Impact of Minimum Wages on Low-Skilled Self-Employed Workers in India: Evidence in the Presence of Varying Compliance Levels and Market Power

Mohit Sharma and Brinda Viswanathan[1]

Abstract

This study estimates the effects of minimum wages given heterogenous compliance regimes and labour market concentration in low skilled male self-employed labour markets in India. Using IV-GMM and *Border District Discontinuity* design this study estimates the effects of minimum wages on the earnings, intensive employment measured by working hours per week, and consumption of all wage earners covered under minimum wage law and self-employed workers who are not covered under minimum wage law. This analysis is based on the Periodic Labour Force Survey (PLFS) rounds 2017-18, 2018-19, 2019-20, and 2020-21, and a detailed compilation of state and industrial sector specific minimum wages and compliance rates. The results show that in higher compliance regimes (compliance level equal to 1 or 0.8), a 10 percent increase in minimum wages results in 2.9 percent increase in earnings, 4 percent increase in monthly per capita expenditure and lowers the average number of hours worked by 1.1 percent for the male own-account workers. The results hold only in regions with high compliance and labour market concentration and is in consonance with economic theory that elucidates the impact of minimum wages given both wage and non-wage labour market. This paper contributes to the thin literature that focus on effect of minimum wage on self-employed workers given heterogenous compliance and market power.

JEL classification: J21, J23, J30, J31, J46, J50

Keywords: Minimum wage, Self-employment, Enforcement, Market power, India

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1. INTRODUCTION

The statutory enactment of minimum wages is expected to protect the workers against low wages and thereby contributes to reduce wage inequality and poverty (David, Manning, and Smith 2016; Mansoor and O'Neill, 2021; Neumark et al. 2021; Stigler, 1946). However, minimum wages may influence the wages and employment of the workers who are not covered under the minimum wage legislation and belong to self-employed sector (Blau, 1987; Bruce and Mohsin, 2006). Very few studies explore the linkage between minimum wages and earnings or employment of self-employed workers by including both covered sector employees (wage-earners or employees) and uncovered sectors employees (non-wage earners or self-employed) (Glasner, 2022, Belman and Wolfson, 2014). This study attempts to fill the gap in this literature based on India.[2]

In the past decade or so several studies have examined the impact of minimum wages on wages and employment in India (Mansoor & O'Neill, 2021; Menon, 2017; Soundarajan, 2019). However, most of the earlier studies in India are primarily concerned with the wage earners and leave aside self-employed labour market. Among the Indian workforce of 53.6 percent aged 15-65 years are self-employed (PLFS, 2020-21), hence, it is important to study the effect of minimum wages on the self-employed. Few studies have analyzed the employment effects of minimum wages on the self-employed but could not study the wage effects of minimum wage on the earnings self-employed (Menon, 2017).

This study explore the impact of minimum wages on the earnings, number of hours and consumption for wage earners as well as self-employed workers in heterogenous compliance regimes, Theoretically, in the presence of monopsony labour market and in certain special cases

[2] The detailed explanation of the covered and uncovered sector/worker is provided in section 4 of the paper.

of perfect competition, the minimum wage set up in the covered sector can positively influence the earnings of the workers engaged in the uncovered sector by affecting the employment levels of self-employed workers (Glasner, 2022; Welch, 1974 and Gramlich et al.,1976).[3] The role played by the labour market structure in this context is discussed in more detail in Section 2 below.

If minimum wages induce the migration of workers from the formal wage-earning sector the corresponding increase in the supply of labour in the informal wage-earning or self-employed sector could, in principle, lower earnings. There are, however, several countering effects that could lead to the opposite result of an increase in informal sector earnings. Faznzlyber (2001), finds minimum wages to impact the entire wage distribution and the changes in wage distribution seems to impact all kind of workers including self-employed workers. More importantly, he estimates an earning elasticity of 1.32 for the self-employed workers, which is significantly larger than formal and informal salaried workers (1.08 and 1.03 respectively). Alaniz, Gindling, and Terrell (2011) estimate the impact of minimum wages on the transition of workers from the covered sector to the uncovered sector including self-employment. An increase in wages in the formal private sector can result in disemployment, and these disemployed workers can find themselves working as self-employed workers. Further, an adverse effect is noted in this study due to higher legal minimum wages, wherein many workers who lost their jobs in the private sector were forced to enter unpaid family work. More recently, Glasner (2022) observes an adverse effect following the development of online gig economy in the 2010s- a 10% increase in the minimum wage increased the number of nonemployer establishments classified as transportation and warehousing services by approximately 2.7%. Earlier studies for India have highlighted the role of minimum wage compliance only for covered sector (Soundarajan, 2019), however, to best of our knowledge no study in India

[3] The details on covered and uncovered sector are provided in section 5 of this paper.

explore the impact of minimum wages on earnings, consumption and employment of self-employed workers given varying levels of market concentration. The result in this paper shows that regions with high labour market concentration and compliance exhibit a negative relationship between the minimum wage and an average number of hours employment in uncovered self-employed market. The earnings and consumption of the self-employed workers are positively related with minimum wage in these regions. However, there is no significant impact of minimum wages on earnings, consumption, and average number of hours of self-employed workers in regions with high labour market concentration even in higher compliance areas.

This study makes several contributions to the existing literature. The first contribution is to extend studying the impact of minimum wages from covered wage earners to uncovered self-employed workers. The second contribution is to include the interaction between compliance rate and minimum wages and a further interaction of these two with the types of employment to explore the effect of minimum wages in heterogenous compliance regimes on earnings, consumption, and number of hours employed for male low-skilled workers in India. The third contribution is a compilation of minimum wage data for recent years using state-wise minimum wage notifications for respective scheduled employments and job categories. Data on approximately 1900 minimum wages have been compiled. This is an update to the minimum wage compendium published by the union government. The fourth contribution of this study is that it includes all the industrial sectors of the economy including agriculture. The fifth contribution is that this study tries to empirically test and validate the theoretical framework that exhibit dynamic interplay between the labour market of wage earners and self-employed in the presence of minimum wages.

The structure of the paper is as follows. Section 2 covers the theoretical framework. Section 3 covers the discussion on data sources. Section 4 briefly discusses some of the labour market

characteristics in India. Section 5 discusses the coverage and compliance level of minimum wage in India. Section 6 discuss few key descriptive statistics, Section 7 discusses the estimation strategy and presents the main findings from the regressions and section 8 concludes with a discussion of the potential takeaways.

