NIU Journal of Social Sciences Copyright©2022
Nexus International University ISSN: *3007-1682*; 8(1): 37- 47

Economic Discomfort and Wellbeing in Nigeria: Evidence from dynamic ARDL simulation

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Abstract. The United Nations identified improved health and wellbeing as a major goal in the Sustainable Development Goals in 2015. With less than nine years until the SDGs' deadline, however, unemployment and inflation continue to rise, leaving most citizens living on less than a dollar a day. Theoretical and empirical literature show that there are numerous disadvantages associated with economic discomfort. However, empirical findings on the impact of economic discomfort on wellbeing in Nigeria are virtually non-existent. This study contributes to the misery literature by examining the relationship between economic discomfort and wellbeing in Nigeria. This was achieved through the use of novel dynamic autoregressive-distributed lag simulations and Breitung and Candelon (2006) frequency domain granger causality test on data covering the period 1991-2020. The study found that economic discomfort has significant negative long run effect on wellbeing in Nigeria. Also, economic discomfort drives wellbeing and no feedback effect in Nigeria. Therefore, Nigerian government should adopt appropriate policies that will help in reducing the high rate of unemployment and inflation to boost public health improvement and in turn bring effective wellbeing to its populace.

Keywords: Nigeria, wellbeing, economic discomfort, novel dynamic ARDL simulation.

1. Introduction

Governments all over the world (whether socialist or capitalist) are enthralled with the well-being of their citizens. Inherently, state efforts aimed at improving economic and financial sustainability tend to improve the economy and the welfare of its citizens (Adodo, 2022; Cakici, & Zaremba, 2020). However, as Dynan and Sheiner (2018) point out, it is harder to measure a person's well-being development than of an entire country. Without any doubt, therefore, economic indicators such as GDP and other national wealth indices are recognized as major factors that can determine the financial wellbeing of the economy. As such, several countries have increasingly begun to use happiness indices to assess the efficacy of government policies. For example, Australia, Bhutan, Canada, France, as well as the United Kingdom, utilizes advanced surveys to assess the metric of gross national happiness (GNH) and also to measure the standard of well-being of their citizens (Frasquilho, et al 2015; Okonji & Igbanugo, 2019).

Happiness is important to life, and for one to be happy, it requires a good living standard because we live in a complicated world. (Ubah, et al, 2021). Understanding the importance of happiness, therefore, indicate that people believe their lives are going well. Consequently, wellbeing becomes necessary in every aspect of human life (Joseph, 2020; Lawal, Osinusi, & Bisiriyu, 2021). The importance of wellbeing to public policy and government effectiveness, made the United Nation to include it among the Sustainable Development Goal (SDGs) target by the United Nation. Goal 3 calls for healthy lives and promote well – being for all at all ages. However, many indicators that measure living conditions fail to measure what people think and feel about their lives, such as the quality of their relationships, their positive emotions and resilience, the realization of their potential, or their overall satisfaction with life. Well-being generally includes global judgments of life satisfaction and feelings ranging from depression to joy (Solarin, Gil-Alana, & Lafuente, 2020).

Attaining sustainable development is major target for all countries in the world and since good health and wellbeing are major targets that need to be achieved, governments of countries must put in more efforts to ensure that all efforts towards achieving the goals are not left untouched. However, less than nine years to the end of the SDGs target, Nigeria, which has always been recording low in the misery index, has increased within the last three years. For example, the misery index that was published by Steve Hanke, misery index in 2021 ranked Nigeria sixth (6th) in the world of countries that are most miserable and first in Africa. The major contributory factor has been the continuous increase in the rate of unemployment. This measure of misery index was also substantiated by the recent report from the World Bank on the issue of poverty, inequality, and wellness.

Nigeria's misery index in 2015 was approximately 18.02 % and rises to approximately 28.73 % in 2016. During these periods, the rate of inflation and unemployment were regarded as the major contributory factor. However, as at 2018, Nigeria was ranked 7th most miserable country in the world and second in Africa after South Africa. As at today, the country is ranked 6th in the world and first in Africa with 43.0 percent. Table 1 below shows the top five African countries that are most miserable

Table 1: Top 5 Miserable countries in Africa

Countries	Misery Index	Contributing Factor	Rank
Nigeria	43	high unemployment rate	1st
South Africa	42	high unemployment rate	2nd
Egypt	36.8	unemployment rate	3rd
Algeria	21.9	Lending rate	4th
Mauritius	17.9	Lending rate	5th

Source: *Hanke, misery index 2021*

Today, government achievement in any economy can be measures by decreasing economic discomfort which is the addition of inflation plus unemployment. A high rate of misery places any government as not performing effectively. It is a pity that less than nine years to the end of the SDGs target, Nigeria is ranked 6th among countries with the most misery index in the world and 1st in Africa. This situation calls for examining the implication of the economic discomfort of the country on its wellbeing. Therefore, the objective of this paper are as follows: First, to determine the effect of economic discomfort on wellbeing of the Nigerian economy. Second, to investigate the response of wellbeing to shock in economic discomfort and finally to determine the direction of causality between economic discomfort and wellbeing in the country.

