IMPACT OF MINIMUM WAGE ON FIRM-LEVEL PRODUCTIVITY IN NIGERIA

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Abstract

Despite the fact that Nigeria is one of the top oil exporters in Africa, its failure to maintain a high productivity has affected growth and spread of wealth beyond a few rich elites. The aim of implementing the minimum wage is to alleviate poverty, reduce exploitation from employees, reduce income inequality and create incentive to work. This study examined the impact of minimum wage on Firm-level productivity in Nigeria. Data was sourced from the firm-level enterprise survey obtained from World Bank from 2007 to 2014 and the Difference-in-Difference(DID) approach was used for the analysis. The D.I.D is a quasi- experimental approach 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 in the programme and that which is not. The findings showed an insignificant, negative impact of minimum wage on productivity (-1.895). The study concluded that raising minimum wage alone may not necessarily improve productivity. The recommendation includes urging firms to hire employees on merit so as to improve productivity.

Keywords: Minimum wage, productivity, difference-in-difference
JEL Codes: D50, J35, R27

1. INTRODUCTION

Globally, countries have embraced the minimum wage policy but there are debates on its impact on productivity for example Croucher and Rizov (2012) found a significant positive impact of minimum wage on productivity while scholars like Alvarez and Fuentes (2018) found a negative effect on productivity. Productivity is the relationship between quantity produced and input thus making it an input-output ratio. According to Riley and Bondibene (2015), there are several reasons to believe that minimum wage may increase productivity. Since minimum wage increases the cost of labour, companies may move towards more capital intensive forms of production and may implement organizational changes or offer training in an attempt to improve efficiency.

Social policies which are implemented through minimum wage raise come at a cost and these costs are partly borne by firms. The part borne by a specific firm depends on several factors; Firstly, the impact of firms' total cost depends on the share of workers affected by the new minimum

wage. Secondly, it will depend on the firm's ability to absorb the wage cost shock by adjusting its profit margin and to pass the cost increase to consumers. Finally, the impact of minimum wage policies will be dependent on the flexibility of firms to change their ratio of capital to labour. If the firms cannot fully offset the impact of minimum wage increase, their condition will get worse financially. 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 productivity.

Despite the fact that Nigeria is one of the top oil exporters in Africa, its failure to imbibe the culture of high productivity has hampered growth and spread of wealth beyond a few rich elites. From the definition of productivity, it implies ability to produce more with less. In Nigeria, some workers are hired on the basis of nepotism and may not be qualified to do the job. In such cases, one should not expect much in terms of productivity. In order to increase productivity, a deliberate attempt should be made to hire qualified workers, address the issue of power, insecurity and also create incentives to work. It is important to study productivity growth because to sustain economic growth, the economy has to have a sustained growth in its productivity. Low productivity stemming from unskilled labour causes impediments in economic growth and spreads poverty which in turn will reduce a nation's capacity to be competitive in the global economy.

The following factors as stated by Umoru and Yaqub (2013) are responsible for low productivity in Nigeria. They include; prevalence of redundant labour, low income growth, low level of training, low level of technology, low level of capacity utilization, low investment expenditures and poor performing infrastructure. The poor rating of Nigeria on the Global Competitive Index can be attributed to a lot of things which includes low level of productivity. Abundant local resources are under- utilized while value added products of those resources are imported. The role of government in facilitating competition and the development of efficient markets to enhance productivity is indispensable but national entrepreneurial capacity is also to be blamed for undermining productivity (Sapovadia, 2015). This study investigated the impact of minimum wage on productivity at firm level.

2. LITERATURE REVIEW

2.1 Conceptual Definitions

2.1.1 Minimum Wage

Minimum wage is the lowest rate an employer is allowed by law to pay an employee in a country. Fapohunda (2013) 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 afford such people a more comprehensive protection than is available through existing voluntary bargaining machinery.

Similarly, Mankiw(2011), defines 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.

2.1.2 Productivity

Productivity is the rate of efficiency by which a company produces goods and services. Productivity in economics, measures output per unit of input such as labour and capital or any other resource and is typically calculated for the economy as a whole, as a ratio of GDP to hours worked (Kenton, 2019). Productivity is categorized into physical and economic productivity and Piana (2001) defines the former as the quantity of output by one unit of input in a unit of time (e.g 10 tonnes of output per hour) and the later, as the value of output obtained with one unit of input. The author looked at labour productivity from a macroeconomic level as depending on the corresponding dynamics of two aggregates (GDP and employment), meaning that productivity will rise faster than employment.

