

## IMPACT OF MINIMUM WAGE OF FIRM-LEVEL EMPLOYMENT IN NIGERIA

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### ABSTRACT

*The aim of the minimum wage is to alleviate poverty, reduce income inequality, protect workers from exploitation and also create incentive to work. This work studied the impact of minimum wage on Employment. Data was sourced from World Bank's enterprise survey (2007 – 2014). Data spans seven years allowing for a comprehensive analysis of trends over time. The difference-in-difference (DID) approach was used for the analysis. The DID is a quasi-experimental strategy typically used to estimate the effect of a specific intervention by comparing the changes in outcome over time between a population that is enrolled and that which is not. The findings showed a positive effect of minimum wage on employment (4.165). One of the recommendations was urging firms to hire based on merit so as to improve productivity because by improving productivity firms may not consider down-sizing as a result of minimum wage increase.*

**Keywords:** Minimum wage, Employment, Difference-in-Difference, Firm-level, Nigeria.

### Introduction

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Despite decades of research the question about impact of minimum wage on employment is still being debated among policy makers and researchers. For example,

Card and Krueger (1994) found no evidence of a reduction in employment following a rise in minimum wage in restaurant industries while authors like Holtemoller and Pohle (2019) saw a negative impact of minimum

wage on employment. Minimum wage is the lowest or minimum payment that an employer is expected to pay employees for work done during a period of time. Minimum wage protects workers from being underpaid as it curbs employers attempt to exploit workers leaving an opportunity for them to be paid at a livable rate.

The aim of implementing the minimum wage policy is for poverty alleviation, reducing income inequality and also to give incentives to work. Although minimum wage affects a small proportion of workers, usually located at the lowest ends of the wage distribution, these policies are prevalently adopted by countries at different development stages and policy makers often refer to minimum wage policies as one of the practical solutions to reduce wage inequality (Chen and Teulings, 2018). Although, the vast literature has recorded a positive impact of minimum wage on income of workers in the low wage bracket, some studies predict about potential implications for the operation of firms which includes changes in employment. Some economists disagree with the idea of increasing minimum wage on the ground that such increases will increase the unemployment level while others argue that the unskilled labour has a relatively inelastic demand meaning that a higher minimum

wage raises the incomes of unskilled workers as a group and raise their productivity (Akpansung, 2014).

## Literature Review

### Conceptual Definitions

#### Minimum Wage

According to the business Dictionary, the lowest hourly rate an employer can pay an employee is referred to as a minimum wage. This goes in line with the words of Fapohunda (2013), who defined minimum wage as the smallest hourly wage that an employee may be paid as mandated by the federal law. It may also be defined as the rate of pay fixed either by collective bargaining agreement or by government enactment as the lowest wage payable to specified categories of employees. From the definitions above, it is certain that minimum wage is aimed at low income earners in order to bridge the income gap between them and those who earn higher. The author argued that the fixing of minimum wage prevents the exploitation of weak, un-informed or isolated group of individuals. Minimum wages affords such people a more comprehensive protection than is available through existing voluntary bargaining machinery.

Also, Mankiw(2011), defined minimum wage as laws that dictate the lowest price for

labour that any employer may pay. The impact of the minimum wage depends on the skill and experience of the worker. According to the International Labour Organization (ILO), Minimum wage is a wage which provides floor to the wage structure in order to protect workers at the bottom of the wage distribution. The ILO further noted that the minimum wage must have a legal backing.

### **Employment**

The Labour Force Survey (LFS) defines an employed person as anyone aged sixteen or over who has completed at least one hour of work in the period being measured. The LFS uses four categories of employment in the UK which are employees, the self-employed, unpaid family workers and participants in government funded training schemes. Pettinger (2017) defined full employment as the situation where everyone willing to work at the going wage rate is able to get a job.

Cooley (1963), did not see employment as a simple term denoting the mere holding of a job for which a wage is paid or the operating of one's own business. The author rather saw employment to signify the state of anyone who is doing what, under the circumstances, he wants to do it. According to the author, such a person is fully employed and that the ways in which people may be employed are legion. People may be engaged in different

activities such as cooking, dancing, driving or just lying down and gazing up into the blue. To Cooley, all are employment because it is done to satisfy and the satisfaction received whether measurable in money or not are income to the recipient.

