Explaining Nigeria's Economic Growth through the Minimum Wage Policy

Ifeoluwa B. Babalola[1], Abayomi A. Adebayo[2] and Abiodun A. Adegboye[2]
[1] Department of General Studies, Moshood Abiola Polytechnic, Abeokuta, Nigeria
[2] Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria

Abstract
The study investigated the relationship between wage policy and output in Nigeria from 1981-2018. The study utilised the Autoregressive Distributed Lag mechanism on the variables of interest such as minimum wage, investment, lending interest, credit to the private sector, inflation and economic growth. The result showed there was evidence of a positive relationship between minimum wage and investment in the short and long runs. Also, there was evidence of a positive relationship between minimum wage and economic growth in the long run only. In addition, the growth impact of minimum wage reduced in the long-run as more potential growth improving variables were examined. Therefore, the study concluded that upward review of wages is a necessary but not a sufficient income policy for the Nigerian economy. Hence, the study recommends periodic and consistent review of wages that is consistent with the stipulated time frequency of 5 years; with provision for wage indexation and complementary investment related expenditures to cushion the negative unemployment and inflationary effect of minimum wage policy in Nigeria.

Keywords: *Minimum Wage, Economic Growth, Productivity, Nigeria*

JEL Classifications: *O40, J30*

Introduction

Wage determination is very important among other general labor issues that are discernible in any society (Freeman and King (1979) as cited in Adebayo (2017). The market theory of wage determination states that the price of labour should be set to equate the demand and supply of labour, however, in most economies, this is not always the case due to government interventions through the minimum wage policy. Minimum wage, through its ability to induce labor productivity, can stimulate investment, firm profitability and in turn boost economic output. Alternatively, increase in wages can reduce investment by firms due to higher cost of production. In addition, investment may become unappealing and unaffordable

to firms since they now have little or no surplus to set aside for investment. In the long run, economic growth may be retarded (Obeng, 2015). This debate in the theoretical literature has necessitated empirical investigations over time but to which no consensus is yet to be found.

A minimum wage could be described as the minimum amount legislated and must be paid as wages or salary former workers of a country (see International Labour Organization, 2006). The major goal of setting this wage floor is to ensure that low-skilled workers are paid reasonable wage income that can enable them achieve and sustain at least, a "subsistence standard of living." It can also help to ensure an impartial share of the benefits of national progress to the entire populace (Obeng, 2015). Given the stipulations of the market theory, a minimum wage is therefore necessary to prevent low-skilled workers from becoming worse off. A standard minimum wage has three major characteristics. These include; It must be adequate to purchase the vital necessities of life such as food, clothing, housing, education and recreation; It must be the lowest legal level of remuneration; and anyone who fails to abide by the legislated minimum wage is punishable by law (Durban Chamber of Commerce, 2014). However, due to the lack of effective monitoring and regulatory schemes, these characteristics are not always obtainable in all economies operating the income policy. For instance, an common economic flaw in the determination of minimum wage in Nigeria is that it does not correspond to upward movements in price (Folawewo, 2009).

Also, Aderemi (2018) report the percentage increase in minimum wage as usually less than the value of the rate of exchange and consumer price index (CPI). This indicates that the fixing or upward review of minimum wage may be insufficient for workers to maintain previous level of welfare. In most cases, they become worse-off than they were prior to the wage increase. On this basis, the minimum wage increase may be counter-productive. The result of this is that in Nigeria, the value of the minimum wage diminishes in the long-run and cannot function as a living wage. Furthermore, beyond the short run effect of the minimum wage policy is the long run impact which has greater implications for the overall expansion of the economy.

With focus on growth impacts of minimum wage, a vital component to be considered is investment. For instance, the endogenous growth theory maintains that improvements in productivity relates directly with a faster pace of investment in manpower and innovation. Against this background, this study investigates the wage-growth relationship through the channel of investment with focus on

Nigeria from 1981 – 2018. Whilst many studies in the minimum wage literature have focused on the impact of minimum wage on employment; productivity; welfare; income distribution; poverty; in Nigeria, only a handful of papers have considered the growth impact of this policy. Furthermore, is the unsettled debate on the growth impact of the minimum wage policy vis a vis the positive and negative impacts of minimum wage on economic growth via investment as explained in theory. This study therefore intends to provide further empirical evidence to resolving this issue.

The findings of the study revealed that there was evidence of a positive relationship between minimum wage and investment both in the short run and in the long run. The study also showed that there was evidence of a positive relationship between minimum wage and economic growth in the long run. However, in the short run, minimum wage does not determine economic growth. In addition, the impact of minimum wage on economic growth in the long-run reduced as more potential growth-enhancing variables were considered. Furthermore, the impact of increase in minimum wage accompanied by increase in investment was also growth enhancing, however only in the long run. The study also found a positive relationship between investment and economic growth; and credit to the private sector and economic growth in the long run. More importantly, the result of the study showed that the growth impact of minimum wage policy in Nigeria was highly sensitive to the kind of measures employed.

Following the Introduction is Section II which provides an overview on minimum wage policy across the globe while Section III presents the Review of Literature. Section IV contains the Methodology, Section V is the Discussion of Result and Section VI presents Conclusion and Policy Implications.

Minimum Wage Policy across Economies: An Overview

The debate over the macroeconomic effects of minimum wage has a long history. Minimum wage policy was established first in New Zealand in 1894 due to the recognition of unions by the government. Australia was next in 1896 followed by the United Kingdom in 1909. Initially, the movement for a wage floor was primarily focused on stopping employers in sweatshops from exploiting their workers (Nordlund, 1997). As time passed by, the focus shifted to facilitating the independence and self-sustainability of people, especially families (ILO, 2006).