2. Theory

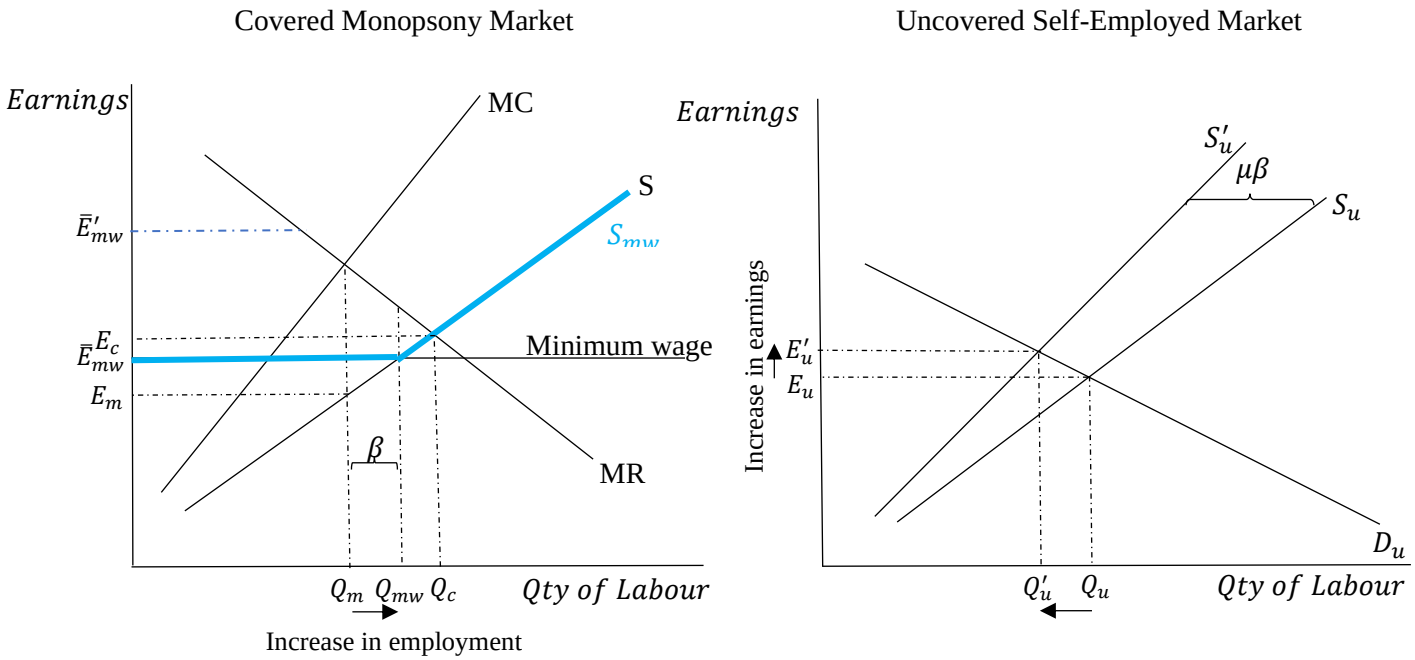
To understand the impact of minimum wages on the workers in the covered and uncovered sector we present a model adapted from Glasner (2022), Welch (1974) and Gramlich et. al. (1976). We first discuss a model with monopsonist labour market in the covered sector. Monopsony is a situation where single firm or employer is employing the workers. The first panel of figure 1, presents 'covered monopsony labour market'. The equilibrium is attained where marginal cost (MC) is equal to marginal revenue (MR), before the institution of minimum wages. At equilibrium, Q_m is the number of workers employed at the ongoing wage rate, E_m. Assuming binding minimum wage is set at $\bar{E}_{mw}$, such that $\bar{E}_{mw} > E_m$, the new marginal cost curve will become S_{mw}. At new equilibrium, Q_{mw} is the number of workers employed at the ongoing wage rate, E_{mw}. As $Q_{mw} > Q_m$, the introduction of minimum wages has resulted in the increase in employment. The magnitude of change in employment is represented by 'β' in the model. However, if minimum wage is set up really high, say at $\bar{E}'_{mw}$, that would raise the marginal cost of firm and hence, can result in reduction in employment.

Change in employment in the covered sector would also impact uncovered market. Let us assume that covered and uncovered markets are economically connected and $E_m = E_u$. The total supply of labour is assumed to be the summation of Q_m, Q_u and a proportion 'α' of $(Q_c - Q_m)$ who are not employed in uncovered sector. This implies $(1-\alpha) \times (Q_c - Q_m)$ labourers are working

in the uncovered sector and is part of Q_u. Free movement of labour between covered and uncovered sector is also assumed.

If the minimum wage is set at set at $\bar{E}_{mw}$, such that $\bar{E}_{mw} > E_m$, this would result in increase in labour demand in the covered sector from Q_{mw} to Q_m. The difference between Q_{mw} and Q_m is represented by 'β'. Given the skill sets, reservation wage and job characteristics, some workers belonging to the uncovered sector would transition to the covered sector. The share of workers willing to transition from uncovered sector to covered sector is represented by 'μ'. As movement of workers, of size μβ, occurred from uncovered sector to covered sector, the earnings of workers in the uncovered sector bid to rise from E_u to E'_u. Alternatively, the earnings could fall in case minimum wage is set too high in case of monopsony covered labour market.

Figure 1: Linkage between the Covered Monopsony Market and the Uncovered Self-Employed Market



In case of perfect competition, the setting up of minimum wages above the market equilibrium level can result in reduction in employment. The decrease in employment in the covered sector will result in outward shift in supply curve of uncovered workers and fall in earnings of workers in the uncovered sector. Alternatively, Glasner (2022) shows that lower barriers to entry and higher labour demand in the uncovered sector can also result in higher earnings of workers engaged in uncovered sector, when minimum wage is introduced under the perfectly competitive set up. Given this theoretical framework, one can empirically expect that incremental change in minimum wages can result in either fall (in case of monopsony and particular instance of perfect competition) or rise (usually in case of perfect competition) of the employment of the workers engaged in the uncovered sector due to transition of workers from uncovered sector to covered sector and vice-versa. However, in case of imperfect enforcement of minimum wages, the minimum wage can affect the employment positively, negatively, or even does not have any impact (Basu et al., 2010). As a result, the theoretical framework incorporating imperfect competition and imperfect enforcement provides for various possibilities on how minimum wage can affect earnings as well as employment of the workers. The empirical framework used in this paper helps to see the association between minimum wages and earnings and employment of the self-employed workers given enforcement levels and market structure. In the next section we provide a detailed discussion about the datasets using in this paper.

3. DATA SOURCE

This study makes use of the unit record data from the Periodic Labour Force Survey (PLFS) 2017-18, 2018-19, 2019-20 and 2020-21 datasets (MOSPI, 2022).[4] PLFS collects yearly information on the key employment and unemployment indicators that can help us to estimate,

[4] The PLFS data is accessed from Ministry of Statistics and Programme Implementation (MOSPI), Government of India

Labour Force Participation Rate (LFPR), Unemployment Rate, distribution of different categories of workers, and average earnings among many others. It also collects information about individual worker specific details such as gender, socioeconomic characteristic, general education level, marital status, religion, household size, and age.

The information is collected both using Current Weekly Status (CWS) and Usual Primary and Secondary Status (UPSS). Under CWS and UPSS the activity status of the worker is determined using the 7 days' reference period and one year preceding the date of the survey respectively. The information on both earnings and hours is available only for CWS, as a result. we have used CWS criteria to categorize workers into the employer, regular, casual, and own-account worker.[5] As minimum wage notification announces minimum wage on a per day basis for 8-hour day, there is a possibility that the worker ends up working for more than 8 hours and paid single consolidated amount for the entire workday. To align wages with minimum wages and prevent over-estimation of wages, it is essential to convert daily wages to wages per 8 hours (Soundarajan, 2019). The 8-hours wage blocks have been created using the data on the total number of hours spent each working day. To estimate real wages, 8-hour wage blocks have been deflated using state wise average inflation consumer price index (CPI) provided by Ministry of Statistics and Programme Implementation, Government of India.

To estimate the employment effect of minimum wages the intensive margin of employment, provided by number of hours worked, has been used in this paper as one of the outcomes. This helps to estimate employment effects through an adjustment in number of hours, half day or even full day rather typical unemployment with changes in minimum wage, a more feasible scenario in case of India (Rani and Besler, 2011; Mansoor and O'Neil, 2022).

[5] The details and definition of different categories of workers is provided in section 4 of this paper.

One of the key welfare objectives of the minimum wage policy is to reduce poverty (Stigler, 1946). We have used monthly per capita expenditure (MPCE) as a measure of consumption and estimated the relationship between the minimum wages and MPCE. Meyer and Sullivian (2012) argued that consumption is the better measure of welfare than income. Moreover, in India estimation of income is difficult especially for self-employed and workers engaged in informal sector with seasonal fluctuation in income, and associated data reporting errors due to large rural and informal economy.