Employment can be expressed in number of people working or in total working hours. A mixed measure is the number of hours divided by standard working hours to give a full time equivalent to jobs. (Piana, 2001). From the definitions above, the supply of labour is a choice between non market activities( sleeping, cooking etc) and legal market activities(paid jobs).The various definitions also show that employment is the engagement of persons in occupation, trade or profession. This study is particular on paid employment because that is where the issue of minimum wage comes in.

### **Theoretical Literature Review**

#### **Perfect Competitive Theory**

This model assumes that employment will reduce if minimum wage is set above the equilibrium wage. A firm's demand for labour is dependent on the marginal product of labour and the price of the goods produced by the firm while the supply of labour depends on population, work preference, skills and training. Wages are determined by

the intersection of demand and supply and once the wage has been established in a particular market, firms in perfect competition take it as given. In a perfect competitive market structure; there is no direct competition between firms/ sellers. The market price is taken by the seller as the price of his own product.

The perfect competitive theory of wage determination can be used to identify the benefits and cost associated with minimum wage legislation. This theory assumes that workers and jobs in the formal and informal sector are homogenous and that market forces ensure that the wages and rate in each sector are equalized. If the labour market is

a perfectly competitive market and the minimum wage is set above the equilibrium wage, the minimum wage is the price of labour. Due to this binding minimum wage, employers tend to increase the use of capital, hire fewer workers or reduce their working hours. These changes can result in a reduction in employment, (Liu, 2015). This can be illustrated thus;

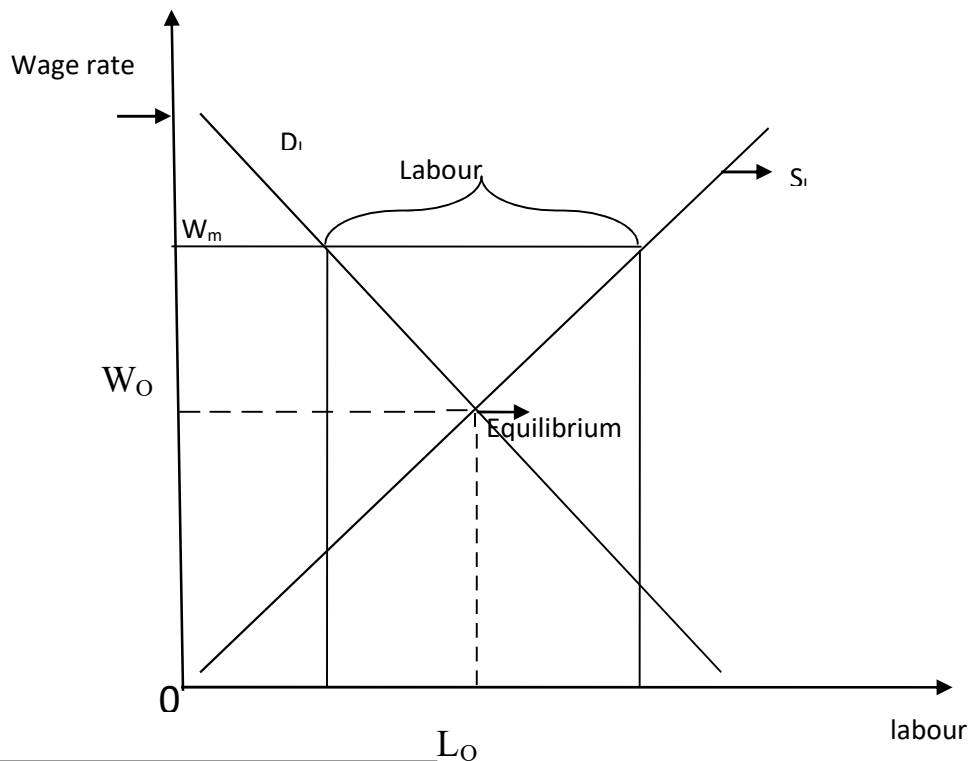


Figure 2.1: Minimum wage in a perfectly competitive market.

Source :Liu, 2015

From the figure above  $D_L$  is demand for labour,  $S_L$  supply of labour,  $W_O$  and  $L_O$  shows wage and labour supplied and demanded respectively at equilibrium .In a situation where government sets a minimum wage at  $W_M$ , supply of labour will exceed the demand for labour i.e surplus labour (as shown in the diagram). From the diagram above, we can deduce that a higher minimum wage set by the government is capable of reducing employment. The Austrian school criticized this theory and the question of realism implied on concepts like homogenous products and numerous participants were raised.