Ever since, many countries have adopted minimum wage policy. For instance, in the United States of America, a national minimum wage was introduced in 1938 during the Great Depression (Grossman, 1978). In 1998, the United Kingdom also made extensive improvement on the existing minimum wage system (Stone, 2010). More than 90 percent of all countries in the world have legislation or binding collective bargaining, regarding the minimum wage (ILO 2006; Williams 2009). Despite its growing adoption there are some countries without minimum wage laws. These include Denmark, Finland, Sweden, Austria, Switzerland and Italy. However, it is noted that minimum wage setting in these countries still depends on collective bargaining between trade unions and employer associations. By implications, one form or another of minimum (income) wage policy exists in all European countries.

Similarly, a number of minimum wage laws are applied in many developing and emerging economies. For example, it was adopted in China in 1994 and reinforced in 2004, Brazil, 2005, and the Russian Federation put in place regional floors in 2007 to complement its national minimum wage. Others include Malaysia in 2013, the Lao People's Democratic Republic and Myanmar in 2015, and Macao in 2016. On the African continent, Cape Verde adopted the minimum wage system in 2014 (ILO, 2006). Also, South Africa approved the minimum wage system in 2017 but is yet to enforce it (Adema et al., 2019).

In Nigeria, the minimum wage law was established in 1981. The history of national minimum wage in Nigeria is replete with crisis and reoccurring agitations and protests by workers. The institutions involved in minimum wage setting are the federal government (represented by the Presidency, Federal Ministry of Labor and Productivity, and Federal Ministry of Finance), the trade union centre (including Nigeria Labor Congress and Trade Union Congress), and Nigeria Employers' Consultative Agency (NECA). The first minimum wage bill in Nigeria stipulated a monthly wage of ₦125 ($ 200). This bill was signed by Late President Shehu Shagari. However, it was reviewed upwards to ₦5,500 ($ 55) in 2001 and to ₦18,000 in 2010, although the Nigerian Labor Congress (NLC) proposed ₦52,200. In 2011, the mandated wage of ₦18,000 was equal in value to about US$110. However, its current worth is less than US$50 (Houeland, 2018).

In Nigeria, the legislated minimum wage stipulates that there should be a review on a regular basis (at least every five years) to keep up with inflation. Given that the last minimum wage negotiation was in 2011, wages ought to have been reviewed upwards since 2016. However, due to certain bottlenecks in the

negotiation process, the minimum wage was eventually reviewed upwards to ₦30, 000 per month in 2019 from ₦18000 per month in 2018. Specifically, on March 19, 2019 the new minimum wage bill was signed into law. Therefore, minimum wage in Nigeria averaged ₦24, 000 per month from 2018 until 2019 (Wage Indicator Foundation, 2019). By comparison, the new minimum wage of ₦30, 000 (US $83) is in real terms less than the 2011 wage floor of ₦18, 000 at the time of agreement (US $110), whereas the 1981 minimum wage of ₦125 was worth almost US$200. GDP per capita in Nigeria also averaged 1,715.99 USD for the 1981-2018 period. Over this study period, GDP per capita was highest in December 2014 with a record of 3,225.71 USD and lowest in December 1999 with a record of 492.77 USD. In December 2018, Nigeria's GDP per capita was 2,134.08 while it was 1,951.41 USD in 2017. Furthermore, Nigeria's investment accounted for 15.5 percent of its nominal GDP in December 2017 and 19.8 percent in December 2018. Over the study period, the average investment to GDP ratio was 35.4 percent with a minimum value of 14.7 percent in December, 2012 and a maximum value of 89.4 percent in December 1981 (Census and Economic Information Center, 2020).

Figure 1 presents the trend of gross fixed capital formation (GFCF) and GDP per capita (GDPC) in Nigeria for the 1981 - 2018 period. Over the study period, the trend of gross fixed capita formation (a proxy for investment in this study) in Nigeria showed that periods of upward review of wages were often associated with a sharp decline in investment such as 2010 – 2012, and 2018 respectively as shown in Figure 1 below. This sharp decline in investment can be attributed to the economic instabilities through industrial actions which often accompany the review of wages in Nigeria.

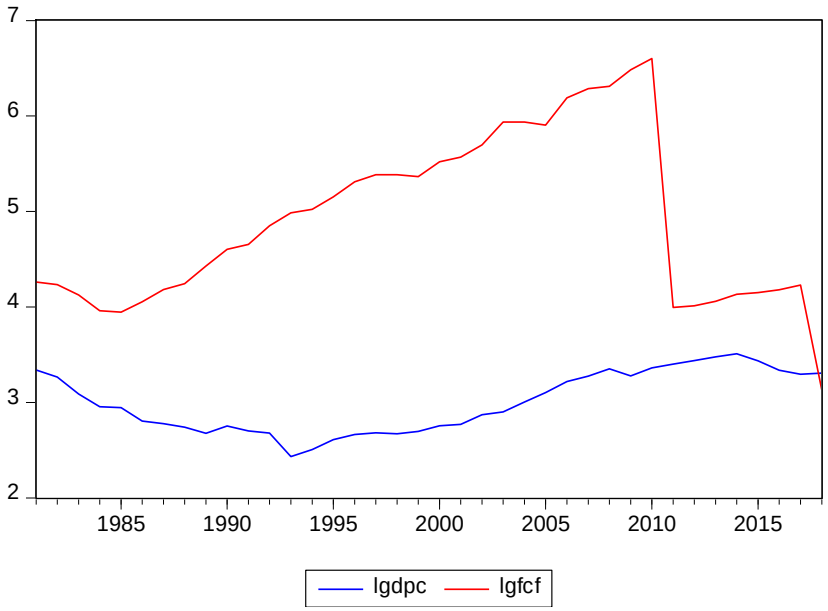

Figure 1: Investment and Gross Domestic Product Per Capita in Nigeria.

Review of Related Literature

Economic theory suggests that a higher wage tends to raise employees' ability to acquire more goods and services. Increase in consumption especially among low-income workers, due to their higher propensity to consume, could cause a multiplier effect in the overall economy and consequently promotes economic growth. Ghani (2016) posited that an upward review of minimum wage would spur economic growth since it provides workers more money to spend, which expands aggregate demand and further boosts business growth. In addition, he noted that a raise in the minimum wage is one way by which government can ensure that the benefits of economic growth is continuously shared by all.

