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The Exasperating Economic Misery in Nigeria: Can we Depend on Monetary Policy?

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ABSTRACT: *The core objective of this study was to detect the influence of monetary policy on economic misery in Nigeria from 1991 to 2021. The study employed the Granger causality test, autoregressive lag (ARDL) bounds test for cointegration, the fully modified ordinary least squares, impulse response function, and the variance decomposition in analyzing the data. From the Granger causality test, it was realized that a one-way causality flows from the monetary policy rate to economic growth. The ARDL bounds test for cointegration validated the existence of a long-run relationship between monetary policy rate and economic misery in Nigeria. From the long-run estimates, it was observed that the effect of monetary policy rate on economic misery is positive and significant. Furthermore, it was realized that the effect of monetary policy rate on inflation has been positive and significant, while the effect on unemployment has been negative but insignificant. The impulse response function portrayed that economic misery responded positively to shocks in monetary policy in the short-run but such response is being decomposed in the long-run. These findings therefore justify the Central Bank of Nigeria's stance of increasing the monetary policy rate to tackle inflation, which will hitherto reduce the economic misery in Nigeria.*

Key words: *Unemployment, Inflation, Monetary policy rate, Economic development, Misery index, ARDL.*
JEL Classification: *B23; E24; E31; E52; O11.*

1. Introduction

The question of development, according to Seer (1969) has been categorized into three major aspects: What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? A rising trend in three of these key variables would be strange to call the result 'development' even if per capita income doubled (Brinkman, 1995; Gandhi, 1996; Seer, 1969; Todaro & Smith, 2011). The implication of this argument centres around the fact that development cannot exists in the midst of inequality. This made (Sen, 1999) to assert that "development has to be more concerned with enhancing the lives we lead and the freedom we enjoy". Thus, "development is the process of improving the quality of all human lives and capabilities by raising people's levels of living, self-esteem, and freedom" (Todaro & Smith, 2011).

Consequent upon the above definitions of development, a rising economic misery occasioned by a rising unemployment and inflation is the bane to achieving an enhanced living standard thereby limiting the capacity of the citizens to enjoy. The implication is that economic misery negatively affects the welfare of the citizens. As noted by George-Anokwuru (2022) the factors contributing to Nigeria's misery include its high unemployment rate, inflation rate and interest rate. Okun's misery index developed as at 1966, otherwise

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known as “the economic discomfort index” (EDI), was one of the first attempts to create a comprehensive index comprised of a variety of metrics for tracking macroeconomic circumstances over business cycles. It includes the inflation and unemployment rates for a certain economy. It gained popularity in the early 1970s, during a period of economic stagflation in the United States of America (Anaele & Nyenke, 2021). As a result of stagflation, greater levels of either inflation or unemployment were found to have a detrimental influence on citizens' welfare.

Arthur Okun proposed the misery index as a measure of economic hardship as a result of the considerable financial burden put on the people by the country's unfavourable economic conditions at the time. The indicator was originally calculated as a mix of unemployment and inflation rates. According to Mankiw (2010) “the index measures the level of economic discomfort as an unweighted sum of unemployment and inflation which constitutes two important indicators of macroeconomic policy outcomes” (Anaele & Nyenke, 2021).

Other forms of the index have been produced throughout time, such as the Barro (1999) misery index, which incorporates interest rates and Gross Domestic Product (GDP) growth rate into the mix. Hufbauer, Kim, and Rosen (2008) and Barro (1999) work on assessing the index in various nations. Since then, the index has become a key indicator of economic livelihood in many nations, and policymakers use it to steer policy (Cohen, Ferretti, & McIntosh, 2014). The index, in general, is a vector variable with magnitude and direction that is generally triggered by the size and direction of unemployment, growth rate, and inflation at any particular point in time.

To the best of our knowledge, no documented empirical evidence of the calculated misery index exists in Nigeria. However, in conversations and policy debates, a combination of the degree of inflation and unemployment has been often used as a mirror to evaluate the level of misery. This too simplified technique to calculating the misery index may remove essential information relevant to effective policymaking in Nigeria and may be deceptive (Tule, Egbuna, Dada, & Ebuh, 2017). Cohen et al. (2014) contend that a dynamic approach to generating the misery index based on output, unemployment, and inflation varies from Okuns' proposal because it includes more elements and can discriminate between short-run and long-run problems; along with being regarded to be a superior signal of recession as opposed to expansion.

This study sees misery index in line with Okun’s view as an aggregation of unemployment rate and the rate of inflation in Nigeria. The choice of this measure is due to the fact that we will control our model with the monetary policy rate and the GDP growth rate which could have already been a component of the misery index if we employ the Cohen et al. (2014) approach.