### Neo-Classical Price theory

The neo-classical price theory focuses on supply and demand as the driving force behind the production, pricing and consumption of goods and services. In this theory, mandated minimum wages are treated as any other price floor. If the mandated wages exceed the market clearing wage, then it gives a downward sloping labour demand curve, firms reduce the quantity of labour demanded. The magnitude of the reduction depends upon the wage increase and the wage

elasticity of labour demand but the direction of change is unambiguous. The Neo-classical model of labour market was accepted before the research by Card and Krueger (1994). It predicts that minimum wage unambiguously lowers employment. According to Nicholas (2012), the basic problem with the Neo-classical price theory is that it abstracts from both production and money in the first place such that when these are eventually brought back into the explanation of price, it is done in an inessential manner where production and money have no bearing on the findings of the analysis of price which excluded them. Giulletti(2015), in his work cited Stigler(1946),who argued that Neo- classical models postulate that minimum wage reduce employment since firms have to pay wage that are higher than the market level.

### Monopsony Model

Monopsony refers to a situation where there is only one buyer of an economic good in the market. This single buyer has some market power to control price. Some economists argue that minimum wage can actually increase employment level and they supported their argument with the monopsony model. Monopsony models,

according to Finegold (2013) can be used by economists to provide a theoretical justification for the minimum wage. The reason why the marginal cost curve lies above the labour supply in the monopsony model is because the firm has to raise the wage of all other employees as it draws a new labourer from the market. If firms have some monopsony power, increasing minimum wage can cause the employment level to rise, fall or remain constant depending on the size of the increase.

### **Theoretical Framework**

This study is investigating firm employment in relation to wage determination so it is based on the monopsony theory. Monopsony models can be used as a theoretical justification for minimum wage. A minimum wage set above the market rate may increase employment by raising labour market participation even where there are several employers. The firm will still employ labour until the marginal factor cost equals marginal revenue product. This theoretical conclusion received clear validation from the works of Card and Krueger (1994) and some economists interpreted their study as demonstrating monopsony power in the labour market.

### **Empirical Literature Review**

With panel regressions on the state- industry –level, Holtemoller and Pohle (2019) looked into the employment effect of introducing a minimum wage in Germany, 2015 and found a robust negative effect of the minimum wage on marginal employment and a robust positive effect on regular employment. There was also a negative overall effect in terms of number of jobs. They recommended the consideration of regional differences in the implementation process of minimum wage regulations. They however discovered a shortcoming in their study i.e. the use of number of employees as a dependent variable and suggested that working hours should be used to study the income effects of minimum wage. The results showed that German labour market did not show any sizeable immediate negative repercussions after the introduction of the minimum wage. The author noted that the analysis only considered the short run effect in the first year after the introduction of the minimum wage so the results cannot give a proper indication of the impact of the minimum wage during the next economic recession and recovery. In addition, the minimum wage might have some harmful medium to long run effects due to location and investment decisions so he recommended that firms could invest in new machines

which are less labour intensive or decide to relocate to other areas due to changes in labour prices among regions.

Ramirez (2019) investigated the short run effects of the minimum wage on employment and labour market participation, taking evidence from an individual level panel. The study made use of CPS panel of 50 US states plus the district of Colombia from 1990 – 2017 and D.I.D approach. The findings show no evidence of increase in unemployment immediately following a minimum wage increase. There is no evidence to conclude that there is a presence of a labour-labour substitution but it could be a subject for future research. He also recommended that future works use the empirical framework to estimate the effects of minimum wages on households instead of individuals.

Paun(2021), explored the relationship between minimum wage and employment dynamics in 22 EU countries from 1999-2016. The results showed a negative impact of the minimum wage on total employment and on sensitive categories after the models were tested for random and fixed effects. They recommended prudent use of this public policy tool. In an attempt to show that a binding minimum wage raises product prices encourages substituting away from labor and creates unemployment, Bai, Chatterjee,

Krishna and Ma (2018), made use of Chinese customs data to exploit rich regional variation in minimum across Chinese prefectures. They used Itzschker – Ohlin – Samuelson model and OLS estimation and found evidence in support of causal effects of minimum wage consistent with their theoretical predictions. The author planned to explore migration patterns and their response to minimum wage and also to look for evidence of agglomeration effects.

Deng (2018) analyzed the impact of minimum wage increase on the employment at the state level in U.S before 1994 and 2016. The ordinary least square estimation technique was used and there was no statistically significant impact of minimum wage on employment. His recommendation was that policy makers should consider increasing the minimum wage to prevent wage inequalities and reduce poverty.