Productivity refers to the physical relationship between the quantity produced (output) and the quantity of resources used in the cause of production (input). It can be summarized as;

$$\text{Productivity (p)} = \frac{\text{Output (o)}}{\text{Input (i)}}$$

The output is the total production and the input is a combination of all the factors of production. Productivity is an output- input ratio. But at the macro- level, productivity is a measure of performance of an economy or country. Kim and Loayza (2017) identified innovation, education, market efficiency, physical infrastructure and institutional infrastructure as the five main determinants of economic productivity. They argued that creating new technologies leads to the development of high value added activities and improves the performance of existing economic activities. They also looked into education by saying that; advancing knowledge and skills with strong basic foundation and sufficient specialization is necessary for adopting, attaining and spreading new and better technologies.

Whenever productivity is said to be high, it means that the resources have been used very well in

such a way that more can be produced. Likewise, when there is wastage of resources, productivity can be low. A lot of factors affect productivity but for this study, we will look into willingness to work as contained in the human factor. The motivation and morale of the employee is driven by incentives. This includes increased wages, allowances, minimum wage, workers' welfare etc. When minimum wage is increased, we expect an increase in productivity as well.

2.2 Theoretical Review

2.2.1 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;

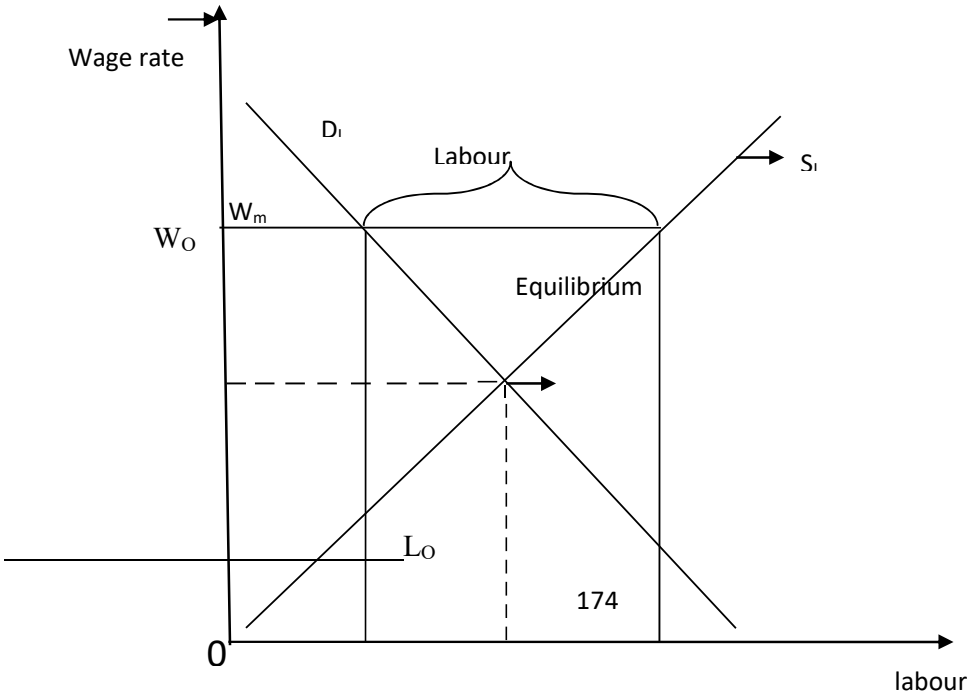


Figure 2.1: Minimum wage in a perfectly competitive market.

Source: Liu, 2015

From the figure above (2.1), 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.

2.2.2 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 .Card and Krueger (1994) believed that this model is based on some assumptions as follows; firstly, paying a higher wage doesn't affect a worker's productivity. Secondly, it is impossible for employers to get lower prices from their suppliers, to raise prices in their market or to exploit the lower turnover due to the higher wage. Lastly, the fact that workers are willing to work at any wage given and also the fact that firms have the power to decide freely the wage at which to hire.

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.

2.2.3 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 argued that minimum wage can actually increase level of employment 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.