The contribution of this paper are as follows. First, the use of dynamic ARDL simulation estimation techniques that can capture the issue of counterfactual shock which no study have used in estimating the relationship between economic discomfort and wellbeing in Nigeria. Second, literature over the years have failed to investigate the issue of economic discomfort and well – being, a gap in which this study try to fill. Third, the use of frequency domain granger causality test developed by Breitung and Candelon (2006) which test causality in frequency instead of time and able to produce better result for short span series with seasonal and other potential economic episodes in developing countries like Nigeria.

Apart from the introduction, the rest of the paper is structured as follows; section 2 presents the literature review, section 3 presents the data and methodology used for empirical analysis, section 4 presents the results, while section 5 concludes the study and provides policy implications

2. Literature Review

Wellbeing is complex to describe, but even more difficult to quantify. In general, there are two types of wellbeing measures: objective and subjective measures. The first classification assesses happiness using verifiable facts such as social, economic, and environmental facts. Cardinal measures are used to assess people's well-being indirectly. Subjective measures of wellbeing, on the other hand, directly capture people's feelings or real-life experiences (van Hoorn 2007). They assess happiness using ordinal measures. The importance of wellbeing makes it to be included in the definition of health by the World Health Organization (WHO) that defines health as "a condition of complete physical, mental, and social well-being, rather than the absence of sickness or disability. (WHO, 1948). The concept relates health to wellbeing and in line with Ottawa Charter (1986) concept, describing health as "a commodity for daily

life, not the purpose of living." From this viewpoint, health is a means to a happy life. According to Hetschko, Schöb, and Wolf, (2020) sees wellbeing as a state in which people are being comfortable, having good health and happy with the state of their living.

Misery in life refers to the bottom levels of life satisfaction (Fleche and Layard, 2015). However, one of the basic cause of misery is inflation accompanying with unemployment. This is because, an individual that is unemployed will find it difficult to afford the basic needs of life. The worst is seen if the prices of the basic needs are also rising. Rising inflation rate therefore, along with continuous unemployment has been one of the basic issues affecting developing countries in the recent year. According to Arthur Okuns, the combination of the two will produce discomfort in the society. Economic discomfort which is also regarded to as misery index refers to the sum of unemployment rate and the annual inflation rate. (Lovell & Tien, 2000).

Empirical literature over the years have investigated the effect of misery on economic growth, wellbeing, and consumer satisfaction. For example, Rezapour, Ghorbani, Mahmoud, and Faradonbeh, (2020), investigated the implication of the Okun's misery index on out - of -pocket health care system in Iran between 2000 and 2016. The autoregressive distributive lagged (ARDL) model was employed to determine the short and long run impact. Conclusion reached from their study shows that the Okun's misery index has a long run significant effect on the out – of – pocket health care in Iran. Furthermore, feedback causality runs from misery index to out-of-pocket health expenditure.

In Nigeria, the nexus between misery and economic growth was investigated by Ubah, et al (2021). The study takes into consideration the implication on the management of electricity for the period 1987 to 2017. ARDL estimation techniques was employed to determine the effect on the long run basis. Findings from their study revealed that misery dampens economic growth in Nigeria. In the same vein, Ali, Audu and Ronssel (2021) examined the effect of economic misery and urbanization on life expectancy in MENA from 2001 to 2016. Cointegration and causality test was employed. Conclusion reached from the study showed that economic misery reduces life expectancy in the selected countries and stand as a significant factor that determines life expectancy. Reduction in life expectancy led to fall in labour force and hence bring about fall in output.

Wang, et al (2019) in their study on the relationship between financial structure, misery index and economic growth in Pakistan between 1989 to 2017 revealed that, the misery index measured by rate of unemployment and inflation impacted negatively and significant on the Pakistan economic growth during the period under investigation. They however, stated that for Pakistan economy to grow significantly, efforts towards tackling the persistent increase in price and unemployment should be addressed.