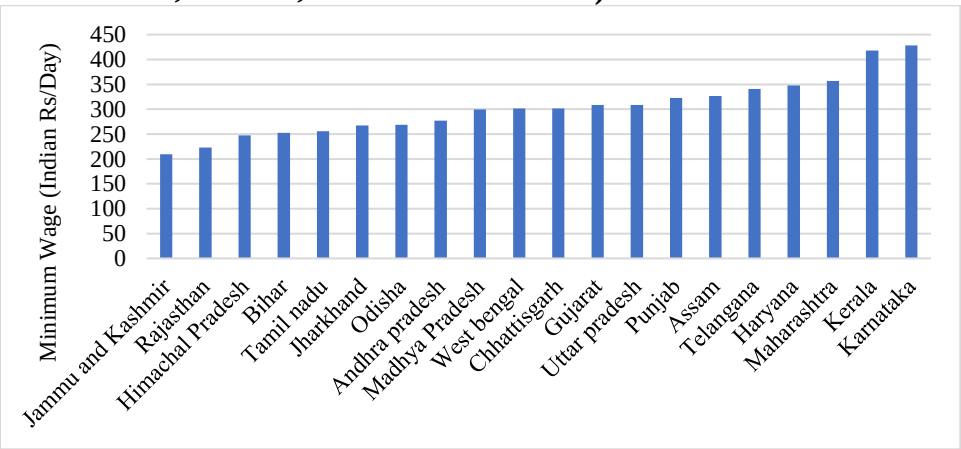
The minimum wages data is compiled using state-wise notifications issued by the Labour departments of respective State governments. The minimum wages are notified for all wage earners, regardless of their gender, age, or whether working in rural/urban locations, who belong to the list of schedule employment covered in the notification. The number of scheduled employments differs from state to state. For instance, Odisha notified minimum wages for 89 scheduled employments, whereas Bihar notified minimum wages for 69 scheduled employments. Moreover, for each schedule employment, different minimum wages are reported according to the skill levels of the workers. This complicated system has given rise to more than 1900 minimum wages in India (Mansoor and O'Neill, 2022).

The final compiled yearly minimum wage data, used in this paper, has unique value belonging to each schedule employment and skill category for every state. For analysis the data on minimum wages, effective as on 31st December of the previous year, have been merged with PLFS round of the corresponding year. This has been done to account for adjustment lags for the internalization of minimum wage in the system (Soundarajan 2019, Menon 2017).

The minimum wages averaged across years for each state shows substantial inter-state variation. Figure 2 shows the state-wise level of minimum wages for unskilled workers. There

is a difference of more than Rs 200 between the state with the highest minimum wage (Karnataka) and the state with the lowest minimum wage (J&K).

Figure 2: State-wise Minimum Wage for unskilled workers in nominal terms (averages over 2017-18, 2018-19, 2019-20 and 2020-21)



Source: Data compiled from State Wise Minimum Wage Notifications (2016-2020)

4. LABOUR MARKET IN INDIA

Employment in India is characterized by two major categories, those that are self-employed (non-wage earners) (the majority of which are own-account workers), and those that are defined as wage earners. According to PLFS 2020-21, using CWS criteria, 47 percent of the workers are self-employed, and the rest 53 percent are wage earners. The latter refers to those with an employment relationship linked through the payment of wages. Under this category, the PLFS has subdivided workers into (a) regular, and (b) casual wage employment. In India, 26.9 percent are regular and salaried employees and 26.1 percent are casual workers.

The other half of the workforce comprises self-employed individuals. Self-employment is composed of employers, unpaid family workers, and own-account workers. The latter constitutes the biggest group of the self-employed, 69 percent are own-account workers, 27.5 percent are unpaid family members and 3.5 percent are employers according to PLFS 2020-21.

Regular or salaried workers have continuous employment, and their wage compensation is made periodically (weekly or monthly) (Estupinan et al., 2020). On the other hand, casual

workers, are usually engaged in informal jobs, are under-employed with irregular working cycles, and are compensated on daily basis (ILO, 2018). The own-account workers are mostly home-based workers, and their income fluctuates the same as casual workers (ILO, 2018).

Apart from these, there are unpaid (domestic workers) and the unemployed in the labour market. These two categories will not be able to report either wages or earning, but minimum wages would influence their numbers. However, studies on Indian involving these two are rare and will be analysed separately as an extension to this work and is beyond the scope of this study.

5 Minimum wage Coverage and Compliance in India

According to the Minimum Wage Act (1948), a worker covered under the minimum wage notification by the force of the decree is legally entitled to receive a minimum wage. The states in India notify minimum wages for the schedule employments covered under the act. Firms that form part of the scheduled employments not covered under the minimum wage act are not mandated to pay their employees the legislated minimum wages. This implies that there are wage-earners in India that are not covered under the minimum wage legislation. In addition to uncovered wage-earners, there are self-employed workers who do not come under the ambit of the Minimum Wage Act (1948). Around 32.5 percent of low-skilled wage earners are presently not covered under the Minimum Wage Act of 1948 (author's estimate using PLFS rounds). In this paper the analysis is carried out on the 67.5 percent of the low-skilled workers that are covered under the act.[6]

The enforcement of minimum wages is entrusted to the state labour departments that carry out labour inspections to ensure compliance with the minimum wages. Given the informal nature of Indian labour markets, the overarching nature of the inspection system and the complicated

[6] Only those workers who have studied till 8th class have been considered for the analysis and categorized as low-skilled.

structure of minimum wages makes minimum enforcement a difficult task (Soundarajan, 2019).

We have applied Foster–Greer–T horbecke poverty metric (Foster et. al. (1984)) which has been widely used in literature to estimate the compliance index (Bhorat et. al., 2013, Mansoor and O'Neil 2022). We have adapted the metric to estimate compliance rates using,

$$C_\gamma = \frac{1}{N}\sum_{i=1}^{N} I(W_i \geq MW_i)\left(\frac{W_i - MW_i}{MW_i}\right)^\gamma$$

Where W_i is the observed nominal daily wages, MW_i is the minimum wages and γ is a measure of violation-aversion. C_γ is a measure of compliance. When γ is equal to 0, the compliance index measures the number of individuals who are earning at or greater than minimum wages. In this paper we have used this measure of headcount to estimate proportion of wage earners who are earning at-least or greater than minimum wages.

6 DESCRIPTIVE STATISTICS

Table 1 reports the summary statistics for the outcome and key control variables for low-skilled male workers across all worker categories who have reported positive earnings and non-zero working hours. From table 1 it is observed that employers as a category have the highest average daily earnings, followed by regular workers, then own-account workers, and lowest for the casual workers. Regular workers on an average are employed for 57.8 hours per week, in comparison casual workers are working 45.2 hours per week and own-account 48.7 hours per week. 59 percent of regular workers are earning at-least or greater than minimum wages, in comparison to 44 percent of casual worker, 59 percent of own-account workers and 85 percent of employers.

Around 35 percent of the casual workers belong to the SC category. Whereas 21 percent, 18 percent and 13 percent of the regular, own-account and employers belong to SC category. 29

percent of the casual workers have completed middle school. Whereas 50 percent, 33 percent and 44 percent of the regular, own-account and employers have completed middle school. The average number of children are similar for casual and own-account workers, and greater than both employer and regular workers.

