is a greater chance that a worker will leave the private covered sector and enter sector z. The findings imply that when minimum wages rise, employees in the private covered sector are likely to quit their jobs and end up working as unpaid family workers.This is a novel and strong finding that holds true whether we use the sample of all workers, full-time employees making less than 20% of the minimum wage, or workers making less than 20% of the minimum wage. The impact is significant, particularly for full-time employees who make close to the minimum wage. A 1% rise in the minimum wage will result in a 0.42 percentage point increase in the likelihood that an employee will transition from the private covered sector to unpaid family employment. A 1% rise in the minimum wage will enhance the likelihood to 4.6%, or a 9 percent increase, given that the mean (unconditional) probability is 4.2%.

Table 3 :Marginal impact of minimum wages on the probability that a worker keeps his/her employment in the covered sector

For workers in the following sectors at time t:	All Workers A		All workers within 20% of MW at time t		Full-time Workers within 20% of MW at time t	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Private covered	−0.310	0.099***	−0.522	0.189***	−0.509	0.382
Large-firm private	0.615	0.219***	−1.197	0.266***	−2.126	0.724***
Small-firm private	0.038	0.393	−0.089	0.428	−0.847	1.358

Notes: Table reports marginal effects evaluated at the means of all variables, from estimates of α1 in Eq. (2) using probit regressions for samples identified by row and column.

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A positive coefficient indicates that there is a greater likelihood of a worker remaining in the designated covered sector when minimum wages are raised. Significant values are indicated by *** at 1%, ** at 5%, and * at 10%. The reported standard errors have been adjusted for error clustering in the worker's industry, which also happens to be the minimum wage category, and they are resistant to heteroskedasticity.

There is evidence that workers who lose their jobs in the private covered sector may migrate into self-employment or unemployment, but there is no evidence in Table 5 that people who leave the private covered sector may go seek a job in the public sector or quit the labour market.

Next, we also estimate the effect of minimum wages on the probability of being hired into the private covered sector from selfemployment, unpaid family work or the public sector. We first estimate the "overall" effect on hires from any of these sectors, and then the "specific" effect on hires from a specific sector (public sector, self-employment or unpaid family work17). Specifically, we use the probit technique to estimate equations of the form:

$$Prob\left(TRANS_{ikz,t} = 1\right) = \alpha_{oz} + a_{1kz}\Delta \ln MW_{lt} + \Delta X'_{it}\beta kz + a_{2kz}\Delta \ln GDP_{lt} + \sum_{t=1}^{T} \gamma_{zt} YR_t + \mu ikz, t,$$

For the overall effect, the dependent variable TRANSikz,t, equals zero if the person stays in an uncovered sector from t to t+1 and equals 1 if the person gets employed into the covered private sector at time t+1 from any other sector at time t. For the specific impacts, TRANSikz,t = 0 if the person stays in the other specific sector from t to t+1; it equals 1 if the person is employed into the covered private sector at time t+1 conditional on being in another specific sector (e.g., self employment) at time t.

These estimates are displayed in Table 6, where a positive number means that there is a greater chance that an employee will move from the self-employed, public, or unpaid family worker sectors into the private covered sector; a negative number means that there is a less chance that an employee will move from these sectors. The findings suggest that raising the legal minimum wage has a statistically significant negative effect on the likelihood that an employee will be employed from the public sector or from self-employment into the private covered sector. There is a significant marginal effect. For all workers within 20% of the MW, a 1% increase in the minimum wage reduces the likelihood that a self-employed person or a worker in the public sector at time t will be hired into the private covered sector at t+1 by 0.52 percentage points. There is no proof that greater minimum wages influence the shift from unpaid family labour to paid employment in the private covered sector.

All things considered, the estimation of the transition equations results indicate that the decline in employment in the private covered sector that follows an increase in the legal minimum wage is caused by both workers quitting the private covered sector and fewer people being hired from the uncovered sectors into the private covered sector. A lesser percentage of workers may find employment in the public sector. Most workers who lose their jobs in the private covered sector due to higher legal minimum salaries either exit the labour force or take on unpaid family work. There's no proof that employees who lose their jobs in the private covered sector due to increased minimum salaries end up jobless.