Alem and Kohlin (2014) assessed how food price inflation affect the subjective well being in urban area of Ethiopia between 2007 to 2008. Ordered logit regression model estimation techniques was employed on the collected data. Their findings revealed that shock on food price inflation affect subjective wellbeing negatively and it is an important factor that determines the subjective wellbeing of the urban populace in Ethiopia. On the effect of inflation and unemployment on subjective wellbeing, Grandelman and Hernandez-Munillo (2009) examined the implication of both on the subjective wellbeing taking into consideration the individual effect and the country wise effects. Using data gathered from the Gallop World Poll, they concluded that rising unemployment accompanied with excessive inflation rate affect subjective wellbeing negatively.

3. Data and Methodology

3.1 Data

To achieve the study objective, a structured yearly data from Nigeria stretching from 1991 to 2020 is used for empirical analysis. The constructed dataset includes the dependent variable wellbeing (measured by per capita income) as supported (Dynan, & Sheiner, 2018; Conceição & Bandura, 2008). Economic discomfort (unemployment + inflation) is the regressor of interest. Other variables regarded as the determinants of wellbeing are also used as control variable. These include gross fixed capital formation, government consumption expenditure and secondary school enrolment (see Kwark, 2013; Park, Ryu & Lee, 2019). All data for the study were retrieved from the World Bank's world development indicators (WDI) database (https://databank.worldbank.org/source/world-development-indicators).

3.2 Model Specification

To empirically investigate the impact of economic discomfort on wellbeing in Nigeria, the following econometric model is specified:

$$LPKY_t = \beta_0 + \beta_1 LED_t + \beta_2 LGFK_t + \beta_3 LGEX_t + \beta_4 SSE_t + \varepsilon_t \quad (1)$$

Where LPKY = log of per capita GDP proxy for wellbeing. LED = log of economic discomfort (unemployment rate + inflation rate). LGFK = log of gross fixed capital. LGEX = log of government total final expenditure and LSSE = log of secondary school enrollment. Although the study is to examine the effect of economic discomfort on wellbeing. Gross fixed capital government total final expenditure and secondary school enrollment are added as control variables and stand as major determinants of wellbeing.

3.3 Granger Causality Test

The direction of causality between economic discomfort and wellbeing is another important objective of the study. To determine the pattern of relationship between both in Nigeria, we adopt the Granger causality test in frequency domain developed by Breitung and Candelon (2006). This causality approach builds on the previous works of Granger (1969), Geweke (1982) and Hosoya (1991). The approach is preferred in this study due to the following advantages. First, it is superior to the alternative time domain approaches. Second, it produces better outcomes for short span series with seasonal and other potential economic episodes like ours. Third, it is more suitable for non-linear series, and it is able to reflect causal relations at various frequencies. We thus use this causality test to determine whether a particular component of economic discomfort (LED) at frequency ω serves as a useful predictor of the component of wellbeing (LPKY)' at the same frequency one period ahead.

Following the pattern established by Breitung and Candelon (2006), we placed the linear restrictions on the coefficients of the first component following the autoregressive VAR model (1) to take the form;

$$LPKY_t = \alpha_1 LPKY_{t-1} + \cdots + \alpha_p LPKY_{t-p} + \varphi_1 LED_{t-1} + \cdots + \varphi_p LED_{t-p} + \varepsilon_{1t} \quad (11)$$

Where for simplicity, the variables α andφ denotes the lag polynomial coefficients and the test hypothesis follows that $M_{LED \to LPKY}(\gamma) = 0$ equals the linear restriction. $H_0: R(\gamma)\varphi = 0$. Where $\beta\varphi = [\varphi 1, \ldots, \varphi p]'$= vector of the coefficients of LED, and$R(\gamma) = \begin{bmatrix} cos\ (\gamma) \cos(2\gamma) \ldots \cos\ (p\gamma) \\ \sin(\gamma) \sin(2\gamma) \ldots \sin\ (p\gamma) \end{bmatrix}$.