When this monopsony model is used to predict effects of the minimum wage increase, critics note several difficulties. First, low wage industries which are more likely to be influenced by the minimum wage are unlikely to have monopsony power. Firms with monopsony power are those that hire a large proportion of labour in a market, whereas low wage industries such as fast food and retail industries, generally consist of many small firms with few employees. Second, in the long run labour supply curve even to an apparent monopsony may not be upward sloping. Firms have monopsony power because of flawed data, search friction of geographic boundary etc., notwithstanding, over the long haul these conditions might become more vulnerable. In order to keep the employees to other firms or industries, employers need to pay compensation moving towards the competitive rate. The labour supply curve becomes flatter. This can be illustrated thus;

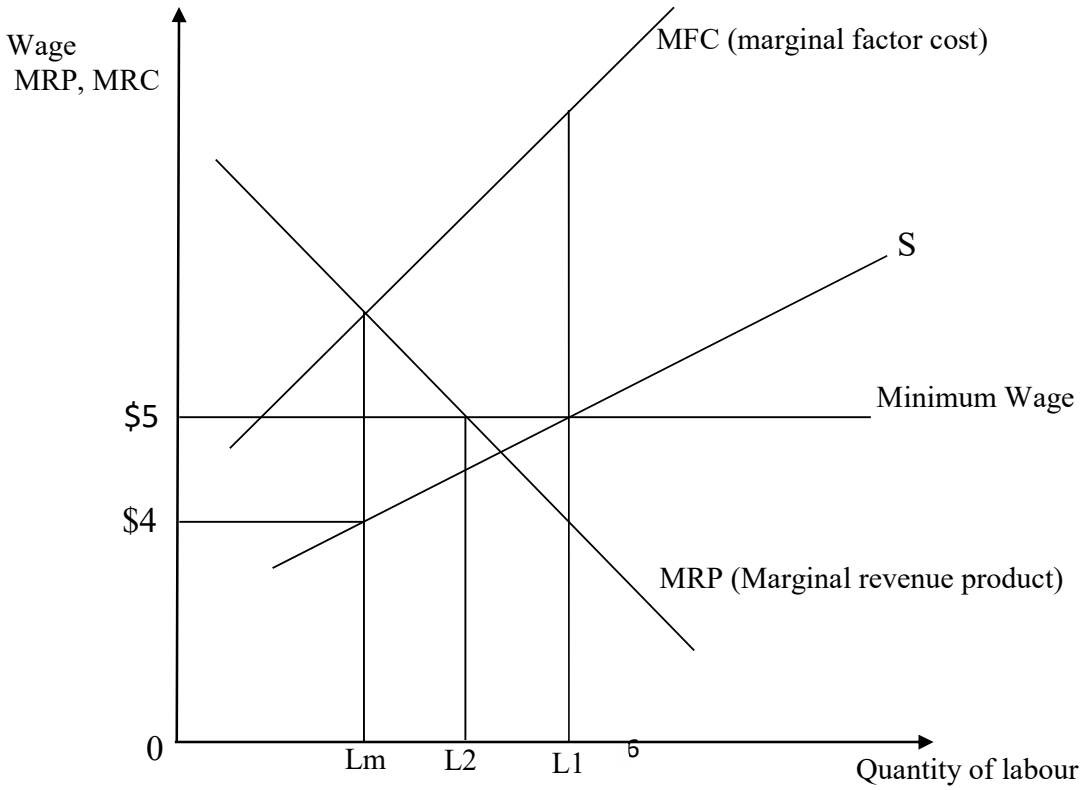


Figure 2.2 Minimum wage and monopsony

Source: Liu, 2015

Some criticisms were made by the neo classical and the Austrian schools. According to the Austrian school, monopsony is unrealistic and they saw the entire concept as intellectually incoherent. The neo-classical school argued that if at all there are monopsonistic industries, the workers are likely to be underpaid and they will eventually seek other jobs. They also argued that in the real world, monopsony applied to the upper income end of the market and not the bottom minimum one.

2.3 Theoretical Framework

This study was based on the monopsony theory. This is on the grounds that the research is investigating firm productivity in relation to determining wages. In a monopsony market, firms set wages and an increase in minimum wage will increase productivity. Monopsony models, according to Finegold (2013) can be used by economists to provide a theoretical justification for the minimum wage A minimum wage set moderately above the market rate can increase employment by raising labour market participation even where there are several employers. The firm will still employ labour until the MFC equal MRP. This theoretical conclusion received clear empirical validation in a study by Card and Krueger (1994) and some economists interpreted their study as demonstrating monopsony power in the labour market.