[Insert table 1 here]

7. EMPIRICAL STRATEGY

In this section we empirically investigate the impact of minimum wages on earnings, working hours and monthly per capita expenditure for male wage earners and non-wage earners (especially own-account workers) given heterogenous compliance regimes. Our analysis sample consist of low-skilled male workers,[7] aged between 15 years and 65 years, that are covered under the minimum wage legislation in India and who have reported non-zero earnings and working hours. 67.5 percent of the workers are covered under the minimum wage legislation in India, and among covered workers 69.8 percent of the workers are low-skilled workers, and rest 30.2 percent of the workers are skilled or high-skilled workers.[8]

Following Card (1992), Neumark and Wascher (1992), Besley and Burgess (2004), Allegretto et al. (2017), Menon and Rodgers (2017), Mansoor and O'Neil (2022) we use canonical two-way fixed effects model with interaction term to account for interaction between minimum wages, compliance rate and worker type as shown below:

7 Low skilled workers are those who have studied till middle school.

[8] Author's estimate using PLFS rounds. High skilled workers are all those workers who have studied above secondary school including graduation, post-graduation, and Ph.D.

$$
\begin{aligned}
y_{ijst} = \beta_0 + \beta_1 C_{ijst} + \beta_2 Ow_{ijst} + \beta_3 Em_{ijst} + \beta_4 \mathrm{Ln}MW_{jst} + \beta_5 Com_{jst} \\
+ \beta_6 (C_{ijst} \times \mathrm{Ln}MW_{jst} \times Com_{jst}) + \beta_7 (Ow_{ijst} \times \mathrm{Ln}MW_{jst} \times Com_{jst}) \\
+ \beta_8 (Em_{ijst} \times \mathrm{Ln}MW_{jst} \times Com_{jst}) \\
+ \beta_9 \boldsymbol{X}_{ijst} + \beta_{10} \gamma_{st} \\
+ \partial_t + \partial_s + \mu_{ijst}
\end{aligned}
\qquad eq\ (1)
$$

Where y_{ijst} assumes one of the three outcomes, namely, (i) Log of nominal daily wage earnings, (ii) log of hours worked, and (iii) log of monthly per capita expenditure, for worker i, employed in industry j, in state s, and at time t.[9] The model is a pooled cross section where time refers to the different PLFS rounds, and the same workers are not repeatedly surveyed across the years. C_{ijst} denote *casual worker* i , Ow_{ijst} denote *own-account worker* i , Em_{ijst} denote *employer* i in industry j, at time t in state s respectively. We have used regular workers as the reference (omitted) category which helps us to estimate the earning gap between regular workers and all other categories of workers. $LnMW_{jst}$ is the logarithm of statutory nominal minimum wage across the industry, state and time. Com_{jst} gives us the compliance rate of workers in industry j, in state s, and at time t. $\boldsymbol{X}_{ijst}$ is the set of household and individual characteristics such as worker's education, social group, age, religion, the proportion of dependents, and marital status. Regional variables are whether a worker belongs to a rural or urban region and a separate set of variabes γ_{st} for state domestic product and state population, (Menon and Rodgers, 2017; Soundarajan, 2019, Mansoor and O'Neil, 2022) and ∂_t *and* ∂_s are the time and state fixed effects, respectively, that are common for all works in the year 't' and state 's'. u_{ijst} is the error term that includes unobservable individual-specific characteristics.

In equation (1) worker type is included as fixed effect as intercept dummy variables. It also allows for differences in slope coefficients for minimum wage and compliance rate across

[9] Real wages have also been considered and the technical appendix covers the output for the same.

worker type as an interaction of worker type with minimum wages and compliance rate to understand the association between minimum wages, compliance rate and the different kinds of worker earnings at the state level. The interaction term involving all three is an important variable in this empirical study, as it captures the heterogenous effect of minimum wages on the earnings, working hours and MPCE, for each worker type for different compliance rates in comparison to base category of regular workers. This will also enable us to compare between the own-account and casual wage worker.

7.1 Result of Interaction Between Minimum Wages, Worker Type and Compliance

In equation (1) worker type is included as fixed effect intercept dummy variables. It also allows for differences in slope coefficients for minimum wage and compliance across worker type as an interaction of worker type with minimum wages and compliance to understand the association between a higher level of minimum wages, compliance, and the different kinds of labour market outcomes. Table 2 shows a regression model given in eq (1). We are interested in the coefficient of interaction term given by Own account worker × Minimum Wage × Compliance rate to estimate the impact of minimum wages on own-account worker.

[Insert table 2 here]

For us to conclude that minimum wage has notable effect on earnings, working hours or MPCE of the own-account workers, we would expect coefficient of interaction term given by Own account worker × Minimum Wage × Compliance rate to be significant. The sign of the coefficient will help us to understand the direction of the relationship between outcome variables and minimum wages. However, to disentangle the effect of interaction term we have used marginal effects. Marginal effects allow for a change in one independent variable, while keeping all other variables constant, to estimate the predicted value of the dependent variable at different values of the independent variable (Stolz and Williams, 2020). While estimating

the marginal effect's values of all other independent variables in a regression model are kept constant. We have used STATA post estimation command *margins* to get predicted values of earnings for different worker types at different levels of minimum wages. Figure 4 shows the predicted average marginal effects for own account workers with regular workers as the base category, for increasing values of minimum wages given compliance level.

When compliance level is equal to 1 or 0.8, then the earnings of own account workers, in comparison to regular workers is predicted to increase, however, at the same time work intensity of the own account is predicted to decrease (Figure 4a). However, for lower compliance levels with higher level of minimum wages, earnings of own-account worker are predicted to decrease and work intensity of own-account is predicted to increase (Figure 4b). The marginal effects estimate shows that in higher compliance regimes (compliance level equal to 1 or 0.8), a 10 percent increase in minimum wages results in 2.9 percent increase in earnings and lowers the average number of hours worked by 1.1 percent for the male own-account workers. The positive effect of minimum wages on wages of own-account workers has also translated on average into higher household consumption for these workers in higher compliance regimes. 10 percent increase in minimum wages results in 4 percent increase in monthly per capita expenditure of own-account worker. For casual worker also there has been positive effect of minimum wages on earnings and MPCE but no effect on number of hours worked. The results for casual labor, a wage-earner, are in line with what has been found in literature (Mansoor and O'Neill, 2021). Further, this study extends the analysis to self-employed workers who are not covered under the minimum wage legislation.

Figure 4a: The marginal effect of the minimum wage on nominal wages and work-intensity (given by hours per-week) at higher level of compliance for own-account workers.