Following the efficiency wage theory, increase in minimum wage can motivate workers to produce higher output or encourage those who remain in employment to multiply their efforts, so as to prevent competition from those who had been retrenched. Therefore, minimum wage, through its ability to induce labor productivity, can stimulate investment and in turn the economic growth (Obeng, 2015). In addition, wage increment can expand the size of the domestic market, increase firm profitability and in turn increase economic growth. Furthermore, in

labor market structures, other than the perfectly competitive market, increase in minimum wage tends to increase employment (Sabia, 2015b).

Alternatively, a raise in minimum wage may lead to increase in the costs of labor and the prices of firms' output. This will in turn reduce the profit of firms and the willingness of firms to offer job training. It could also lead to unemployment which will in turn have a negative impact on aggregate demand since people without employment may spend less. Reduction in aggregate demand may in turn reduce economic growth (Sabia, 2015b). Each of these negative outcomes may also lead to a reduction in output. On this basis, opponents of minimum wage policy claim that it has a non-positive effect on employment and output. Furthermore, increase in wages can reduce investment by firms. Investment may become unappealing and unaffordable to firms since they now have little or no surplus to set aside for investment. In the long run, economic growth may be retarded (Obeng, 2015). Alternatively, even if workers remain employed, wage increment may create preference for foreign goods or services. Given rising levels of income, demand for foreign goods or services may become greater, other things being equal. This will eventually lead to currency depreciation, trade deficit, inflation and other trade imbalances in the economy which in the long run may retard domestic economic growth. From the foregoing, the impact of minimum wage on economic growth via investment can be presented theoretically through two basic channels.

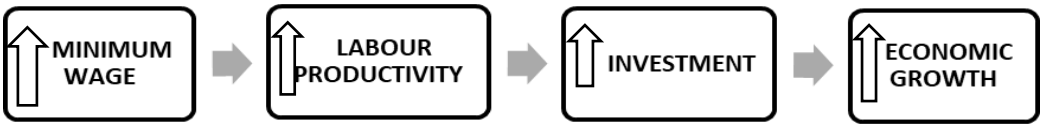

Figure 2: Positive Impact of the Wage-Growth Linkage

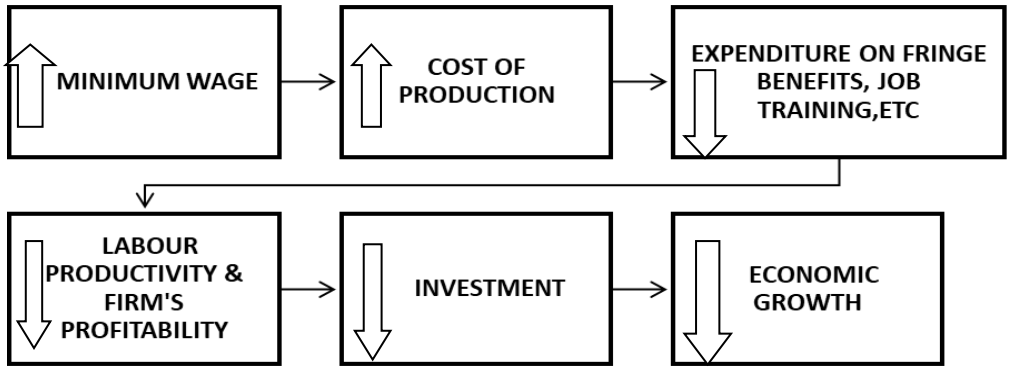

Figure 3: Negative Impact of the Wage-Growth Linkage

The unsettled debate on the growth impact of minimum wage policy in economic theory has informed the need for empirical investigation. According to Friedman (2005), only a few studies investigate the effects of minimum wage in the long run, and a greater part of it often focused on developed economies such as the United States of America and the United Kingdom. Among these studies are Flug and Galor (1986), Cahuc and Michel (1996), Cukierman, Rama and Ours (2001), Neumark and Nizalova (2004), Friedman (2005), Watanabe (2013), Sabia (2015a) and Sabia (2015b). The use of minimum wage policy in many countries does not in any way make them inefficient or to grow at a slow rate compared to others. Rather, minimum wages can correct for some inefficiency or other alterations in the economy, and therefore could promote economic growth and economic efficiency. This is a claim supported by Askenazy (2003), Fanti and Gori (2011), Aishah (2012), Watanabe (2013), Obeng (2015) and Ghani (2016).

Ravn and Sorensen (1999) showed that minimum wage will encourage schooling on the part of young agents, and it will also discourage training on the part of employers. Thus, the final effect of income policy on growth is ambiguous. It will generally depend on which source of skill accumulation dominates the increase in labor productivity in the long-run. Nickel and Laynard (1999), Cukierman *et al*. (2001), Neumark and Nizalova (2004), as well as Friedman (2005) also provided ambiguous, unclear effects of wage income policy. Empirical studies which support the negative impact of minimum wage on economic growth include Sabia (2015a), Sabia (2015b), Abowd, Kramarz, Margolis, & Philippon (2000). Furthermore, the unemployment effect can create negative scale effect on economic growth, which in turn can discourage investment in physical capital.

Specifically, studies in Nigeria (including Taiwo, Oladeji, Akerele, Adenikinju, Bamidele, & Uga (2005), Folawewo (2009), Abachi and Iorember (2017), Idiaye, Kuhn, & Okoruwa (2018) have largely focused on the short-run impact of minimum wage policy. A key finding in Nigeria showed that any percentage increase in minimum wage may increase productivity in all sectors of the economy. It also showed that the impact of a raise in minimum wage on employment is uncertain. The current study seeks to investigate the wage-growth linkage via the channel of investment in the context of Nigeria.