To provide evidence on the consequences of the new statutory minimum wage in Germany which was introduced in January, 2015, Bossler and Gerner (2018) looked into the employment effects of the new German minimum wage. They employed the IAB Established panel and the D.I.D estimation. The D.I.D revealed an increase in average wages between 3.8 and 6.3 percent and an employment loss by about 1.7 percent. The

estimates imply a labour demand elasticity with respect to wages ranging between -0.2 and -0.4. They observed short run effects of the minimum wage introduction in 2015 and 2016 and suggested that long run effects might differ and should be addressed in the future. Chen and Teulings (2018), investigated the impact of minimum wage on wage and employment, taking current population survey data from U.S from 1979 – 2015. They used neoclassical labor market model – simple model containing two reduced form equations. The estimation technique was OLS and the probit model. Their findings include; first, increases in minimum wage have a positive impact on the wage of the lower end of the distribution and persistent spillover effects on those who earn higher than the minimum wage level. Secondly, minimum wage generates a negative effect on employment which off sets the labor supply effects of the minimum wage although the study did not explain fully the negative sign of labour supply elasticity. They recommended that using richer individual level panel data will be beneficial and to iterate the steps of the estimation procedure to get better estimates of all parameters.

In trying to examine a link between the minimum wage and employment by

observing Lithuanian minimum wage increase in 2013, Zlatkute (2017) used D.I.D Estimation to evaluate the effects and the results revealed that the minimum wage reform in 2013 has reduced the probability of remaining employed for the minimum wage earners by 4.5 to 5 per cent. The study also found an indication that the increase of the minimum wage positively affected minimum wage earners' probability of changing from full time to part time employment, although no effect was observed on working hours and unemployment duration. The author recommended the use of other data set (company pay roll data or monthly observation) to shed more light on the developments in Lithuanian labour market and the robustness of the study results.

From the existing literature, it was observed that most of study on minimum wage as it affects employment were conducted outside Nigeria and they made use of different data sets and estimation techniques, see Ramirez (2019) , Holtemoller and Pohle (2019), Paun(2021)etc. This study adds to the body of literature by studying firms in Nigeria using the enterprise survey supported by World Bank and employing the difference-in –difference approach to get our results. The D.I.D approach has been used by many authors but not on the same data set example

Ramirez (2019) used a CPS panel of 50 U.S states.

## Methodology

### Data Source

For this analysis, Data was sourced from the Firm-level Enterprise Survey from World Bank. The Enterprise survey offers a wide range of Economic data on firms in about 144 countries. It is also a panel data because it is a combination of both cross sectional and time series data. The panel data is more efficient in capturing both cross sectional and time variation hence it gives good information for analysis. In this case, the data cover firms in Nigeria (as obtained in the survey).

### Model Specification

This study employs the Difference-in-Difference (D.I.D) model used by Zlatkute (2017) with some modifications. The model will include productivity, treatment and control groups, estimated treatment effect, a set of control variables and error term. Below is the model by Zlatkute (2017).

$$E_{i,t} = \alpha + \beta G_i + \gamma t_i + \delta(G_i \cdot t_i) + X_{i,t} + \varepsilon_{i,t}$$

Where E is employment status, G is a dummy variable indicating if a person is in a treatment (=1) or a control (=0) group and t is a year dummy =0 in 2013 and 1 in the treatment period 2013. Not all the variables

in this model are relevant to this study hence the need to replace them. Zlatkute (2017) used variables like employment status, hours worked a week, months employed and employed full time. The model for the effect of minimum wage on Employment used for this work is represented thus;

$$E_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta(T_i \cdot t_i) + X_{i,t} + \varepsilon_i$$

From the model above,  $E_{i,t}$  is the Employment,  $\alpha$  is a constant term,  $T_i$  is a dummy variable indicating if a person is in a treatment(=1) or a control group(=0).  $\gamma$  is the time trend common to control and treatment group,  $t_i$  is the time period,  $\delta$  is the true effect of treatment,  $x$  is a set of control variables and  $\varepsilon$  is the error term.

### Estimation Technique

The regression adjusted Difference –in-Difference estimation (D.I.D) was used to estimate the effect of Minimum wage on Employment. The D.I.D is a quasi-experimental strategy typically used to estimate the effect of a specific intervention (in this case, the minimum wage increase) by comparing the changes in outcomes over time between a population that is enrolled in the programme and a population that is not. The D.I.D approach focuses on change rather than absolute levels.