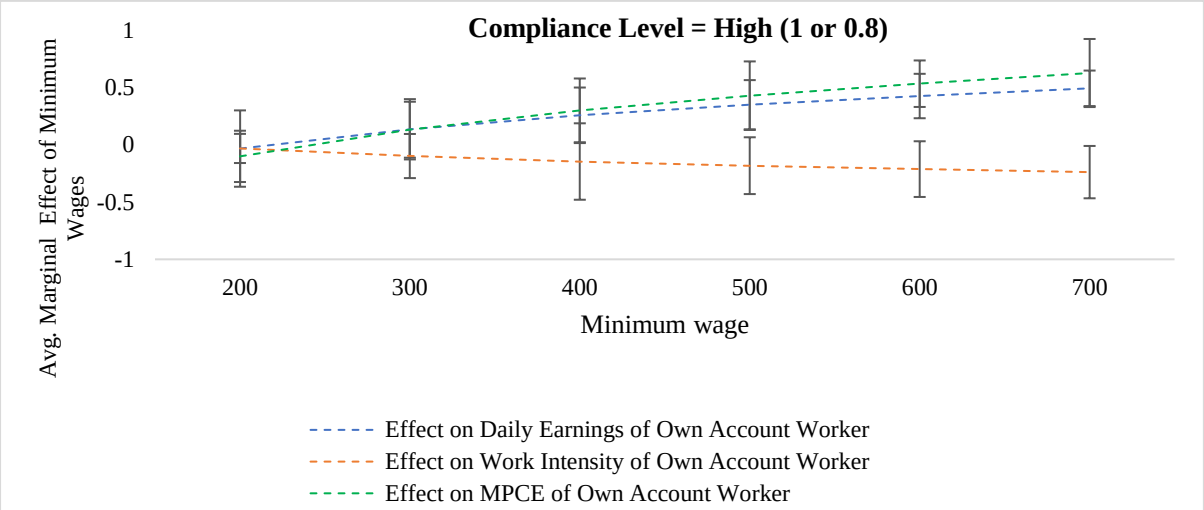
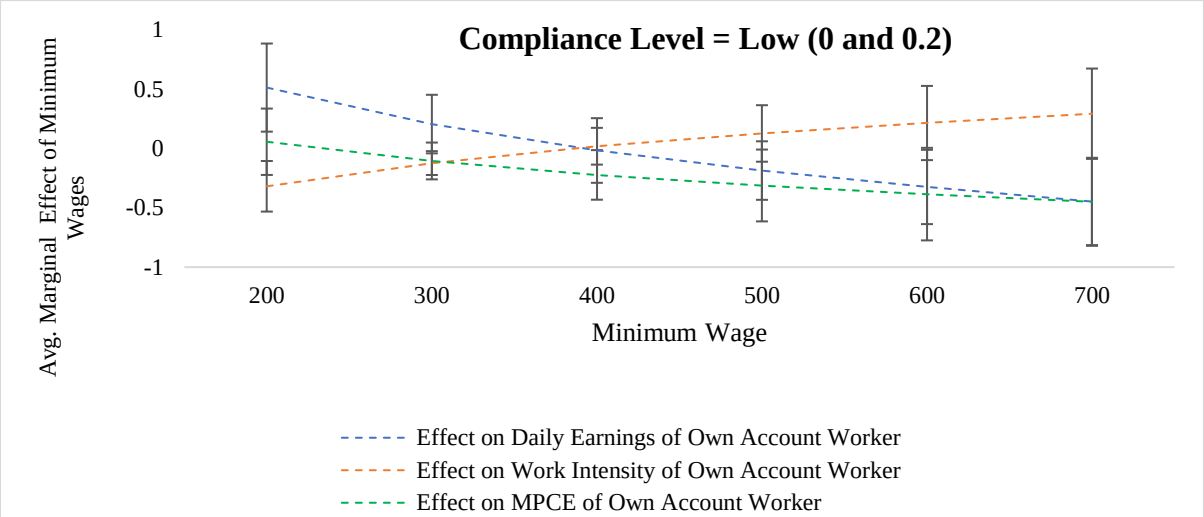


Figure 4b: The marginal effect of the minimum wage on nominal wages and work-intensity (given by hours per-week) at low level of compliance for own-account workers.



Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.
Note: Each panel represents two fixed-effects regressions, for the outcomes, Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure. The confidence intervals are represented by lines around marginal effects at each level of minimum wages. In all regressions, robust standard errors are clustered at state level. State and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. All regressions are weighted.

7.2 Addressing Endogeneity

To causally interpret interaction coefficients the potential endogeneity concerns related to the compliance rate needs to be addressed. The compliance rate has been estimated as a proportion of wage-earners who are earning at or above the existing minimum wages. However, earnings of wage earners depend on the wage contract they end up signing with the respective firms. Given circumstances existing in the local labour market or goods market and the enforcement effort taken by the state machinery, whether firm comply with minimum wage law or not may also depend on factors that might be influencing their production decisions (Ashenfelter and Smith, 1979; Chang and Ehrlich, 1985; Basu et al., 2010; Clemens and Strain, 2020). Inability to account for unobservable production decisions would render compliance rate endogenous. In turn, the presence of endogeneity would make OLS estimator biased. To address this issue, we have used three instruments. The first one is crime rate that has been used earlier in literature by Almeida and Carneiro (2005), Mansoor & O'Neill (2021), and Soundarajan (2019). The second instrument is the election year which is used by Levitt (1997), Hanson and Spilimbergo (1999) and, Soundarajan (2019). Number of corruption cases filed in a state makes up for the third instrument.[10] Corruption is expected to be correlated with the endogenous variable of the enforcement; however, it does not seem to be not correlated with the error terms in our regression model. There are eight endogenous variables in our regression model Compliance rate, Compliance rate × Minimum Wage, Casual worker × Compliance rate, Own account worker × Compliance rate, employer × Compliance rate, Casual worker × Minimum Wage × Compliance rate, Own account worker × Minimum Wage × Compliance rate, employer × Minimum Wage × Compliance rate. We have used the vector of instruments and estimated

[10] The data on crime rate and number of corruption cases has been sourced from National Crime record Bureau (NCRB). The data on election is sourced from the Election Commission of India (ECI)

equation (1) using two-step IV-GMM. The advantage of two step IV-GMM over IV-2SLS is that it provides more efficient estimator in the presence of heteroskedasticity in data (Baum et al., 2007). Moreover, if number of instruments exceeds number of endogenous variables, it is desirable to use GMM (Kandpal and Maiti, 2022). For model used in this paper both these conditions exist therefore it is pertinent to use IV-GMM.

To test for instrument relevance and validity, Sanderson-Windmeijer F-stat and Hansen test have been used respectively. The output related to these statistics and IV-GMM estimates are provided in table 3. The Sanderson-Windmeijer F-stat tests the null hypothesis that instruments are relevant. The F-stat values shows that null hypothesis can't be rejected implying that instruments are relevant. Moreover, Hansen test shows that instruments are uncorrelated with the error term. It is encouraging to see overall results remain robust and corroborate with the findings of the two-way fixed effect model after accounting for potential endogeneity concerns using preferred IV-GMM.

[Insert table 3 here]

7.3 Border discontinuity design (BDD)

BDD is one of the most robust designs to study the causal effect of minimum wages in the past decade or so. It has been developed by Dube et al. (2010) and since then has been used in many studies including Magruder (2013), Huang, Loungani, and Wang (2014), and Aaronson, French, Sorkin, and To (2017), Soundarajan (2019) to estimate the casual relationship between minimum wages and earnings or employment. BDD design considers two contiguous districts bordering each other but belong to separate states. It uses variation in treatment provided by different minimum wage policies existing in counterfactual districts belonging to separate states and assumes that border districts experience similar economic shocks (Allegretto et al., 2017). Allegretto et al. (2017) further argues that BDD is a robust design that helps to estimate the causal effect of the minimum wage policy, while accounting for the possibility of

endogenous state level minimum wage policies driven by the local economic conditions affecting the low-wage labour market.

$Equation\ (2)$ bring forth the border discontinuity design and has been used to estimate the wage and employment effects of minimum wages on different categories of labour given heterogenous compliance regimes. To utilize this design a dataset has been created that contains information on all the border districts accounting for the possibility that a single district can pair with multiple border districts. In India, out of 651 districts, 391 districts form part of border district pairs, rest 260 are non-border districts. This dataset is then merged with the main dataset. In $Equation\ (2)$ time effects are allowed to vary with $g,\ \partial_{gt}$, where g is the district pair along common state borders. This allows to use the variation only within local district pairs. Usual OLS models are based on a strong assumption that minimum wages between any location are uncorrelated with residuals. However, in the case of border discontinuity designs, this assumption significantly weakens as it needs to hold only for local areas along the state borders and thus it helps to estimate the local average treatment effects (Allegretto et al., 2017). To account for the possibility that in border discontinuity design a single district can be part of multiple cross-border pairs the standard errors are clustered by district and border pair (Allegretto et al., 2017, Soundarajan, 2019). Further, in all BDD regressions, district fixed effects, border-district-pair fixed effects and time fixed effects have been incorporated.

$$\begin{aligned} y_{ijst} = {} & \beta_0 + \beta_1 C_{ijst} + \beta_2 Ow_{ijst} + \beta_3 Em_{ijst} + \beta_4 \mathrm{Ln}MW_{jst} \\ & + \beta_5 (C_{ijst} \times \mathrm{Ln}MW_{jst} \times Com_{jst}) + \beta_6 (Ow_{ijst} \times LnMW_{jst} \times Com_{jst}) \\ & + \beta_7 (Em_{ijst} \times LnMW_{jst} \times Com_{jst}) \\ & + \beta_6 \boldsymbol{X}_{ijst} + \beta_7 \gamma_{st} + \partial_s \\ & + \partial_{gt} + \mu_{ijst} \end{aligned} \qquad eq\ (2)$$

Table 4 (a) and 4 (b) presents the BDD regression results for two-way fixed effects regression and IV-GMM model respectively. The three outcome variables (a) Log of Nominal Daily

Earning, (b) Log of Total Weekly Hours, and (c) Log of Monthly Per Capita Expenditure. The coefficient of the interaction term, Own account worker # Minimum Wage # Compliance rate, is significant and the signs are like what we have obtained while running regression for the entire sample. This further corroborates the earlier findings.