Methodology

Empirical Model

The study assumes investment as the channel through which wage policy affects economic growth, following Obeng (2015). In order to establish the wage-growth linkage, this study presents the long-run wage-investment relation as follows:

$$In\ INV_t = \theta_1 + \theta_2 In\ MWG_t + \theta_3 INTRS_t + \theta_4 INF_t + \theta_5\ In\ CPS_t + \epsilon_t \quad --(1)$$

Where INV_t represents investment; MW_t, minimum wage; $INTRS_t$, lending rate of interest; CPS_t, credit to the private sector; and INF_t, inflation rate. Given that the wage-investment relationship exists, the wage-growth relationship in Nigeria is examined via a step-wise regression, using four equations specified as follows:

$$In\ Y_t = \alpha_0 + \alpha_1\ In\ MWG_t + u_t \quad --------(2)$$

$$In\ Y_t = \beta_0 + \beta_1\ In\ MWG_t + \beta_2\ INV_t + \varepsilon_t \quad ----(3)$$

$$In\ Y_t = \gamma_0 + \gamma_1\ In\ MWG_t + \gamma_2\ In\ Z_t + \eta_t \quad -----\ (4)$$

$$In\ Y_t = \delta_0 + \delta_1\ In\ MWG_t + \delta_2 In\ Z_t + \delta_3\ CPS_t + \varphi_t \quad ---(5)$$

Y_t represents GDP Per Capita (for economic growth) and
Z_t represents an interaction term.

Data: Sources and Measurement

Annual time series were utilized. While minimum wage data were sourced from Wage Indicator Foundation (2019); the series on investment, inflation rate, and economic growth were collected from the World Bank Development Indicators (2019). The data on credit to the private sector and rate of interest were sourced

from Central Bank of Nigeria (CBN) Statistical Bulletin (2018). The minimum wage was measured in both nominal and real values. The real value is computed as a ratio of nominal minimum wage to the Consumer Price Index (CPI) over the study period. This is with a view to providing for the effect of inflation on the nominal value of the minimum wage. While investment is proxied by Gross Fixed Capital Formation (GFCF), interest rate is proxied by the prime rate in Nigeria, and economic growth is proxied by Gross Domestic Product Per Capita (GDPC). The study period spanned 1981-2018. The basic statistics of the variables' series is reported in Table 2

Table 2: Basic Statistics

	GDPC	MWG	GFCF	CPS	INTR	INFT
Mean	1291.524	6052.632	473056.5	4825.212	17.5765	19.32377
Median	892.3679	3875.000	57999.70	480.7708	17.5400	12.54718
Maximum	3222.694	18000.00	4007832.	22521.93	29.8000	72.83550
Minimum	270.2240	125.0000	1343.700	8.570050	7.75000	5.382224
Std. Dev.	889.7283	7012.24	901898.5	7416.464	4.62824	17.25517
Skewness	0.611724	0.781250	2.524168	1.333422	0.20404	1.742258
Kurtosis	1.980163	2.130637	8.941946	3.240348	3.66813	4.837185
Jarque-Bera	4.016747	5.062235	96.25467	11.35222	0.97050	24.56874
Probability	0.134207	0.079570	0.000000	0.003427	0.61554	0.000005
Sum	49077.92	230000.0	17976145	183358.1	667.9095	734.3033
Observations	38	38	38	38	38	38

Note: GDPC, MWG, GFCF, INTR, CPS and INFT represents gross domestic product per capita, minimum wage, gross fixed capital formation, rate of interest, credit to the private sector, and inflation rate respectively

Table 3: Unit Root Test Results

Variables	Status			
	ADF Test		Philip - Perron Test	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
LGDPC	I(1)	I(1)	I (1)	I(1)
LMWG	I(1)	I(1)	I (1)	I(1)
LGFCF	I(1)	I(1)	I(1)	I(1)
LCPS	I(1)	I(1)	I(1)	I(1)
INFT	I(0)	I(0)	I(0)	I(1)
INTR	I(1)	I(0)	I(0)	I(0)
RGDPC	I(1)	I(0)	I(1)	I(1)
RGFCF	I(0)	I(0)	I(0)	I(0)
RCPS	I(1)	I(1)	I(1)	I(1)
RMWG	I(0)	I(1)	I(0)	I(1)

Note: LGDPC, LMWG, LGFCF, INTR, LCPS, INFT, RGDPC, RGFCF, RCPS and RMWG represents Log of gross domestic product per capita, Log of minimum wage, Log of gross fixed capital formation, rate of interest, Log of credit to the private sector, inflation rate, real gross domestic product per capita, real gross fixed capita formation, real credit to the private sector, and real minimum wage respectively.

Both the ADF and PP tests indicated that the variables have different orders of integration as, shown in Table 3, which are suitable for analyses using the ARDL mechanism. Furthermore, the tests showed the same order of integration in the different categories i.e. intercept versus intercept and trend, except for inflation and real GDP per capita. However, the ADF test was given preference over the PP test due to small sample size utilized in the study.

The Wage-Investment Relation

Using the ARDL bounds test the equilibrium relation between minimum wage and investment was examined by utilising the transformed series of gross fixed capital formation (LGFCF), minimum wage (LMWG), rate of interest (INTR), credit to the private sector (LCPS), and inflation rate (INFT). By controlling for other factors such as rate of interest, credit to the private sector and inflation rate, the bounds test results in Table 4 show that the computed F-statistic is greater than the upper bound both at 10%, 5% and 2.5% levels of significance. Hence, the null hypothesis of no co-integration is rejected. The existence of co-integration implied that there is long-run relationship among the variables in the model. The negative sign and statistical significance of the coefficient of the error correction term (ECT) at 5% and 1% level of significance in Table 6 further confirms the

validity of this conclusion. However, the speed of adjustment is explosive in nature, implying that it would be difficult to return to equilibrium or correct the negative shocks that might have been created when an income policy such as the minimum wage is imposed to boost investment. Other complementary policies might be needed to achieve the desired equilibrium. This further supports the view that income policy contributes more distortions in the Nigeria's macroeconomy.