3.4 Estimation Techniques

The ARDL model of Pesaran, Shin, and Smith (2001) is primarily used in empirical analysis, particularly when dealing with short-run and long-run concerns (Jordan & Philips, 2018). However, there are two significant advantages to using the ARDL method. First, regardless of whether the variables are integrated of order I(0) or order I(1), or whether variables are mutually co-integrated, it can produce accurate findings (Pesaran et al., 2001). The second is based on the notion that, even when some of the independent variables are endogenous, the results of the procedures are usually unbiased (Harris & Sollis, 2003). For these reasons, the ARDL method is recommended for this research. The traditional ARDL technique, however, has two drawbacks. First, when applied to small samples of time series data (time points of 80 and lower), the result frequently suggests that cointegration is absent when ii fact it is actually present. Furthermore, the models frequently have complex dynamic structures with multiple lags, coexisting values, first differences, and first differences lags. The short- and long-run effects of the regressors are difficult to comprehend due to their complicated dynamic structure (Jordan & Philips, 2018). Jordan and Philips proposed the dynamic ARDL model to solve the issues posed by the complicated structure of the ARDL. This method is a versatile process for dynamic simulation of various ARDL models. Rather than using traditional hypothesis testing for parameter estimations, dynamic simulations use counterfactual scenarios to report the importance of the results. Changes in the explanatory variable due to changes in an independent variable can likewise be estimated, simulated, and plotted using this method, all things being equal. This innovative method can estimate and simulate changes in the dependent variable caused by a regressor, which is useful for policy formation. The dynamic ARDL model is used in this paper because it can improve the resilience of the standard ARDL model. As shown in Figure 1, based on the Akaike information criteria, the model selected is ARDL (4, 4, 4, 4, 4).

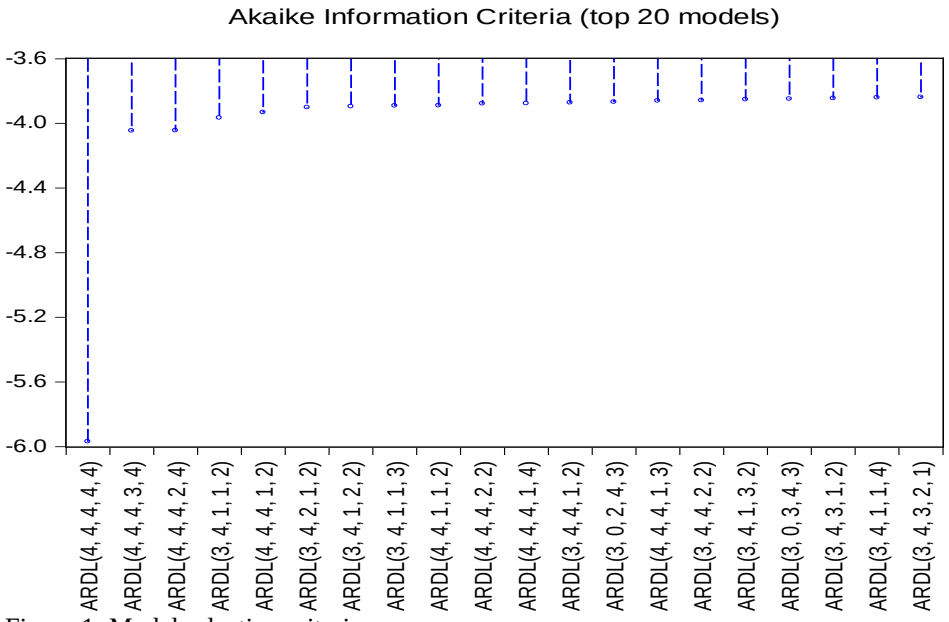


Figure 1: Model selection criteria

Based on Akaike Info Criteria, the novel dynamic ARDL simulations of the econometric models specified in Equations 1 is re - specified in error correction form as follows.

$$LPKY_t = \beta_0 + \beta_1 \Delta LPKY_{t-1} + \beta_2 \Delta LPKY_{t-2} + \beta_3 \Delta LPKY_{t-3} + \beta_4 \Delta LPKY_{t-4} + \beta_1 \Delta LED_{t-1} + \beta_2 \Delta LED_{t-2} + \beta_3 \Delta LED_{t-3} + \beta_4 \Delta LED_{t-4} + \beta_1 \Delta LGFK_{t-1} + \beta_2 \Delta LGFK_{t-2} + \beta_3 \Delta LGFK_{t-3} + \beta_4 \Delta LGFK_{t-4} + \beta_1 \Delta LGEX_{t-1} + \beta_2 \Delta LGEX_{t-2} + \beta_3 \Delta LGEX_{t-3} + \beta_4 \Delta LGEX_{t-4} + \beta_1 \Delta LSSE_{t-1} + \beta_2 \Delta LSSE_{t-2} + \beta_3 \Delta LSSE_{t-3} + \beta_4 \Delta LSSE_{t-4} + \varepsilon_t \quad (2)$$

4. Results and Discussion

Descriptive Statistics

The descriptive statistics of the variables used are reported in Table 1. Per capita income which stands as the proxy for wellbeing has minimum of $270.22million and $3098.99million maximum value with mean of $1443.69 million and standard deviation of $932.82 million. Economic discomfort (inflation + unemployment) has $9.01 and $76.67 as minimum and maximum value respectively. The mean value and standard deviation are 22.94 and 16.66 respectively. For government consumption expenditure, the mean value and standard deviation are $4.54 and $3.05 respectively. However, the minimum and maximum values are $0.91 million and $9.44 million. The mean value for gross fixed capital is $27.30million. The minimum and maximum values are $14.17 million and $48.40 million respectively. This shows that government expenditure in Nigeria over the years has been very low compared to other countries that have similar characteristics with Nigeria. Secondary school enrolment in Nigeria is between the range of 24 million and 56 million between 1991 and 2020.