[Insert table 4 (a) and 4 (b) here]

7.4 Market Power and Effect of Minimum Wages

According to the theoretical framework elucidate in section 2, the effect of minimum wages on earnings and employment of workers (both wage earners and self-employed) depends upon the market structure. High labour market is concentration implies higher monopsony power of firms and vice vera. To evaluate the market concentration, Herfindahl-Hirschman Index **(**HHI) has been constructed using sixth Economic Census of Firm (2013) data provided by Ministry of Statistics and Programme Implementation (MOSPI). The low value of HHI indicates low monopsony power and vice versa. The economic census provides information on the number of workers employed by a firm, geographical location of the firm that helped us to construct HHI. First, data is gathered about the number of employees in each firm. This tells how much labour is concentrated in each firm. Second, each firm HHI has been added to get the district level HHI, a measure of the aggregate employment concentration at the district level. HHI have been used previously in India by Soundarajan (2019) to examine the effect of minimum wages in districts with high labour market concentration. Districts have been divided into two groups, using the median HHI as cutoff, and hence been categorized as districts with low monopsony power and high monopsony power respectively (Soundarajan, 2019).

Table 5 (a) and 5 (b) presents results for areas with low and high monopsony power, respectively, using preferred IV-GMM method. The expectation is that regions most likely to exhibit a negative relationship between the minimum wage and participation in uncovered self-employed market are those with high labour market concentration and high compliance. The

wage and MPCE expected to be positively related with minimum wage in these regions. The coefficient of the interaction terms, Own account worker # Minimum Wage # Compliance rate, across all the three outcomes is only significant in case of high HHI and are insignificant in case of low HHI values. This implies that regions most likely to exhibit a negative relationship between the minimum wage and participation in uncovered self-employed market are those with high labour market concentration and high compliance. The wage and MPCE of the self-employed workers are also positively affected by minimum wages in these regions.

[Insert table 5 (a) and 5 (b) here]

8. Conclusion

The aim of minimum wage policy is to protect unskilled workers against low wages. However, in developing countries, like India, labour markets are characterized by high informality and self-employment. In the minimum wage literature, studies have attempted to study wage and employment-effects of minimum wages. However, while estimating wage effects, most of these studies have considered only workers covered by the minimum wage legislation (wage-earners or employees), leaving aside large proportion of workers not covered by the minimum wage legislation (non-wage earners and/or self-employed). This study attempted to include self-employed workers and explore the impact of minimum wages on the earnings of all kinds of workers including self-employed using the novel minimum wage data and earnings data from the four recent PLFS rounds starting from 2017-18 to 2020-21. Our results show that minimum wage not only impacts the wage sector but also the non-wage sector. When compliance level is equal to 1 or 0.8, then the earnings of own account workers, in comparison to regular workers is predicted to increase, however, at the same time average number of working hours per week is predicted to decrease. Our results show that minimum wage not only impacts the wage sector but also the non-wage sector and how different enforcement

regimes and market structure determines the impact of minimum wages on self-employed workers.

With higher compliance levels and concentrated labour markets the earnings amd MPCE of the own account workers, in comparison to regular workers, are predicted to increase, however, at the same time work-intensity of the own account is predicted to decrease. Overall, our results show, given proper enforcement, minimum wages influence the wages and consumption, thereby household welfare, for both wage and non-wage earners.

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TABLES

Table 1: Summary statistics of all covariates (Age:15 to 65 years) (averages over 2017-18, 2018-19, 2019-20 and 2020-21)

	Regular workers		Casual workers		Own Account Worker		Employer	
	mean	sd	mean	sd	mean	sd	mean	sd
Daily earnings (Rupees)	394.70	238.15	273.88	121.44	350.21	216.45	585.40	382.29
Log daily earnings (Rupees)	5.84	0.53	5.50	0.49	5.68	0.63	6.20	0.60
Average weekly hours	57.81	11.70	45.25	13.40	48.70	13.14	51.04	13.95
Monthly Per Capita Expenditure (Rupees)	2256.01	1300.04	1568.94	802.01	1722.30	942.26	2597.60	1456.66
Compliance rate	0.59	0.49	0.44	0.50	0.59	0.49	0.85	0.36
Average age (in years)	36.40	11.69	38.17	12.27	45.07	11.47	47.16	10.75
Household size	4.57	2.07	4.66	1.90	4.81	1.96	4.52	1.96
Social group:								
Scheduled tribe	0.08	0.27	0.14	0.35	0.14	0.34	0.04	0.19
Scheduled caste	0.21	0.41	0.35	0.48	0.18	0.38	0.13	0.33
OBC	0.43	0.49	0.37	0.48	0.47	0.50	0.46	0.50
Forward caste	0.29	0.45	0.14	0.35	0.21	0.41	0.37	0.48
Education:								
Illiterate	0.17	0.38	0.38	0.49	0.36	0.48	0.20	0.40
Below or Completed Primary School or literate w/o formal education	0.32	0.47	0.33	0.47	0.31	0.46	0.36	0.48
Completed Middle School	0.50	0.50	0.29	0.46	0.33	0.47	0.44	0.50
Marital status:								
Never married	0.21	0.41	0.16	0.36	0.05	0.21	0.02	0.15
Currently married	0.76	0.42	0.81	0.39	0.92	0.27	0.94	0.23
Widowed	0.02	0.12	0.02	0.15	0.03	0.18	0.03	0.17
Divorced/separated	0.01	0.08	0.00	0.07	0.00	0.06	0.00	0.05
Religion:								
Hindu	0.78	0.42	0.81	0.39	0.84	0.37	0.82	0.38
Islam	0.17	0.38	0.13	0.34	0.12	0.32	0.12	0.32
Christian	0.02	0.14	0.02	0.13	0.02	0.15	0.02	0.15

Sikh/Jain/Buddhism	0.03	0.17	0.03	0.17	0.02	0.13	0.04	0.19
Others	0.00	0.06	0.01	0.08	0.01	0.08	0.00	0.05
No of Children (<15 years)	1.55	1.59	1.79	1.69	1.78	1.70	1.36	1.43
No. of elders (>60 years)	0.18	0.45	0.17	0.45	0.19	0.48	0.27	0.56
N	20689		50981		76766		2902	

Source: Author's estimate using PLFS 2017-18, 2018-19, 2019-20, and 2020-21

Table 2: OLS regression estimates of effect of minimum wages on outcomes for Male Low Skilled Workers (Age group 15 to 65 years). Outcomes: Log of Nominal Daily Earnings-LnNDE, Log of Total Weekly Hours-LnTWE and Log of Monthly Per Capita Expenditure-LnMPCE

	(1) LnNDE	(2) LnTWE	(3) LnMPCE
Ln Minimum Wage	1.195***	-0.653***	0.558**
	(0.344)	(0.169)	(0.209)
Compliance rate	8.595***	-4.497**	5.58***
	(2.897)	(1.787)	(599.6)
Ln Minimum Wage # Compliance rate	-1.495***	0.788***	-1.02***
	(0.508)	(0.322)	(1.998)
Regular worker (reference category)			
Casual worker # Ln Minimum Wage # Compliance rate	1.491***	-0.428	1.110***
	(0.509)	(0.351)	(0.285)
Own account worker # Ln Minimum Wage # Compliance rate	1.484**	-0.817***	1.232***
	(0.562)	(0.262)	(0.314)
employer # Ln Minimum Wage # Compliance rate	2.61***	-0.463	.953
	(.901)	(0.319)	(0.547)
Observations	148,498	148,498	148,498
R^2	0.195	0.146	0.372

Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.