The result of the long-run estimates and shot-run estimates in Tables 5 and 6 respectively shows that in the current period, a 1% change (increase or decrease) in the minimum wage will lead to a change (increase or decrease) of about 2.59% in investment in the long-run and 1.51% increase in investment in the short-run. However, in the past period, there is a negative relationship between investment and minimum wage.

Table 4: F-Statistics of the Wage-Investment Relation

Test Statistics	**Value**	**No. of Regressors (K)**
F-Statistics	4.8265	4
Pesaran, Shin, & Smith **(2001) Critical Value Bounds: Unrestricted Intercept and** No Trend		
Significance	I(0) Bound	I(1) Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Table 5: Long-Run Regression Estimates

Variables	**Coefficient**	**Standard Error**	**T-Statistic**	**Probability**
LMWG	2.5935***	0.6830	3.7969	0.0035
LCPS	-1.7868***	0.4551	-3.9264	0.0028
INTR	0.0317	0.0443	0.7151	0.4909
INFT	0.0201	0.0206	0.9751	0.3525

Note: *, **, ** *denotes significance at 10, 5% and 1% levels respectively.*

Table 6: Estimated Short Run Coefficient of the ARDL model

Dependent Variable: Gross Fixed Capital Formation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.7840***	0.1963	-3.9944	0.0025
D(LGFCF(-1))	0.1526	0.1574	0.9693	0.3553
D(LGFCF(-2))	0.1743	0.1741	1.0013	0.3403
D(LGFCF(-3))	0.3806*	0.174775	2.1777	0.0545
D(LMWG)	1.5068***	0.4039	3.7307	0.0039
D(LMWG(-1))	-0.5208	0.3134	-1.6615	0.1276
D(LMWG(-2))	-0.8204	0.3088	-2.6573	0.0240
D(LMWG(-3))	-0.9436**	0.3442	-2.7419	0.0208
D(LCPS)	1.7671	1.5319	1.1535	0.2755
D(LCPS(-1))	5.0071**	2.0053	2.4970	0.0316
D(LCPS(-2))	10.7555**	2.4618	4.3690	0.0014
D(INTR)	0.0591*	0.0282	2.0952	0.0626
D(INTR(-1))	0.0201	0.0285	0.7065	0.4960
D(INTR(-2))	0.0005	0.0285	0.0190	0.9852
D(INTR(-3))	-0.0680**	0.0277	-2.4567	0.0339
D(INFT)	-0.0193**	0.0065	-2.9907	0.0136
D(INFT(-1))	-0.0477***	0.0094	-5.0997	0.0005
D(INFT(-2))	-0.0336***	0.0102	-3.3014	0.0080
D(INFT(-3))	-0.0281***	0.0086	-3.2777	0.0083
CointEq(-1)*	-1.1573***	0.1991	-5.8126	0.0002

R-squared	0.779321	Mean dependent var	-0.024503
Adjusted R-squared	0.479829	S.D. dependent var	0.505717
S.E. of regression	0.364738	Akaike info criterion	1.109893
Sum squared resid	1.862474	Schwarz criterion	2.007752
Log likelihood	1.131823	Hannan-Quinn criter.	1.416088
F-statistic	2.602139	Durbin-Watson stat	2.655707
Prob(F-statistic)	0.036653		

Note: **, **, *** denotes significance at 10%, 5% and 1% levels respectively.*

Wage-Growth Relation

Given the establishment of cointegration between minimum wage and investment, by using three different set of measures, the study examines the wage-growth linkage. These measures are in nominal, real and growth rates. The four equations explaining the wage-growth linkage namely; Equations (2), (3), (4) and (5) are represented by Models 1, 2, 3 and 4 respectively in Table 7. Specifically, Model 1 explains the relationship between economic growth and minimum wage; Model 2 relates the relationship among economic growth, minimum wage and investment;

Model 3 fits the relationship among economic growth, minimum wage, and the interaction term while Model 4 explains the relationship among economic growth, minimum wage, the interaction term and credit to the private sector.

Table 7: Existence of Long Run Relationship (Nominal)

Test Statistics	Model 1		Model 2		Model 3		Model 4	
F-Statistics	10.8125		7.977785		7.894250		8.016203	
Pesaran *et al.* (2001) Critical Value Bounds: Unrestricted Intercept and Trend								
Level of Significance	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound
10%	4.04	4.78	3.17	4.14	3.17	4.14	2.72	3.77
5%	4.94	5.73	3.79	4.85	3.79	4.85	3.23	4.35
2.5%	5.77	6.68	4.41	5.52	4.41	5.52	3.69	4.89
1%	6.84	7.84	5.15	6.36	5.15	6.36	4.29	5.61

Table 8: Estimated Long-run Coefficients (Unrestricted Intercept and no Trend)
Dependent Variable: Gross Domestic Product Per Capita

Regressor	Model 1	Model 2	Model 3	Model 4
LMWG	0.4255*** (0.0923)	0.4481*** (0.1207)	0.2866* (0.1555)	-0.0347 (0.2923)
LGFCF	-	0.1455 (0.1440)	-	-
LCPS	-	-	-	0.1413 (0.1784)
LZ	-	-	0.0336 (0.0327)	0.0587 (0.03648)

Note: *Standard errors are given in parentheses.*
, **, * denotes significance at 5% and 1% levels respectively*

Table 9: Short run coefficient Estimates (Gross Domestic Product per Capita)