The role of monetary policy centres on ensuring full employment, ensuring price stability, promoting economic growth, and the achievement of a favourable balance of payments (Jhingan, 2007). These objectives (especially price stability and full employment) are crucial in the monitoring of the level of economic misery experienced by the citizens of the country. This is because any policy action by the monetary authority will have a substantial influence on these variables given the effect it will have on the price level. Without a doubt, a country's monetary policy influences both the direction and amount of credit in the economy. As a result, the importance of sound and successful monetary policy cannot be overstated. It is sufficient to note that many monetary authorities have continued to monitor the success of their respective country's monetary policy, mostly due to the perceived role it plays in ensuring good economic growth (Okorafor, 2010).

Recent trend in the variables capturing economic misery indicates a rising trend in both the rate of unemployment and the inflation rate. While the rate of unemployment was reported to be 3.86% in 2006 against 4.12% in 1991, the rate has grown substantially in recent times up to 8.39% and 9.79% in 2017 and 2021 respectively based on the ILO estimates. But for the old national estimate, unemployment in the fourth quarter of 2020 was put at 33.3%. The rate of inflation also follows a similar rising trend in recent periods as it stood at 57.17% in 1993 against 13.01% in 1991. This was followed by a continuous increase to the tune of 72.84% in 1995 before declining sharply and recording a single-digit of 8.53% in 1997, 6.62% and 6.93% for 1999 and 2000 respectively. The economy was returned to a double-digit inflation for five consecutive years, averaging 15.73% between 2001 and 2005 before a single digit of 8.23% and 5.39% were recorded in 2006 and 2007 respectively. Within 2008 and 2012, the rate of inflation returned to a double-digit averaging 12.18% before returning to a single-digit within 2013 and 2015 averaging 8.52%. Thereafter, the rate of inflation has maintained a double-digit reaching 15.50% in 2021 and averaging 14.07% between 2016 and

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2021. Recent statistic has shown that the rate of inflation stood at 18.60% in the second quarter of 2022 as against 17.71% in the first quarter.

The Central Bank of Nigeria (CBN) has been putting forth different monetary policy stance depending on the targets, as captured by the changing monetary policy rate over the years. The CBN employed a tight monetary policy within 1991 and 1993 as captured by the rising monetary policy rate (MPR) from 15.50% in 1991 to 17.50% in 1992 before raising it further to 26.00% in 1993. This was followed by an easy monetary policy stance which was maintained at 13.50% from 1994 through 1998, before a policy change to 18.00% and 20.50% was recorded for 1999 and 2001 respectively. Thereafter, the CBN has been embarking on a continuous easy monetary policy stance as captured by the declining MPR from 15.00% in 2003 to 9.50% and 6.25% for 2007 and 2010 respectively. Though the MPR has never returned to a single-digit since 2010, the MPR has been staggering between 11% and 14% within 2011 and 2021, with 11.50% recorded as at 2021.

Table 1 captures the behaviour of the rate of inflation, unemployment rate, and monetary policy rate in Nigeria for the period 1991 through 2021.

Table 1. Unemployment, inflation, monetary policy rate in Nigeria, 1991 – 2021.

Year	Unemployment Rate (%)	Inflation Rate (%)	Monetary Policy Rate (%)	Year	Unemployment Rate (%)	Inflation Rate (%)	Monetary Policy Rate (%)
1991	4.122	13.007	15.500	2007	3.837	5.388	9.500
1992	4.089	44.589	17.500	2008	3.819	11.581	9.750
1993	4.102	57.165	26.000	2009	3.796	12.555	6.000
1994	4.085	57.032	13.500	2010	3.778	13.720	6.250
1995	4.061	72.836	13.500	2011	3.770	10.840	12.000
1996	4.027	29.268	13.500	2012	3.742	12.218	12.000
1997	4.015	8.530	13.500	2013	3.700	8.476	12.000
1998	3.999	9.996	13.500	2014	4.560	8.062	13.000
1999	3.990	6.618	18.000	2015	4.310	9.009	11.000
2000	3.954	6.933	14.000	2016	7.060	15.675	14.000
2001	3.935	18.874	20.500	2017	8.390	16.524	14.000
2002	3.882	12.877	16.500	2018	8.456	12.095	14.000
2003	3.899	14.032	15.000	2019	8.530	11.397	13.500
2004	3.876	14.998	15.000	2020	9.714	13.200	11.500
2005	3.871	17.863	13.000	2021	9.788	15.500	11.500
2006	3.856	8.225	10.000				

Source: Central Bank of Nigeria (2021).