6. Effects on household income and poverty alleviation

Legal minimum wages may have different effects on households at different locations in the distribution than they do on the overall wage distribution. High income households may have only one worker who makes a low wage, whereas low income households may have one primary worker who makes a low wage. As noted by Addison and Blackburn (1999) and Fields et al. (2007), the effect of legally mandated minimum wages on household incomes is contingent upon the manner in which the job composition of a household changes. Therefore, our findings regarding the effect of minimum wages on individual earnings and employment do not allow us to draw

conclusions about the effect of minimum wages on the distribution of household income or the reduction of poverty. We need to conduct in-depth research on how legal minimum salaries affect household incomes.

Table 4: Marginal impact of minimum wages on the probability of entering the private covered sector from another sector

Origin Sector:	All Workers		All Workers within 20% of MW at time t		Full-time Workers within 20% of MW at time t	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Panel A: Probit Regression (Destination is the Private Covered Sector)						
All Others (non-private)	−0.095	0.125	−0.524	0.079***	−2.696	6.229****
Public	−7.925	1.499***	−7.874	1.934***	−20.421	5.133***
Self-employed	−0.157	0.081*	−0.281	0.042***	−0.564	0.284**
Unpaid Family Worker	0.119	0.078	n.a.	n.a.	n.a.	n.a.
Panel B: Unconditional Probability of Entering the Private Sector from Another Sector						
All Others (non-private)	0.109		0.131		0.207	
Public	0.219		0.256		0.268	
Self-employed	0.087		0.083		0.119	
Unpaid Family Worker	0.097		n.a.		n.a.	
Sample Size	3581		1263		676	

Notes: Table provides marginal effects of the estimated α1kz in a variant of Eq. (3) using probit for samples identified by row and column. A positive coefficient means that higher minimum wages increase the probability of a transition into the private covered sector from another sector. ***= significant at 1%, **=significant at 5%, *=significant at 10%. Reported standard errors are robust to heteroskedasticity and corrected for clustering of errors in the industry of the worker (which also corresponds to the minimum wage category).

Families may be more likely to remain impoverished (or fall into poverty) if a family member impacted by a minimum wage rise loses their work. However, minimum wage increases can aid families in escaping poverty if the members of the family maintain their employment and gain from a salary increase. This section looks at how minimum wages affect the likelihood that a worker's family would be impoverished first. It also looks at how much a raise in the minimum wage either keeps a family in poverty or causes it to become more so. Considering the significance of the head of the household's income for the family's overall income,19 we conduct an analysis that separates the impact of the minimum wage.

First, we inquire as to how much of a chance there is for minimum wage workers to be impoverished. Based on Table 7's data, it is quite probable that a household head who makes at least the minimum salary is not impoverished. Approximately 57% of heads of households earning around the minimum wage and 81% of heads of households earning above the minimum wage are not impoverished. In contrast, a non-household head is far less likely to reside in a non-poor household—where the corresponding percentages are 37% and 58%—if they are making at least the minimum wage.

Lastly, if a household's head or any of its members make less than the minimum wage, they are likely to be extremely poor or poor. Table 7 presents a static image showing the likelihood that an employee is poor or not, depending on their household status and the difference between their take-home pay and the minimum wage. The question that follows is, "What effect does a change in the minimum wage have on the likelihood that a household is impoverished?" By estimating a probit equation using data for every worker and the panel data, we are able to respond to this question, where the dependent variable is equal to 1 if the worker's household is poor at t+ 1 (Poor =1) and 0 if non poor at time t+ 1 (Poor= 0), as a function of the change in the minimum wage from the period t to t+1:

$$Prob(POOR_{it} = 1) = \alpha_o + a_1 \Delta \ln MW_{lt} + \Delta X'_{it}\beta + a_2 \Delta \ln GDP_{lt} + \sum_{t=1}^{T} \gamma_t YR_t + \mu_{it},$$

From the coefficient a1 we calculate the impact of a one percent change in theminimum wage on the probability that a worker's family is poor. The other variables in this equation are the same as those in Eq. (1) through (4).