Note: Robust standard errors clustered at state level are in parentheses. The dependent variables in the model estimated in column (1), (2) and (3) are the Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure respectively. State and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. All regressions are weighted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: IV-GMM estimates of of effect of minimum wages on outcomes for Male Low Skilled Workers (Age group 15 to 65 years). Outcomes: Log of Nominal Daily Earnings-LnNDE, Log of Total Weekly Hours-LnTWE and Log of Monthly Per Capita Expenditure-LnMPCE

	(1) LnNDE	(2) LnTWE	(3) LnMPCE
Minimum Wage	1.25***	-0.003	8.04***
	(0.284)	(0.026)	(2.66)
Compliance rate	10.15***	15.16	3980.5***
	(2.39)	(13.6)	(1464.7)
Minimum Wage # Compliance rate	-1.86***	-0.037	-14.338***
	(0.421)	(0.053)	(4.66)
Regular worker (Base)			
Casual worker # Minimum Wage # Compliance rate	3.24***	0.084	20.11***
	(0.570)	(0.049)	(3.20)
Own account worker # Minimum Wage # Compliance rate	1.10***	-0.070**	13.32***
	(0.426)	(0.032)	(2.50)
employer # Minimum Wage # Compliance rate	0.345	-0.124***	-22.46*
	(1.048)	(0.040)	(4.42)
Sanderson-Windmeijer F-stat			
Compliance rate	31.22	71.50	18.66
Compliance rate × Minimum Wage	22.92	101.51	21.11
Casual worker × Compliance rate	41.96	103.29	11.59
Own account worker × Compliance rate	126.72	43.51	13.77
employer × Compliance rate	136.57	144.73	7.79
Casual worker × Minimum Wage × Compliance rate	75.40	28.87	7.36
Own account worker × Minimum Wage × Compliance rate	110.58	35.94	20.88
employer × Minimum Wage × Compliance rate	133.91	86.52	7.40
Hansen J-Test	17.224	14.124	19.642
Hansen p-value	0.3712	0.5894	0.2368
Observations	148,498	148,498	148,498

Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.

Note: Robust standard errors clustered at state level are in parentheses. The dependent variables in the model

estimated in column (1), (2) and (3) are the Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure respectively and presents a separate IV-GMM regression. State and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. All regressions are weighted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 (a): Border District Discontinuity (BDD): Two-way fixed effects regression estimates of minimum wages on outcomes for Male Low Skilled Workers (Age group 15 to 65 years). Outcomes: Log of Nominal Daily Earnings-LnNDE, Log of Total Weekly Hours-LnTWE and Log of Monthly Per Capita Expenditure-LnMPCE

	(1) LnNDE	(2) LnTWE	(3) LnMPCE
Ln Minimum Wage	1.179***	-.593**	0.269
	(0.366)	(0.210)	(1.165)
Compliance rate	7.82**	-4.00**	2.33**
	(223.43)	(1.86)	(1.07)
Ln Minimum Wage # Compliance rate	-1.343	.0697	-0.407**
	(0 .562)	(0.334)	(1.192)
Regular worker (Base)			
Casual worker # Ln Minimum Wage # Compliance rate	1.139**	-0.497	0.543***
	(0 .491)	(.317)	(0.177)
Own account worker # Ln Minimum Wage # Compliance rate	1.312**	-0.862**	0.584**
	(0.618)	(.303)	(0.230)
employer #Ln Minimum Wage # Compliance rate	2.088	-0.271	-0.004
	(1.22)	(0.411)	(0.424)
Observations	214,068	214,068	214,068
R^2	0.273	0.214	0.455

Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.

Note: Robust standard errors clustered at state and border-pair level are in parentheses. All regressions are run on PLFS-BDD database. The dependent variables in the model estimated in column (1), (2) and (3) are the Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure respectively and presents a separate two-way fixed effects regression. District, border-pair and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. All regressions are weighted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 (a): High market power: IV-GMM estimates of effect of minimum wages on outcomes for Male Low Skilled Workers (Age group 15 to 65 years). Outcomes: Log of Nominal Daily Earnings-LnNDE, Log of Total Weekly Hours-LnTWE and Log of Monthly Per Capita Expenditure-LnMPCE

	(1) LnNDE	(2) LnTWE	(3) LnMPCE
Minimum Wage	1.20***	-0.143	1.11***
	(0.329)	(0.134)	(0.29)
Compliance rate	10.09***	0.387	11.20***
	(2.92)	(1.441)	(2.75)
Minimum Wage # Compliance rate	-1.90***	-0.066	-1.995***
	(0.512)	(0.263)	(4.66)
Regular worker (Base)			
Casual worker # Minimum Wage # Compliance rate	1.82***	0.337	1.80***
	(0.218)	(0.286)	(0.350)
Own account worker # Minimum Wage # Compliance rate	2.34***	-0.897***	1.26***
	(0.373)	(0.208)	(0.243)
employer # Minimum Wage # Compliance rate	2.75	-0.302	-1.93***
	(1.95)	(0.286)	(0.375)
Sanderson-Windmeijer F-stat			
Compliance rate	78.53	39.78	39.79
Compliance rate × Minimum Wage	45.61	47.23	47.26
Casual worker × Compliance rate	127.37	13.86	13.86
Own account worker × Compliance rate	269.75	31.95	31.88
employer × Compliance rate	31.51	8.85	8.85
Casual worker × Minimum Wage × Compliance rate	58.99	11.94	11.93
Own account worker × Minimum Wage × Compliance rate	100.02	35.14	35.11
employer × Minimum Wage × Compliance rate	26.66	7.97	7.97
Hansen J-Test	17.893	16.288	13.162
Hansen p-value	0.3302	0.4330	0.6609
Observations	87,599	87,599	87,599

Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.

Note: Robust standard errors clustered at state level are in parentheses. The dependent variables in the model

estimated in column (1), (2) and (3) are the Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure respectively and presents a separate IV-GMM regression. State and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. Only those districts have been considered which have HHI value at least equal to or greater than median HHI value. All regressions are weighted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 (b): Low market power: IV-GMM estimates of effect of minimum wages on outcomes for Male Low Skilled Workers (Age group 15 to 65 years). Outcomes: Log of Nominal Daily Earnings-LnNDE, Log of Total Weekly Hours-LnTWE and Log of Monthly Per Capita Expenditure-LnMPCE

	(1) LnNDE	(2) LnTWE	(3) LnMPCE
Minimum Wage	1.50***	-1.093***	2.09***
	(0.279)	(0.213)	(0.440)
Compliance rate	14.22***	12.62***	19.94***
	(2.51)	(2.18)	(4.55)
Minimum Wage # Compliance rate	-2.63***	-2.29	-3.41***
	(0.461)	(0.408)	(0.794)
Regular worker (Base)			
Casual worker # Minimum Wage # Compliance rate	2.52**	2.61***	1.83***
	(1.10)	(0.290)	(0.486)
Own account worker # Minimum Wage # Compliance rate	0.86	0.48	0.41
	(0.76)	(0.349)	(0.311)
employer # Minimum Wage # Compliance rate	4.01	-1.75***	-8.090***
	(2.09)	(0.605)	(1.58)
Sanderson-Windmeijer F-stat			
Compliance rate	68.72	39.20	39.20
Compliance rate × Minimum Wage	67.14	48.59	48.59
Casual worker × Compliance rate	129.58	38.61	38.61
Own account worker × Compliance rate	90.61	42.01	42.01
employer × Compliance rate	132.64	178.01	178.01
Casual worker × Minimum Wage × Compliance rate	112.86	84.76	84.76
Own account worker × Minimum Wage × Compliance rate	114.24	41.54	41.54
employer × Minimum Wage × Compliance rate	127.91	125.76	125.76

Hansen J-Test	17.567	14.955	14.124
Hansen p-value	0.3499	0.5279	0.5895
Observations	59,649	59,649	59,649

Source: Authors own calculations using PLFS data and administrative data from the State Notifications to satisfy the requirement of the Minimum Wages Act, 1948.