Regressors	Model 1	Model 2	Model 3	Model 4
C	0.2792*** (0.0604)	0.1160*** (0.0256)	0.2232*** (0.0460)	0.3085*** (0.0531)
D(LCPS)	-	-	-	-0.3925** (0.1539)
CointEq(-1)	-0.1701*** (0.0360)	-0.1361*** (0.0270)	-0.1439*** (0.0287)	-0.1515*** (0.0256)
R-squared	0.3888	0.4204	0.4178	0.5128
Adjusted R-squared	0.3713	0.4038	0.4012	0.4841
S.E. of regression	0.0678	0.0660	0.0662	0.0614
Sum squared resid	0.1609	0.1526	0.1533	0.1283
Log likelihood	48.0950	49.0774	48.9958	52.2902
F-statistic	22.2610	25.3839	25.1181	17.8920
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000
Mean dependent var	0.0035	-0.0008	-0.0008	-0.0008
S.D. dependent var	0.0043	0.0855	0.0855	0.0855
Akaike info criterion	-8.3551	-2.5447	-2.5403	-2.664
Schwarz criterion	-8.0938	-2.4576	-2.4532	-2.5337
Hannan-Quinn criter.	-8.2630	-2.5140	-2.5096	-2.6183
Durbin-Watson stat	2.2737	2.0563	2.041459	1.988501

Note: *Standard errors are given in parentheses.*
****, **, denote 1% and 5% levels of significance*

Table 10: Existence of Long Run Relationship (Real)

Test Statistics	Model 1	Model 2	Model 3	Model 4
F-Statistics	1.3487	4.3187	6.362516	9.655847

Pesaran *et al.* (2001) Critical Value Bounds: Unrestricted Intercept and Trend

Level of Significance	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound
10%	4.04	4.78	3.17	4.14	3.17	4.14	2.72	3.77
5%	4.94	5.73	3.79	4.85	3.79	4.85	3.23	4.35
2.5%	5.77	6.68	4.41	5.52	4.41	5.52	3.69	4.89
1%	6.84	7.84	5.15	6.36	5.15	6.36	4.29	5.61

Table 11: Estimated Long-run Coefficients (Unrestricted Intercept and no Trend) Dependent Variable: Real Gross Domestic Product per capita

Regressor	Model 1	Model 2	Model 3	Model 4
RMWG	0.6405 (0.9854)	0.0426 (0.4415)	0.0830 (0.4036)	-0.1244 (0.3011)
RGFCF	-	0.0003*** (8.47E-05)	-	-
RCPS	-	-	-	3.88E-06 (2.50E-06)
RZ	-	-	3.14E-06*** (1.03E-06)	0.3703 (0.9864)

Note: Standard errors are given in parentheses.
, **, * denotes significance at 5% and 1% levels respectively*

Table 12i: Short Run Coefficient Estimates Real Gross Domestic Product per Capita

Regressors	Model 1	Model 2	Model 3	Model 4
C	13.0341 (11.6981)	17.3223* (9.358012)	12.3077 (8.0280)	18.2450** (8.2651)
D(RGDPC(-1))	0.1793 (0.1515)	0.2158 (0.140494)	0.0131 (0.1479)	-
D(RGDPC(-2))	-0.2384 (0.1455)	-0.2367* (0.125370)	-0.2368 (0.1116)	-
D(RGDPC(-3))	-	-	-0.2323 (0.1408)	-
D(RGFCF01)	-	4.03E-06 (2.43E-05)	-	-
D(RGFCF01(-1))	-	-6.64E-05** (3.01E-05)	-	-
D(RGFCF01(-2))	-	-0.0001*** (2.69E-05)	-	-
D(RGFCF01(-3))	-	-5.77E-05* (3.09E-05)	-	-
D(RZ)	-	-	4.64E-07 (3.41E-07)	1.29E-06** (4.10E-07)
D(RZ(-1))	-	-	-9.29E-07** (3.41E-07)	-1.16E-06** (3.39E-07)
D(RZ(-2))	-	-	-1.63E-06*** (3.10E-07)	-1.88E-06*** (3.18E-07)
D(RZ(-3))	-	-	-1.13E-06*** (3.97E-07)	-2.11E-06*** (4.87E-07)
D(RCPS)	-	-	-	-1.3627 (1.1897)
D(RCPS(-1))	-	-	-	-1.5453 (1.4490)
D(RCPS(-2))	-	-	-	-4.7890** (1.7776)

Table 12b: Short Run Coefficient Estimates Real Gross Domestic Product per Capita

Regressors	Model 1	Model 2	Model 3	Model 4
D(RCPS(-3))	-	-	-	3.2045** (1.5159)
CointEq(-1)*	-0.1838 (0.1101)	-0.3546*** (0.094640)	-0.3583*** (0.0787)	-0.5392*** (0.0812)
R-squared	0.221784	0.583700	0.662153	0.737233
Adjusted R-squared	0.146473	0.471619	0.554042	0.638695
S.E. of regression	61.16868	48.84655	44.87531	40.39216
Sum squared resid	115989.8	62035.62	50344.83	39156.64
Log likelihood	-191.5163	-175.8987	-172.3489	-168.0763
F-statistic	2.944905	5.207852	6.124747	7.481744
Prob(F-statistic)	0.048245	0.000837	0.000212	0.000038
Mean dependent var	3.286280	3.443043	3.443043	3.443043
S.D. dependent var	66.20953	67.19863	67.19863	67.19863
Akaike info criterion	11.17236	10.81757	10.66758	10.47508
Schwarz criterion	11.35011	11.17671	11.07162	10.92401
Hannan-Quinn criter.	11.23372	10.94005	10.80537	10.62818
Durbin-Watson stat	1.892492	2.305925	2.396245	2.097381

Note: *Standard errors are given in parentheses.*
****, **, * denote 1% and 5% levels of significance*

Table 13: Existence of Long Run Relationship (Growth Rate of Real)

Test Statistics	Model 1		Model 2		Model 3		Model 4	
F-Statistics	19.29999		12.47706		13.10746		11.14462	
Pesaran *et al.* (2001) Critical Value Bounds: Unrestricted Intercept and Trend								
Level of Significance	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound
10%	4.04	4.78	3.17	4.14	3.17	4.14	2.72	3.77
5%	4.94	5.73	3.79	4.85	3.79	4.85	3.23	4.35
2.5%	5.77	6.68	4.41	5.52	4.41	5.52	3.69	4.89
1%	6.84	7.84	5.15	6.36	5.15	6.36	4.29	5.61