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The exercise's results, which are shown in Table 8, show that raising the minimum wage will, on the whole, reduce the likelihood that a household will be impoverished—but only if the higher minimum wage is applicable to the head of the household. Raising the minimum wage for those who are not household heads has little effect on the prevalence of poverty. A 1% rise in the minimum wage has a marginal effect (i.e., when all variables are taken at their mean values) of reducing the incidence of poverty by 0.12 percentage points per head. Furthermore, families with more than one worker at a time benefit significantly from greater minimum wages. This could be the case because the minimum wage is set extremely low in relation to the poverty line, so that a family is unlikely to escape poverty unless at least two members of the family are earning an income. There is no discernible difference in the effects of a minimum wage rise between male and female household heads.

So far, we have established that minimum wage adjustments lower the rate of poverty if they affect heads of households with specific attributes, but do they really aid in the process of helping households escape poverty? Furthermore, if some members of the household lose their jobs as a result of the minimum wage hike, it's probable that households with particular characteristics will be more likely to enter poverty. In the following exercise, we calculate the effect of a minimum wage change on the likelihood that a household in poverty at time t would become nonpoor at time t+1, and vice versa, that a home in poverty at time t will become impoverished at time t+1. In particular, we estimate two equations for the poverty transition. In the first, using a sample of workers in poor households in time t, we estimate a probit equation of the form:

$$Prob(OUTPOV_{it} = 1) = \alpha_o + a_1 \Delta\, lnMW_{It} + \Delta X'_{it}\beta + a_2 \Delta\, lnGDP_{It} + \sum_{t=1}^{T} \gamma_t YR_t + \mu_{it},$$

In Eq. (6), OUTPOVit equals one if the family of worker i is poor in time t but not poor in time t+1, and zero if the family of worker i is poor at time t and stays poor in time t+1. The change in the log of the minimum wage that applies to the employee's job at time t is one of the independent variables. We can assess how raising the minimum wage affects the likelihood that a worker's household would escape poverty using the coefficient on this minimum wage variable, a1. We calculate the effect of minimum wages on the escape from poverty for heads of households, heads of households without heads, and heads of households with various features. The other variables in the employment transition equations are also the variables in Eq. (6).
Next, using a sample of workers in non-poor households in time t,we estimate a probit equation of the form:

$$Prob\ INPOV\ it = 1\ \eth\ P = \alpha o + a1\Delta lnMWIt + \Delta X\ 'it\beta + a2\Delta lnGDPIt\ \ \Sigma\ T\ t = 1\ \gamma tYRt + \mu it;$$

In Eq. (7), INPOVit equals one if the family of worker i is not poor in time t but is poor in time t+1, and zero if the family of worker i is not poor at time t and stays not poor in time t+1. The change in the log of the minimum wage that applies to the employee's job at time t is one of the independent variables. We can assess the effect of raising the minimum wage on the likelihood that a family that was not impoverished would become so by looking at the coefficient for this variable, a1. We calculate the effect of minimum wages on the descent into poverty for heads of households, heads of households without heads, and heads of households with various features. The other variables in the employment transition equations are also the variables in Eq. (7).

Table 5:Impact of changes in minimum wages on the probability that a household is poor in t+1.

	Marginal Effect	Standard Error
All	−0.070	0.100
Head of HH	−0.124	0.065*
Non-Head of HH	−0.033	0.108
Male Head of HH	−0.120	0.116
Female Head of HH	−0.101	0.076
Head of HH with 1 worker	−0.009	0.064
Head of HH with 2+ workers	−0.166	0.069**

Note: Using the survey's definition of poverty. A negative coefficient means that higher minimum wages lower the probability that a household is poor at time t+ 1. ***= significant at 1%, **= significant at 5%, *= significant at 10%. Reported standard errors are robust to heteroskedasticity and corrected for clustering of errors in the industry of the worker (which also corresponds to the minimum wage category).