2.3 Empirical Literature Review

In the United States, Coviello, Deserranno and Persico (2021) studied how individual worker productivity responds to the minimum wage. They employed a border discontinuity analysis and found out workers become more productive and are terminated less often after a minimum wage increase. They suggest that the focus on lowest - wage is particularly policy relevant as they constitute the most vulnerable sub-population and also the target of minimum wage policy. Trenovski, Kozeski, Tashevska and Peovski (2021) investigated the correlation and causal relationship between the minimum wage and labour productivity in South Eastern Europe (S.E.E) countries. They used regression and found that the relationship between the statutory minimum wage and labour productivity is strong and positive in the first group (North Macedona, Albania and Serbia) while it is weak and negative in the second group (Bulgaria, Croatia and Romania).

Ku (2020) examined whether a change in minimum wage increases labour productivity and with the use of the D.I.D approach, the findings showed that the productivity of workers in the 40th percentile of the productivity distribution increased by a disproportionate 4.6% relative to those in

the higher percentile. Bossler, Gurtzgen, and Lochner (2018) analysed the effect of German minimum wage on business expectation, profitability and investment using the Difference-in-Difference estimation. The result did not point to minimum wage having effects on firm-level productivity or capital investment.

Using the D.I.D method, Alvarez and Fuentes (2018) analysed the effects of minimum wage on Chilean firms' productivity from 1992 – 2005. They found that an increase in minimum wage had a negative effect on total factor productivity. Similarly, Britain, Rizov, Croucher and Lange (2016) used the FAME data set with an annual record for over 360,000 firms for the period of 1995-2008 and D.I.D to analyze the productivity in low paying sectors since the introduction of the minimum wage. The findings highlighted increased wage incentive effects with implications for management practice and public policy since living wages may be productivity enhancing. The author showed the value of a behavioural and broader social science theoretical perspective in addressing productivity effects.

In China, Mayneris, Poncet and Zhang (2013), used a firm level data from over 160000 and industrial firms compliment with triple difference estimates with an IV strategy that builds on the institutional features of the 2004 reform to analyze both the firm and aggregate level effects of higher minimum wage. They found that the increase in city level minimum wage resulted in lower survival probability for firms that were the most exposed to the reform. Hence, in a fast growing economy like China, wage might have a cleansing effect and represent one way of boosting aggregate productivity. The author concluded by suggesting that higher minimum wage might be one way for developing countries to increase the wages of low paid workers without necessarily harming their economy.

From the existing literature, it was observed that most of the study on minimum wage as it affects productivity were mostly carried out in non- African countries see Croucher and Rizov (2012), Alvarez and Fuentes (2018), Coviello et. al (2021). This work adds to the body of literature by studying firms in Nigeria using the enterprise survey supported by World Bank and also using the Difference- in - Difference approach. Rizov (2016) used the FAME data set covering the period 1995 -2008.Also, Alvarez and Fuentes (2018) covered the period 1992-2005.

3. METHODOLOGY

3.1 Sources of Data

Due to the nature of this study, where the intention is to investigate the impact of minimum wage on productivity, the researcher used the firm-level Enterprise Survey data from World Bank. Enterprise survey offers an extensive array of economic data on firms in about 144 countries. The

data is presented in a variety of ways useful to researchers. It is regarded appropriate for the research because, in addition to using standardized instruments in collecting the data (making the data comparable internationally) it covers a broad range of business environment variables that meet the need of this research. 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 nineteen states of Nigeria (as obtained in the survey).

3.2 Model Specification

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

$$E_{i,t} = \alpha + pG_i + \gamma t_t + \beta(G_i \,.\, t_t) + X_{i,t} + \varepsilon_{i,t}$$

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 productivity used for this work is represented thus;

$$P_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta(T_i \,.\, t_i) + X_{i,t} + \varepsilon_i \qquad 1$$

From the model above, $P_{i,t}$ is the productivity, α is a constant term, T_i is a dummy variable indicating if a person is in a treatment(=1)or a control group(=0). γ is the time trend common to control and treatment group, t_i is the time period, δ is the true effect of treatment and ε is the error term.

3.3 Estimation Technique

In this research, the regression adjusted Difference –in – Difference estimation (D.I.D) was used to estimate the effects of minimum wage increase on productivity. The D.I.D or 'double difference' is the difference in the average outcome in treatment group before and after treatment less the difference in average outcome in the control group before and after treatment. In this study, the treatment groups are those groups of firms that complied with the minimum wage policy while the control groups are those firms in states that have not complied with the minimum wage increase. Since the change in minimum wage was in 2011, periods before 2011are our pre-treatment and periods after are the post-treatment. 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.