Table 14: Estimated Long-Run Coefficients (Unrestricted Intercept and no Trend)
Dependent Variable: Growth Rate of Real Gross Domestic Product per capita

Regressor	Model 1	Model 2	Model 3	Model 4
	-0.2529	-0.2610	0.0265	0.0289
DLOG(RMWG)	(0.2538)	(0.2620)	(0.2474)	(0.2278)
		-0.0089		
DLOG(RGFCF)	-	(0.0397)	-	-
				-0.0619
DLOG(RCPS)	-	-	-	(0.0625)
			-0.0696	-0.1247
DLOG(RZ)	-	-	(0.0681)	(0.7672)

Note: *Standard errors are given in parentheses.*
, **, * denotes significance at 5% and 1% levels respectively.*

Table 15: Short Run Coefficient Estimates
Dependent Variable: Growth rate of Real Gross Domestic Product Per Capita

Regressors	Model 1	Model 2	Model 3	Model 4
	0.0132	0.0125	0.0080	0.0108
C	(0.0485)	(0.0485)	(0.0480)	(0.0459)
	0.3224**			
	(0.1429)	0.3204**	0.3170**	-0.3054**
D(LRGDPC(-1))		(0.1425)	(0.1353)	(0.1292)
	0.0307	0.0225		
D(LRMWG)	(0.1343)	(0.1345)	-	-
			-0.0014	6.85E-05
D(LRZ)	-	-	(0.0220)	(0.0209)
				-0.9638*
D(LRCPS(-1))	-	-	-	(0.5281)
				-
	-1.1549***	-1.1509***	-1.1165***	1.1828***
CointEq(-1)*	(0.1829)	(0.1819)	(0.1722)	(0.1681)
R-squared	0.600950	0.601658	0.611304	0.656054
Adjusted R-squared	0.562332	0.563109	0.573688	0.610194
S.E. of regression	0.286730	0.286475	0.282986	0.270598
Sum squared resid	2.548636	2.544113	2.482508	2.196700
Log likelihood	-3.816529	-3.785447	-3.356470	-1.215990
F-statistic	15.56149	15.60752	16.25126	14.30574
Prob(F-statistic)	0.000002	0.000002	0.000002	0.000001
Mean dependent var	0.023036	0.023036	0.023036	0.023036
S.D. dependent var	0.433412	0.433412	0.433412	0.433412
Akaike info criterion	0.446659	0.444883	0.420370	0.355199
Schwarz criterion	0.624413	0.622637	0.598124	0.577392
Hannan-Quinn criter.	0.508019	0.506243	0.481730	0.431900
Durbin-Watson stat	1.897832	1.895679	1.916254	2.021378

Note: *Standard errors are given in parentheses.*
****, **, * denote 1% and 5% levels of significance*

Residual Diagnostics and Stability Test

The diagnostic tests conducted on the ARDL models are the serial correlation, heteroscedasticity, normality and the coefficient stability test. The results of these tests are presented in Table 16 and 19 with each representing the diagnostic test for the wage-investment relation; and the wage-growth relation.

Wage-Investment Relation

Table 16: Residual Diagnostics based on the Estimated ARDL

Test Statistic	F-statistic	Prob.Value (@5%)	Remarks
Serial Correlation LM Test (Breush-Godfrey)	3.4914	0.0841	No serial correlation
Heteroscedasticity Test (Breusch-Pagan- Godfrey)	0.4221	0.9577	No Heteroscedasticity
Jarque-Bera Normality test	5.5400	0.0627	Well-specified.
Stability test (CUSUM)			Stable
Stability test (CUSUMSQ)			Stable

Source: *Author's Computation, (2020)*

Wage-Growth Relation

Table 17: Residual Diagnostics and Stability Tests based on the Estimated ARDL (Nominal)

Test Statistic	Model 1	Model 2	Model 3	Model 4
Serial Correlation LM Test (Breush-Godfrey)	0.0384	0.0539	0.0361	0.0101
P-Value	(0.8459)	(0.8179)	(0.8505)	(0.9207)
Remarks	No SC	No SC	No SC	No SC
Heteroscedasticity Test (Breusch-Pagan- Godfrey)	0.2424	0.2193	0.2236	4.9720
P-Value	(0.7861)	(0.8823)	(0.8793)	(0.0019)
Remarks	No Het	No Het	No Het	No Het
Jarque-Bera Normality test	22.4787	30.0879	27.0958	1.7202
P-Value	(0.0003)	(0.0000)	(0.0000)	(0.4231)
Remarks	Not Normal	Not Normal	Not Normal	Normal
Lag order in ARDL	(1, 0)	(1, 0, 0)	(1, 0, 0)	(1, 0, 0, 1)
CUSUM	Stable	Stable	Stable	Stable
CUSUMSQ	Unstable	Unstable	Unstable	Stable

Note: SC represents Serial correlation and Het, Heteroscedasticity

Source: Authors' computations (2020)

Table 18: Residual Diagnostics and Stability Tests based on the Estimated ARDL (Real)

Test Statistic	Model 1	Model 2	Model 3	Model 4
Serial Correlation LM Test (Breush-Godfrey)	0.986025	3.1277	2.378876	1.576010
P-Value	(0.4141)	(0.0376)	(0.0881)	(0.2260)
Remarks	No SC	SC	No SC	No SC
Heteroscedasticity Test (Breusch-Pagan- Godfrey)	2.175794	3.1294	3.403403	1.643335
P-Value	(0.0958)	(0.0123)	(0.0073)	(0.1540)
Remarks	No Het.	Het.	Het.	No Het.
Jarque-Bera Normality test	5.4601	5.6185	2.1467	0.5636
P-Value	(0.0652)	(0.0603)	(0.3419)	(0.7544)
Remarks	Normal	Normal	Normal	Normal
Lag order in ARDL	(3, 0)	(3, 0, 4)	(4,0, 4)	(1, 0, 4, 4)
CUSUM	Stable	Stable	Stable	Stable
CUSUMSQ	Unstable	Unstable	Unstable	Stable