The results of the estimation of Eqs. (6) and (7) are presented in Table 9. The findings in Table 9 indicate that increases in the minimum wage will pull households out of poverty but will not throw households into poverty. Regardless of the characteristics of the household, we find that the marginal effect of a minimum wage hike has no statistically significant effect on the likelihood that a worker in a non-poor household becomes poor in the following period. Conversely, a 1% rise in the minimum wage will result in a 0.12 percentage point increase in the likelihood that a worker from a poor household at t will no longer be poor at t+1. Raising the minimum salary for the head of the household is the sole way to help lift families out of poverty; raising the minimum wage for anyone other than the head of the household has no effect on the likelihood that a low-income family would escape poverty.

Our research indicates that, despite the fact that higher minimum wages in Nicaragua result in fewer jobs in the private covered sector, they also raise the likelihood that a household will escape poverty. Furthermore, we discovered that raising the minimum salary for the household head is the only way that minimum wages have a beneficial effect on helping people escape poverty. Raising the minimum wage for other members of the household do not increase the likelihood that a household will escape poverty. This suggests that, compared to non-heads, household heads may be less adversely affected by raising the minimum wage on employment in the private covered sector. Employers in Nicaragua who exhibit paternalistic tendencies may be more inclined to retain an employee who they believe is the primary provider for a family with dependents as opposed to an employee who they view as a secondary earner whose income is not as crucial to the household. As a result, we re-estimate the equations in Tables 4 and 5, but this time we take into account the worker's status as the head of the household.

Table 10 lends credence to the theory that private covered sector businesses in Nicaragua lay off non-heads of household more frequently than heads of household in response to increases in the minimum wage. The information in Table 10 indicates that when minimum wages rise, both household heads and non-heads are more likely to leave their jobs in the private covered sector; however, the marginal effect is almost twice as big for non-heads as for heads.

Table 6:Marginal impact of minimum wages on the probability that a worker keeps his/her job in the covered sector.

For workers in the following sectors at time t:	All Heads of Households (HH)		All Non-heads of HH	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Private	−0.175	*0.110*	−0.384	*0.111***
Large-firm private	−0.366	*0.187**	−0.753	*0.230****
Small-firm private	0.005	*0.399*	0.057	*0.386*
For workers in the following sectors at time t:	All Heads of HH within 20% of MW at time t		All Non-Heads within 20% of MW at time t	
	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Private	−0.447	*0.143****	−0.558	*0.213***
Large-firm private	−0.884	*0.084****	−1.331	*0.352****
Small-firm private	−0.079	*0.459*	−0.094	*0.413*

Notes: Table reports marginal effects evaluated at the means of all variables, from estimates of α1 in Eq. (2) using probit regressions for samples identified by row and column. A positivecoefficient means that higher minimum wages increase the probability that a worker stays in the indicated covered sector. ***=significant at 1%, **= significant at 5%, *=significant at 10%. Reported standard errors are robust to heteroskedasticity and corrected for clustering of errors in the industry of the worker (which also corresponds to the minimum wage category)

Moreover, workers who leave their jobs in the private covered sector due to higher minimum salaries have different destination sectors depending on whether they are heads of households or not. The marginal effects of the same equation, which was computed in Table 5, are shown in Table 11 for heads and non-heads of household. The likelihood of nonheads quitting the private covered sector and becoming self-employed—that is, continuing to make money—is higher than that of nonheads leaving the private covered sector and becoming unpaid family workers or dropping out of the labour force, both of which result in their being unpaid. Therefore, if a worker is a non-head rather than a household head, the negative impact on family income from minimum wage-related job loss in the private covered sector is substantially bigger. The fact that the head of the home is able to supplement some of his or her income via self-employment, considering the proportional sizes of their incomes, can also assist explain why the negative employment consequences of higher minimum salaries do not drive households into poverty.