Table 1: Descriptive statistics of variables

Variable	Mean	Std. Devi.	Min	Max
Per capita income	1443.69	932.82	270.22	3098.99
Economic Discomfort	22.94	16.66	9.01	76.67
Gross Fixed capital	27.30	10.74	14.17	48.4
Govt Consumption expenditure	4.54	3.05	0.91	9.44
Secondary School enrolment	34.74	9.63	23.55	56.21

Source: *Author 2022*

Trend of the Variables

Figure 2 and 3 shows the historical movement of the two variables of interest (economic discomfort and per capita income). In Figure 2, the movement of per capita income is depicted. The graph shows that per capita income in Nigeria increases at a decreasing rate from 1993 to 2007 to a peak and fall in 2008. This marks the period of global

financial crises that affected the stock market. By 2009, per capita income increases more and more until the year 2014 where it gets to its peak and fall drastically in 2015. This period marked the beginning of another democracy which affected wellbeing of the people drastically. On the other hand, Figure 3 shows that from 1991 to 1995, economic discomfort rises in the economy. In fact, as at 1996 it got to a peak. From 1997, there was a decline in the misery of the country, and it affected the economy. Since then, there has been inconsistency in the stability of the economy in terms of the economic misery.

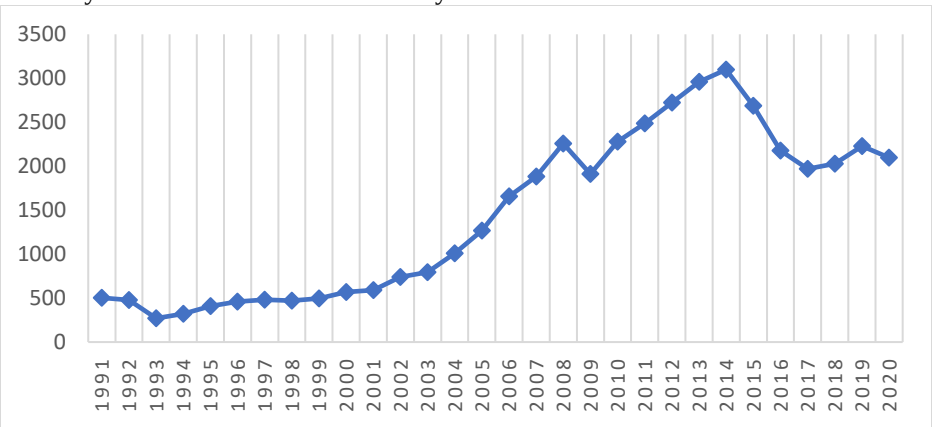


Figure 2: Trend of per capita income in Nigeria

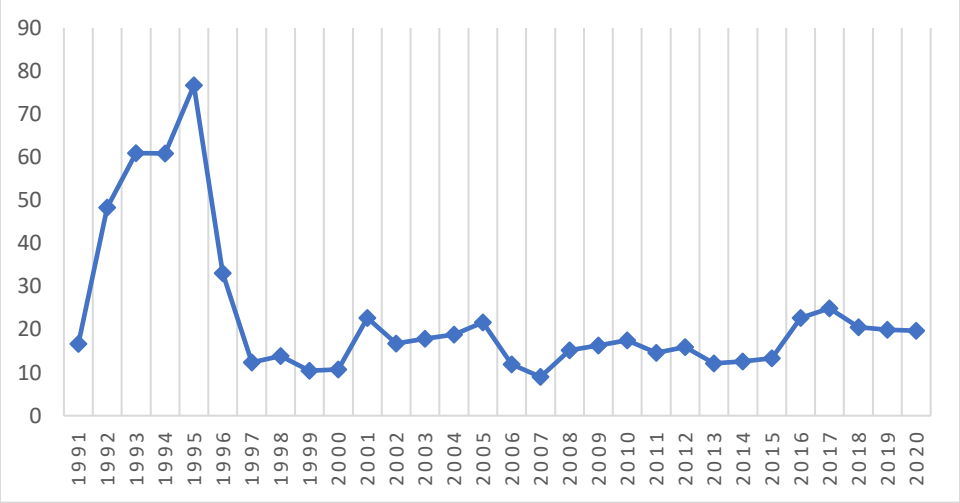


Figure 3: Trend of economic discomfort in Nigeria

Unit Root Test

Before dynamic ARDL simulations may be considered reliable, certain conditions must be met (Sarkodie & Owusu, 2020). First, it is important that the target (dependent) variable must strictly be stationary after first difference. Second, while the regressors can be integrated in a mixed order [I(0) & I(1)], none can be integrated in a higher order than one. Third, cointegration must exist between the dependent and independent variable. To confirm the first and second conditions, the Augmeted Dickey-Fuller (ADF) as well as Phillips-Perron (PP) unit root tests were employed. The results for both tests are reported in Table 2. As reported, the dependent variable is strictly stationary at first difference. Also, none of the independent variables are stationary at order higher than one. Hence, the first and second conditions for the use of novel dynamic ARDL is satisfied.

Table 2: Unit root Test Results

Variable	lpky	led	Lgfk	lgex	lsse
ADF	0.732	-2.412	1.080	-1.669	-2.085
	(0.892)	(0.366)	(0.999)	(0.739)	(0.532)
ΔADF	-4.151***	-5.272***	-3.511**	-5.235***	-5.525***

	(0.003)	(0.000)	(0.015)	(0.000)	(0.000)
PP	0.733	-2.353	-1.632	-0.803	-1.339
	(0.823)	(0.163)	(0.453)	(0.823)	(0.398)
ΔPP	-4.120***	-5.391***	-3.559**	-5.235***	-5.525***
	(0.004)	(0.000)	(0.014)	(0.000)	(0.000)

Note: **and *** denotes significant at 5% and 10% respectively.

Cointegration Test