Note: Robust standard errors clustered at state level are in parentheses. The dependent variables in the model estimated in column (1), (2) and (3) are the Log of Nominal Daily Earning, Log of Total Weekly Hours and Log of Monthly Per Capita Expenditure respectively and presents a separate IV-GMM regression. State and year dummies are included in all regressions. The following control variables are included: the state level minimum wage, the logarithm of state population, the logarithm of state GDP, age and its square (in years) and dummy variables for socio-religious status, regular work status, marital status, gender, urban residence, number of children, number of elders and education level. Male workers (age 15 to 65 years) with education equal to or less than 8th standard is considered for analysis. Only those districts have been considered which have HHI value less than median HHI value. All regressions are weighted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

APPENDIX

In India, the Minimum Wages Act was enacted in 1948 and for the past 70 years has been shaping the minimum wage policy of the country. The Minimum Wages Act, 1948 allows the Government of India to revise and fix minimum wages for employees working in scheduled employment (ILO, 2018). Both the central government and state governments fix minimum wages for scheduled employment under their authority. The state-wise minimum wages are announced according to skill level for each of the scheduled employment. This evolving process has contributed to building a complex web of minimum wage rates in India (Satapathy et al., 2021). At present, the minimum wage system in India has nearly 429 scheduled employments, with 45 in the Central sphere and the rest in various states, and 1,915 scheduled job categories for unskilled workers (GoI, 2018).

Table A1: State-wise Revisions and Notes Related to Announcement of Minimum Wages

State	Indexed revision	Non-Indexed revision	Notes: Announcement of minimum wages
Punjab	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference

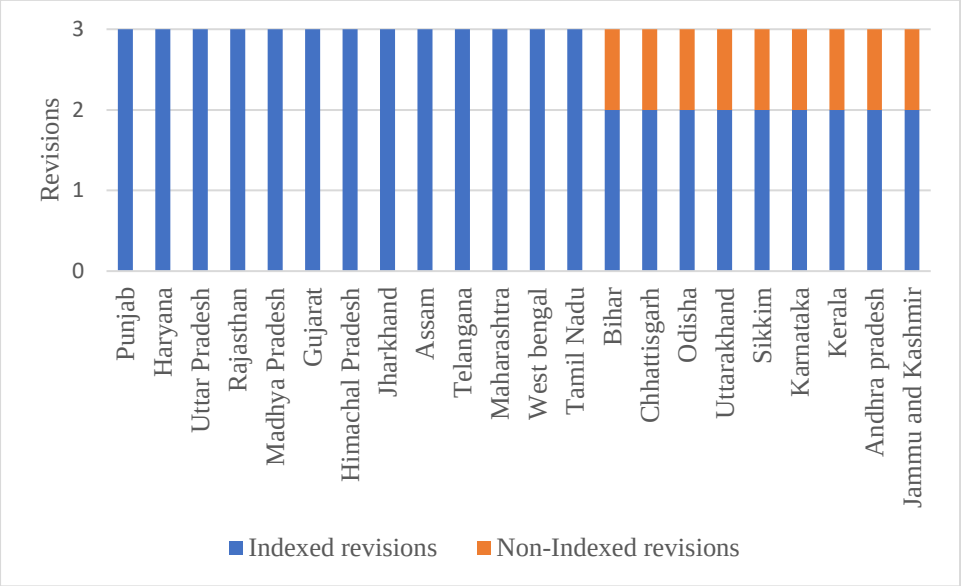
Haryana	3	0	Skill wise announcement of minimum wages. Different minimum wage rates for clerical staff, data entry operator, driver, cleaning staff, and brick klins, but for rest of the scheduled employment category, same minimum wages apply
Uttar Pradesh	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Rajasthan	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Madhya Pradesh	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Gujarat	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Himachal Pradesh	3	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Jharkhand	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Assam	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Telangana	3	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Maharashtra	3	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
West bengal	3	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Tamil Nadu	3	0	Schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Bihar	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference

Chhattisgarh	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Odisha	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Uttarakhand	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Sikkim	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Karnataka	2	1	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Kerala	2	1	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Andhra pradesh	2	1	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Jammu and Kashmir	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Arunachal pradesh	2	1	Skill and experience wise announcement of minimum wages. Scheduled employment wise no difference. Minimum of minimum wages are taken if there is any conflict
Nagaland	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Tripura	2	1	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Lakshadweep	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
A and N Island	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Manipur	0	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference

Mizoram	0	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Delhi	3	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict
Meghalaya	2	1	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Goa	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Daman and Diu	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
D and N Haveli	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Chandigarh	3	0	Skill wise announcement of minimum wages. Scheduled employment wise no difference
Puducherry	1	0	Skill wise and schedule employment wise. Have mapped to NIC category. Minimum of minimum wages are taken if there is any conflict

It is mandated in the ‘Minimum Wage Act, 1948’ to revise the minimum wage not exceeding five years. Figure 2 shows the indexed and non-indexed minimum wage revisions. 15 states and 3 Union territories (UTs) have undertaken a minimum of 3 indexed revisions between 2016-2020 with a few making 2 indexed and 1 non-indexed revision. Two states, Manipur and Mizoram, have not made any revision to the minimum wage during this period. In Puducherry, only one indexed revision was made. 13 states and two Union territories have made single non-indexed revisions. Nine states are shown in the picture, the other four are Arunachal Pradesh, Meghalaya, Nagaland and Tripura. The two UTs, that have made non-indexed revisions are Lakshadweep and Andaman and Nicobar.

Figure 2: Minimum wage revisions between 2016 and 2020 for selected states



Source: Author's estimate

The format for announcing the minimum wage also differs from state to state. Some states use only skill level as the basis for announcing minimum wages. In these states, different minimum wages are announced for each skill level (unskilled, semi-skilled, skilled and high-skilled) but minimum wages remain the same across scheduled employments. On the other hand, some states use skill level as well as scheduled employment as the basis to announce minimum wages. In these states, different minimum wages are announced for each scheduled employment and the skill level within each scheduled employment. In this study, we have mapped skill level-wise minimum wages present in the minimum wage to the PLFS worker data using the National Classification of Occupation (NCO, 2015) categorization of occupations into different skill levels. For a few categories of workers, NCO coding is not available in PLFS data. NCO report also does not classify 'legislators' in any skill category. In those cases, we have used education level as the criteria for classifying workers according to skill level. In states where different minimum wages are announced for separate scheduled employment, we have mapped scheduled employment using National Industrial Classification (NIC) coding available in PLFS. In case multiple minimum wages are announced within a

given NIC, then we have taken a median of minimum wages. If there is zone-wise difference for a same skill, in that case also we have taken a median of minimum wages within a skill level.[11]

[11] For our study, if skill levels are not given, we assume same minimum wage is applicable across all skill levels.