Table 7: Marginal effect of minimum wages on the probability of leaving the private covered sector for another sector.

Origin: Private Covered Sector	All Heads of Households (HH)		All Non-heads of HH	
Destination:	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Public	0.097	0.031***	0.074	0.059
Self-employed	0.244	0.103**	−0.264	0.075***
Unpaid Family Worker	−0.175	0.067**	0.192	0.095**
Unemployed	−0.097	0.060	−0.009	0.041
Not in the Labor Force	−0.199	0.109*	0.262	0.052***
Origin: Private Covered Sector	All Heads of HH within 20% of MW at time t		All Non-Heads within 20% of MW at time t	
Destination:	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Public	0.143	0.313	0.110	0.062*
Self-employed	0.287	0.159*	−0.146	0.052**
Unpaid Family Worker	−0.084	0.055	0.264	0.128**
Unemployed	−0.070	0.029**	−0.010	0.052
Not in the Labor Force	−0.072	0.140	0.289	0.063***

Notes: Table provides marginal effects, based on estimates of α1kz, evaluated at the means of all variables, in Eq. (3) using multinomial logit regressions, respectively, for samples identifiedby row and column. A positive coefficient means that higher minimum wages increase the probability of a transition from the private covered sector. ***=significant at 1%, **=significantat 5%, *= significant at 10%. Reported standard errors are robust to heteroskedasticity and corrected for clustering of errors in the industry of the worker (which also indicates the minimum wage category).

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In the first section of this article, we discovered that a 10% rise in the minimum wage brought private covered sector workers' average pay to within 20% of the minimum wage by roughly 5%. However, this increase also led to a 5% decrease in the number of private covered sector workers who were employed in the covered sector. We also found that employees in the private covered sector who lost their jobs were often more inclined to leave the workforce or take on unpaid household work, which leaves them without a salary. The finding that a greater minimum wage reduced household poverty was surprising, considering the conflicting impacts of pay and employment. The disparities between the effects of a higher minimum wage on heads of households and non-heads provide the answer to this apparent conundrum.

Household heads are less likely than non-household heads to abandon their occupations in the private covered sector when minimum wages rise, despite the fact that they frequently make up the majority of household income. Furthermore, rather than having their pay drastically reduced, the heads of households who do lose their work in the private protected sector will most likely start their own businesses. However, non-heads of household experience a large loss of income for the household when they lose their jobs in the private covered sector. They either quit working or take on unpaid family chores.

7. Conclusions

In this paper, we discovered that minimum wage increases in Odisha between 1998 and 2006 resulted in higher pay and fewer jobs in the private covered sector for workers.But only those employees whose starting pay (before to the minimum wage increase) was nearly at the minimum were impacted by minimum wages. For instance, increases in the legal minimum wage rates had no appreciable effect on salaries in other areas of the distribution but significantly increased the average wages of private sector workers affected by the change and whose pay was within 20% of the minimum wage prior to the change.

Workers in larger companies felt the effects more keenly than those in smaller businesses. An increase in the minimum wage was found to be associated with a decline in employment within the private covered sector. Two things contributed to this decline: first, higher minimum salaries in the private covered sector led to job losses for workers there; second, fewer persons were hired from the uncovered sectors to work in the private covered sector. Most employees who lost their jobs in the private covered sector either stopped working or started doing unpaid family labour as a result of rising legal minimum salaries. No evidence that these workers lost their jobs could be found.

Our study of the relationship between minimum wages and poverty found that: A low-income worker's family was more likely to experience poverty if higher legal minimum wages were in place; additionally, higher legal minimum wages were more likely to benefit the head of the household than the non-head in terms of lowering the incidence of poverty and facilitating the transition from poverty to non-poverty.This was due to the fact that if minimum salaries increased, heads of households were less likely than non-heads to quit their occupations in the private covered sector. Furthermore, heads who did lose their jobs were more likely to pursue alternative paying jobs, including self-employment, than non-heads, who were more inclined to quit their positions or take on unpaid family tasks.

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