The third condition for the use of the novel dynamic ARDL simulation is that the variables under consideration must have a long run relationship. To ensure that the condition is satisfied, the Brock – Dechert – Scheinkman (BDS) and the modified Pesaran, Shin and Smith (2001) bounds tests with Kripfganz and Schneider (2018) critical values that takes into consideration the lower and upper bounds is employed. This technique is known to be superior for identifying the upper and lower bound critical values (Sarkodie & Adams, 2018; Ulucak, 2020). The results for the cointegration tests are reported in Table 3. The F-statistic (BDS = 4.29 and PSS = 179.81) generated by both tests are greater than the upper bound critical value at 5% (4.01) and 1 % (4.61) significance level respectively. This confirms the existence of cointegration between economic discomfort and wellbeing in Nigeria. Therefore, the third condition for the use of the novel dynamic ARDL simulation with counterfactual shock is satisfied.

Table 3: Cointegration Tests

	BDS		PSS		
Critical Value	Lower Bound (0)	Upper Bound (1)	Lower Bound (0)	Upper Bound (1)	F-Statistics
1%	3.74	5.08	3.13	4.61	F_{BDS} = 4.29**
5%	2.06	4.01	3.13	4.61	
10%	2.45	3.52	2.38	3.86	F_{PSS} =179.81***

Note:** and *** denotes significance at 5% and 1% respectively

Regression Result (ARDL)

The resulting short run and long - run parameter estimates for the conventional ARDL model are presented in Table 4. Only the results that are significant in the short run are reported. As reported, economic discomfort impacted negatively on wellbeing in Nigeria both in the short and long run. Specifically, a percentage point increase in economic discomfort will reduce wellbeing in the short – run between (0.106% - 1.582%) in the short run, while a percentage point increase in economic discomfort (misery index) will cause wellbeing to reduce by about 0.156 percent in the long-run. The result for both the short run and long run are statistically significant. This shows that economic discomfort (unemployment + inflation) are factors that determine the pattern of wellbeing in Nigeria. The result conforms with apriori expectation and are in line with (Gandelman, & Hernández-Murillo, 2009 ; Alem & Köhlin, 2014; Prashanthy, 2021).

For both the short run and long run, gross fixed capital formation influenced wellbeing positively. The impact as regard to the short run shows that a percentage point increase in gross fixed capital formation will cause wellbeing to rise by 1.635 percent in the short run and 2.160 percent in the long run. The value was significant in the long run indicating that in Nigeria, gross fixed capital stand as an important factor that determines wellbeing both in the short run and long run. Our findings is supported by (Ur Rehman, & Hysa, 2021)

The outcome from government final expenditure conform with the theoretical apriori expectation in that increase in government expenditure will spur and increase in wellbeing. Specifically, the result for both the short – run and long run indicate that increase in total government final expenditure will lead to a rise in wellbeing in Nigeria between 0.92% to 1.96% in the short run while a percentage increase in government total consumption expenditure will raise wellbeing by 0.295% in the long run. The result was significant in the long run which indicate that total government final consumption expenditure is a major determinant of wellbeing in Nigeria.