4. DATA PRESENTATION AND INTERPRETATION

4.1 Ordinary Least Square Regression Results

We use the Ordinary Least Square (OLS) regression 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: OLS estimation result

PROD.	Coef.	Robust std. err.	t-statistic	P>/t/	95% C.I
Min. wage	-0.9559	0.2489	-3.89	0.000	-1.4446 -0.4670
Power outages	0.0007	0.0060	0.11	0.915	-0.0112 0.125
Full time female employees	-0.0647	0.0868	-0.75	0.456	-0.2353 0.1058
Cons	65.1262	1.0866	59.94	0.000	62.9927 67.2598

Observation =659	F(3, 655) = 5.63	Prob. > F= 0.0008
R Squared = 0.0615	Root MSE = 22.622	

Source: STATA 14 output

From the result presented in table1, the minimum wage coefficient is -0.9559 which shows that there is a significant negative relationship between minimum wage and productivity. This means that an increase in minimum wage can result in a decline in productivity. Ordinarily, the assumption is that the minimum wage increase should bring about an improved productivity but it is not the case here. Sometimes it is not about the wage but competence so when a worker cannot do a particular job, no matter how well he is paid that job will not be done properly. The whole idea is about getting the right people for the job first, then motivate them. The number of power outages has a positive relationship with productivity with a coefficient value of .0006 but not significant having a p-value of 0.915. Most firms do not rely solely on power provided by the government, they have other alternatives even though it adds to their cost of production. Also, the number of full time female employees has a negative relationship with productivity with a coefficient value of -0.06476.

This implies that an increase in female employees that work full time can affect productivity negatively although not significantly (p-value 0.456).

D.I.D Results on Impact of Minimum Wage on Firm Productivity

Model 1; $P_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta(T_i \, . \, t_i) + X_{i,t} + \varepsilon_i$

In the model above, P represents the independent variable productivity. The co-variates used were the length of power outages and the number of full time female employees.

Table 2 : Minimum wage and productivity

	Before	*After*	*Difference*
Treatment (T=1)	*63.649*	*51.551*	*-12.098*
Control (T=0)	*65.544*	*55.341*	*-10.203*
D.I.D			*-1.895*
			(3.288)
t-stat.=0.58	*p>/t/=0.565*	*R-squared=0.02*	*Obs.= 491*

Source; STATA 14 output (standard error in parenthesis)

Table 2, reports the D.I.D estimation results on impact of minimum wage on firm level productivity. From the results, we found a negative and insignificant relationship between minimum wage and productivity (-1.895). This shows a probability of an increase in minimum wage reducing productivity which is quite contrary from our a priori expectation. It shows that there are definitely other factors to consider in increasing productivity which may include taking into account the social needs of the employee. Rather than focusing on technology and structures, neo-classical theorists were concerned with the employee and how to make them see intrinsic value in their jobs. Heise (2020) argues that theoretically, productivity increase was as a result of competition and minimum wage was not necessarily the trigger.

This result is related to that of Alvarez and Fuentes (2018) who analysed the effect of minimum wage on Chilean firms' productivity from 1992 -2005 and the result showed that minimum wage had a negative effect on total factor productivity and Bossler, Gurtzgen and Lochner (2018) who analysed minimum wage effects on productivity, profitability and investment in Germany where the results did not show that minimum wage had any effect on firm-level productivity..

5. CONCLUSION AND RECOMMENDATIONS

This study examined the impact of minimum wage on productivity at firm-level. In the study, concepts of minimum wage and productivity were defined, minimum wage theories were reviewed and also existing literature on relevant areas were reviewed as well. The firm-level enterprise survey data from the World Bank was used. Employing a difference-in-difference approach, the result showed that there is an insignificant negative relationship between minimum wage and productivity of the firms. In conclusion, the negative relationship between minimum wage and productivity shows that raising minimum wage alone may not be the only way to increase productivity. Further studies need to be done in this area to explain changes in firm-level productivity and how this is related to changes in economic policies.

Based on the above results, the following suggestions were proffered. Education and training should be seriously considered during employment process. This can be achieved when tests are conducted and people are selected on merit. Firms should be updated always on new technology so as to improve productivity. This can be achieved by holding seminars and workshops from time to time.

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