## Data Presentation and Interpretation

### OLS Regression results

Below is the OLS results for the impact of minimum wage on firm level employment. We use the Ordinary Least Square (OLS) to

find relationships among variables. The OLS estimators are the best linear unbiased estimators (BLUE) of the real values of alpha and beta.

**Table 1: Impact of Minimum Wage on Firm Employment (OLS results)**

| EMPL.                              | Coef.              | Robust<br>err     | std.<br>t-<br>statistics | P > /t/            | 95% C.I      |
|------------------------------------|--------------------|-------------------|--------------------------|--------------------|--------------|
| Min. wage                          | 0.3255             | 0.1571            | 2.07                     | 0.039              | .1690 .6341  |
| Full time non-<br>prod. Workers    | 1.2487             | 0.4222            | 2.96                     | 0.003              | .4193 2.078  |
| Female<br>employees<br>(full time) | -0.0137            | 0.0633            | -0.22                    | 0.829              | -.1380 .1105 |
| Cons                               | 5.1478             | 0.5827            | 8.83                     | 0.000              | 4.003 6.292  |
| Obs. =575                          | F(3, 571)=<br>5.15 | Prob>F=<br>0.0016 | R <sup>2</sup> =0.0615   | Root<br>MSE=22.622 |              |

Source: STATA 14

Table 1 shows that minimum wage coefficient is 0.3255 implying a positive relationship between minimum wage and employment. This is saying that an increase in minimum wage is likely to increase employment significantly (having a p- value of 0.039). Moving slightly from the traditional competitive market theory, where employment is expected to fall with an

increase in minimum wage, the monopsony theory supports the idea that employment level remain the same even with an increase in minimum wage. The full time female employees have a negative effect on employment generally with a coefficient of -0.0137 indicating that as more females are employed full time, it affects the employment level negatively but not significantly (p-value

0.829). The fulltime non-production workers has a significant positive relationship with employment having a value of 1.2487.

#### **D.I.D Results on Impact of Minimum Wage on Firm-level Employment**

Model:  $E_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta(T_i \cdot t_i) + \varepsilon_i$

In the model above, E represents employment which is the dependent variable while the number of full time female employees and the number of full time non-production employees were the co-variates added.

**Table 2: Impact of minimum wage on firm level employment**

|                | Before      | After            | Difference       |
|----------------|-------------|------------------|------------------|
| Control (T=0)  | 2.106       | 4.381            | 2.275            |
| Treatment(T=1) | 6.271       | 12.711           | 6.440            |
| D.I.D          |             |                  | 4.165<br>(0.833) |
| t-stat.=5.00   | p>/t/=0.000 | R- squared= 0.02 | Obs.= 647        |

Source : STATA 14 output

The D.I.D point estimates for employment in table 2 is 4.165 with a p-value of 0.00. This indicates that an increase in minimum wage may cause a significant increase in employment i.e going by the p-value which is 0.00. Theoretically, the monopsony model was used to support the argument that an increase in minimum wage can actually increase employment. An employer with monopsony power selects its number of workers in such a way that the cost of adding a worker equals the revenue that worker is

expected to generate (MRP). Usually, the firms with monopsony power can hire workers at a wage which is lower than the MRP and if the employers increase the wage to equal the MRP, employment will rise. In Manning (2021), studying the effect of the minimum wage on employment is useful if it has an effect on the economy but if it doesn't, it can't lower employment since it doesn't raise the cost of labour for firms. This study is in line with the study of Card and Krueger (1994) on the minimum wage impact on

employment in restaurants in which they concluded that the employment in New Jersey actually expanded with the increase. This result is also related to that of Vazquez, Esquivel and Henandez (2017) who examined the impact of minimum wage on income and employment in Mexico and did not find a negative effect on employment or on income. Also, the study of Ramirez (2019) investigated the short run effects of minimum wage on employment and labour market participation in the United States and found no evidence of an increase in unemployment.

### **Conclusion and Recommendations**

This study examined the impact of minimum wage on firm-level employment. In the study, concepts of minimum wage and employment were defined. Minimum wage theories were reviewed and also existing literature on relevant areas were reviewed as well. The data was sourced from the firm-level enterprise survey. Employing the difference-in-difference approach, the result showed there is a significant positive relationship between minimum wage and employment at firm level. The study concludes that employment can remain the same or even increase if employees are productive enough to generate high revenue.

Based on the above results, the following recommendations were made. Firstly, firms should improve productivity by upgrading equipment and updating technology. Secondly serious consideration should be given to education and training when recruiting. This can be done by conducting tests and selecting on merit.

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