Secondary school enrollment raises wellbeing in Nigeria both in the short and long-run. The outcome as reported in Table 5 deduce that secondary school enrolment raises wellbeing in Nigeria between 0.351% to 2.786% in the short run. However, a percentage increase in secondary school enrolment will increase wellbeing by 0.869% in the long run. This result is in line with (Sede, 2017)

Table 5: ARDL estimate result for long run and short run

EQN	Variable	Coefficient	SE	p-value
Short Run	Δled	-1.582**	0.470	0.018
	Δled_{t-1}	-0.371**	0.134	0.021
	Δled_{t-2}	-0.106**	0.078	0.04
	$\Delta lgfk$	1.635**	0.684	0.025
	$\Delta lgex_{t-1}$	1.960**	0.607	0.020
	$\Delta Lgex_{t-2}$	0.923**	0.352	0.023
	$\Delta lsse_{t-1}$	0.351*	0.606	0.061
	$\Delta lsse_{t-3}$	2.786*	0.897	0.019
Long Run	Led	-0.156***	0.044	0.002
	Lgfk	2.160**	0.123	0.037
	Lgex	0.295**	0.018	0.024
	Lsse	0.869*	0.123	0.093
ARDL (4,4,4,4,4)	Obs = 30	R-Square 0.87	AdjR2 = 0.85	

Dynamic ARDL

Since all the required preconditions for the use of novel dynamic ARDL are met, the long-run impact of economic discomfort on wellbeing in Nigeria, alongside other control variables on wellbeing, is estimated through novel dynamic ARDL simulations. The long-run estimates are reported in Table 6. The dynamic ARDL result shows that for every percentage point rise in economic discomfort, wellbeing is expected to decrease by 0.268 percent. The result is statistically significant at 10%. We therefore have sufficient evidence to back up the claim made by this study that economic discomfort is a determinant of wellbeing in Nigeria.

Gross fixed capital also impacted positively and significantly on wellbeing. Based on the result, a percentage increase in gross fixed capital formation increases wellbeing by 2.160 percent. The result was significant at 5%. This shows that gross fixed capital stand as an important factor that determines wellbeing in the country. Government total final expenditure also shows a positive and significant effect on wellbeing. As reported, 1% increase in government final expenditure raises wellbeing by 0.295%. The result was not significant in the long run, this may be to misallocation of government expenditure accompanying with the high rate of corruption. Secondary school enrolment drives wellbeing positively based on the result. As reported, a percentage increase in secondary school enrollment will boost wellbeing Specifically, a percentage increase in school enrollment will improves wellbeing by 0.869%. The R-squared value of 0.83 indicated that about 83% in the variation of wellbeing in Nigeria is accounted for by the independent variables.

Table 5: ARDL estimate result for long run and short run

EQN	Variable	Coefficient	SE	p-value
Long Run	LED	-0.268***	0.471	0.090
	LGFK	2.160**	0.123	0.012
	LGEX	0.295**	0.018	0.213

	LSSE	0.869*	0.123	0.091
	C	4.591	2.450	0.075
ARDL (4,4,4,4,4)	Obs = 30	R-Square 0.83	AdjR2 = 0.76	

Predicted Effect effects of counterfactual shocks to economic discomfort

Finally, the predicted effects of one standard deviation counterfactual shocks to the log of economic discomfort are simulated, plotted and reported in Figures 4. The first graph presents the effect of a positive one standard deviation shock to economic discomfort (led) to wellbeing (lweb). The plots indicate that a positive shock to economic discomfort (led) will stimulate a significant decrease in wellbeing (lpky) in the short run, that eventually reaches a long-run value of about 2.58. The second graph presents the impact of a negative one standard deviation shock to economic discomfort (led) on wellbeing (lpky). The impact in this case is the opposite of what was detected in the first graph. A negative one standard deviation shock to economic discomfort will cause a significant improvement in the wellbeing of the economy in the short run to a sustained long-run level of approximately 3.73. These patterns displayed by the counterfactual shocks confirm that positive shocks that trigger rises in economic discomfort in Nigeria will result to poor wellbeing on the citizens in Nigeria, while negative shocks will improve their wellbeing