Note: SC represents Serial correlation and Het, Heteroscedasticity
Source*: Authors' computations (2020)*

Table 19: Residual Diagnostics and Stability Tests based on the Estimated ARDL (Growth Rate)

Test Statistic	Model 1	Model 2	Model 3	Model 4
Serial Correlation LM Test (Breush-Godfrey)	0.1179	0.271702	0.067301	0.638539
P-Value	(0.8892)	(0.8452)	(0.9351)	(0.5365)
Remarks	No SC	No SC	No SC	No SC
Heteroscedasticity Test (Breusch-Pagan-Godfrey)	0.499188	0.592459	1.171024	0.759977
P-Value	(0.7365)	(0.7058)	(0.3433)	(0.6250)
Remarks	No Het.	No Het.	No Het.	No Het.
Jarque-Bera Normality test	0.1719	0.1898	0.394711	0.886113
P-Value	(0.9176)	(0.9094)	(0.8209)	(0.6421)
Remarks	Normal	Normal	Normal	Normal
Lag order in ARDL	(2, 1)	(2, 1, 0)	(2, 0, 1)	(2, 0, 1, 1)
CUSUM	Stable	Stable	Stable	Unstable
CUSUMSQ	Unstable	Unstable	Unstable	Unstable

Note: SC represents Serial Correlation and Het., Heteroscedasticity
Source: *Author's computation*

Discussions of Findings

The estimated results revealed that there is a long-run relationship between minimum wage and investment. The F-statistics in Table 4 was statistically significant at 5% level of significance. Specifically, there was evidence of a

positive and statistically significant relationship between minimum wage and investment both in the short run (t= 3.7306; p=0.0039) and in the long run (t= 3.7969; p =0.0035) respectively. A 1% increase in minimum wage will lead to 1.51% increase in investment in the current period and 2.59% increase in investment in the long-run. A raise in minimum wage stimulates investment through its ability to increase labour productivity. However, previous values of minimum wage have a negative relationship with investment. The result also showed that in the short-run, there is a positive relationship between previous values of investment and current values of investment. The short-run estimates also revealed that in the current period, there is a negative and statistically significant relationship between inflation rate and investment; a positive and statistically significant relationship between interest rate and investment; and a positive but insignificant relationship between credit to the private sector and investment. In the long run, both interest rate and inflation rate have a positive but statistically insignificant relationship with investment while there is a negative and statistically significant relationship between credit to the private sector and investment.

Moreover, the results showed that there was evidence of a non-negative relationship between minimum wage and growth in the long run. This result corresponds with Sabia (2015b), Fanti and Gori (2011), Watanabe (2013) and Obeng (2015). However, in the short run, minimum wage does not contribute to economic growth. The growth impact of minimum wage does not occur immediately but after some period. In addition, the impact of minimum wage on economic growth in the long-run reduced as more and more potential growth enhancing variables were considered such as increase in investment, minimum wage and investment simultaneously, and credit to the private sector.

Specifically, from Table 8, the sign of the coefficient of minimum wage was positive in Model 1, Models 2 and 3 but negative in the fourth Model. A similar pattern was also obtained across the models when real variables were considered (see Table 11). However, a little variation in sign was reported when growth rate variables were considered, as shown in Table 14. This indicates that the growth impact of minimum wage policy was highly sensitive to the kind of measures employed. The impact of a simultaneous increase in investment and minimum wage was also growth-enhancing. As expected, there was a positive relationship

between investment and economic growth; and credit to the private sector and economic growth. These long run specifications were confirmed when both nominal and real variables were employed, with the latter yielding lower elasticity values and weak statistical significance. However, the long run result obtained when growth rate variables were employed differed from the result obtained when nominal and real variables were employed. In the short run or current period, the result of the study showed that minimum wage, investment, and a simultaneous change in investment and minimum wage may not enhance economic growth. However, in the short run, there was a negative but statistically significant relationship between credit to the private sector and economic growth.

When real variables were considered, the result of the study showed that current and past values of the variables of interest except real minimum wage had impact on economic growth in the short run. While in the current period, the interaction term, and real investment had positive but statistically insignificant relationship with real economic growth respectively; real credit to the private sector has a negative and statistically insignificant relationship with real economic growth. In the past period, the interaction term, and real investment had negative but statistically insignificant relationship with real economic growth. However, there is a negative and statistically significant relationship between real credit to the private sector and real economic growth. Furthermore, in the short run, when growth rate variables were considered, there was evidence of a positive but insignificant relationship between the growth rate in the current value of real minimum wage and real economic growth; negative and significant relationship between the growth rate of real credit to the private sector and real economic growth; mixed result for the relationship between the growth rate in the current value of an increase in minimum wage and investment concurrently; and real economic growth; and mixed result between previous values of real economic growth and the current growth rate of the economy.

Conclusion and Implications for Policy

The research findings showed that there was evidence of the existence of the wage-investment relationship in Nigeria, and hence the wage-growth linkage was established for Nigeria. Based on the research findings, the study concluded that upward review of wages is a necessary but not a sufficient income policy for the Nigerian economy. On the one hand, upward review of wages is necessary given the positive relationship between minimum wage and economic growth and the need to keep pace with price movements. On the other hand, it is not sufficient since a nominal increase in the value of minimum wage without due consideration

for other potential growth enhancing variables in the economy is unsustainable in the long run. Furthermore, the study concludes that merely increasing nominal minimum wage will be a naive policy on the part of government. Based on the research findings, the study recommends periodic and consistent review of wages that is consistent with the stipulated time frequency of 5 years; with provision for wage indexation and complementary investment related expenditures to cushion the negative unemployment and inflationary effect of minimum wage policy in Nigeria. One key caveat, the policy implications should be treated with caution because the analyses are sensitive to particular measure of variables.

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