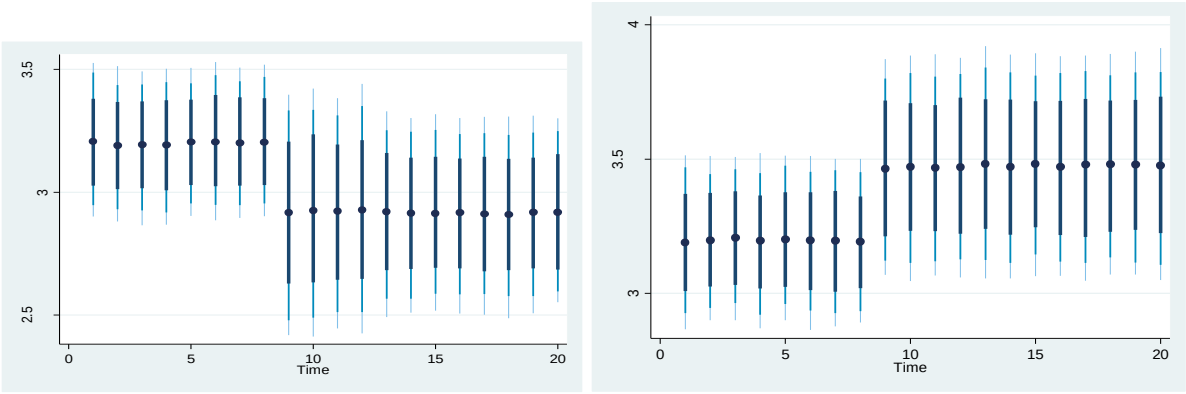
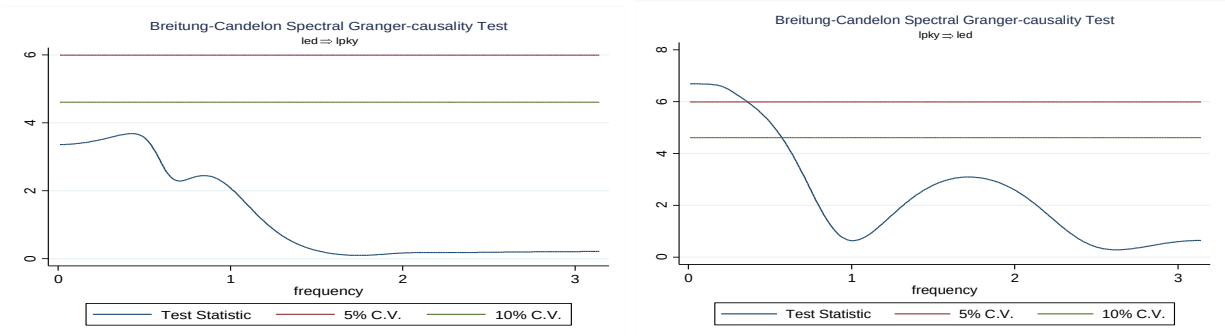


Figure 2. Predicted effect of a ±1 shock in economic discomfort on wellbeing. Note (1) the dark spot on the graph denotes the predicted mean values (ii) 75%, 90% and 95% of the confidence interval are displayed with the darkest to the lightest.

Granger Causality Test

The direction of causality between economic discomfort and wellbeing are viewed through the Breitung and Candelon (2006) Granger causality testing in frequency domain. Figures 4-5 below present the frequency domain causality graphs for the direction of causality between both. The test results revealed that economic discomfort is able to predict wellbeing in Nigeria at various frequencies. Feedback causal relations is however not noticeable. There is thus overwhelming evidence that economic discomfort is a significant predictor of wellbeing in Nigeria.



5. Conclusion and Policy Implication

The study investigated the effect of economic discomfort on wellbeing in Nigeria utilizing the novel dynamic ARDL estimation techniques along with the Breitung and Candelon (2006) frequency domain granger causality test for the period 1991 to 2020. The conclusion reached from the study are as follows: first, economic discomfort deters wellbeing in Nigeria. Secondly, there exist a significant long run relationship between economic discomfort and wellbeing. Third, wellbeing respond negatively to a positive shock (increase) in economic discomfort and positive to a negative (decrease) shock to economic discomfort. Fourth, the direction of causality runs from economic discomfort to wellbeing and not vice versa. Therefore, more activities that lead to a single digit in both the rate of inflation and unemployment need to be pursued. The implication of this is that if the rate of inflation and unemployment continues to rise, wellbeing of the country will be affected drastically and hence, the SDGs target for good health and wellbeing in Nigeria may not be realistic. Therefore, policy towards addressing price stability and creation of more industries to reduce unemployment need to be pursued. Avenue towards reducing cost of education to increase student enrollment must be pursued .

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