Given the data on inflation and unemployment captured in Table 1, we can easily compute the level of economic misery (the sum of unemployment rate and inflation rate) in Nigeria. While economic misery was 17.13% in 1991 before growing sharply to 76.90% in 1995, the following periods were marked with a declining misery index up to 10.89% in 2000 before an increase sets in averaging 18.36% between 2001 and 2006. Though some decline was recorded thereof to the tune of 9.23% and 12.62% for 2007 and 2014 respectively, subsequent years has been marked with a rising trend up to 25.29% as at 2020. Figure 1 captures this behaviour plotted along with the monetary policy rate in the respective periods.

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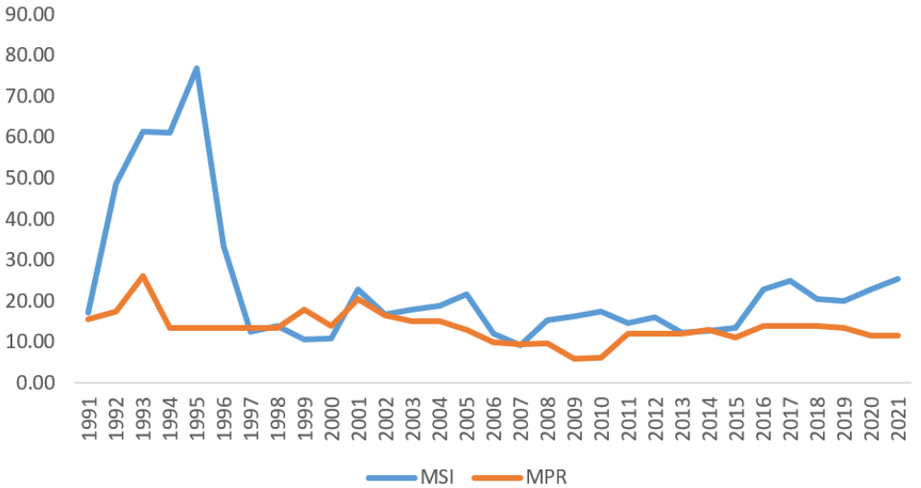

Figure 1. Trend of misery index (MSI) and monetary policy rate (MPR).

It is clear from Figure 1 that both the misery index and the monetary policy rate seems to move in the same direction. Recent statistics has revealed that the misery index reached 62.79% in July 2022 as against 59.4% in December 2021 (note: This rate utilizes the Old unemployment data based on national estimates rather than the ILO modelled estimates). This rise in the index is attributed to a rise in the inflation rate to 18.6%, a rise in the unemployment rate to 33.3%, a rise in the lending rate to 14%, and an economic growth rate of 3.11% recorded in the period. With the Central Bank of Nigeria's adjustment of the monetary policy rate from 13% in the second quarter of 2022 to 14% in the third quarter of 2022 to tackle inflation, could this effectively tackle the rising economic misery in Nigeria? It is in this regards that this paper seeks to investigate the influence of monetary policy on economic misery in Nigeria from 1991 through 2021. The specific objectives are listed as follows:

i. To detect the nature of causal relationship amid economic misery, monetary policy rate, economic growth, import growth, and foreign direct investment inflow.
ii. To investigate the influence of monetary policy rate on economic misery in Nigeria.
iii. To ascertain the response of economic misery to monetary policy shocks in Nigeria.

Economic misery being the dependent variable is measured as the sum of unemployment rate and inflation rate, while monetary policy is represented by the monetary policy rate. The rationale behind the study is centred on the rising inflation and unemployment coupled with the recent increase in the monetary policy rate to 14% by the Central Bank of Nigeria.

2. Literature Review

2.1 Monetary Policy and Macroeconomic Objectives

The view that factors affecting monetary policy could have an impact on the price level stems from the monetarist assumption that inflation is always a monetary event. The Fisher's quantity theory of money, which expresses the amount of money in circulation as being proportionate to the price level, may be used to explain this. Mankiw (2010) asserts that nations with high rates of money growth also likely to have high rates of inflation. This is in line with the quantity theory, which states that an increase in the money growth rate of 1% results in a rise in inflation of 1%. It has also been verified that monetary policy does affect both the actual and the natural rate of unemployment (Blanchard, 2003). In an economy, Maqrobi and Pujiatu (2011) contends that inflation and economic growth are linked. High inflation rates can inhibit economic growth; conversely, relatively moderate and steady inflation rates might promote economic growth. Similar to how rapid economic growth may boost inflation, so can aggregate demand. Once a change in the policy rate is conveyed to bank interest rates, which eventually affect a combination of domestic demand, investment, and production, monetary policy is regarded as being effective (Said, 2018).

The Central Bank must continuously make sure that its monetary policy framework is credible and transparent given the impact of inflation expectations on the trajectory of the aggregate unemployment rate

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compared to the natural rate. As it does so more frequently, inflation expectations are more likely to reach the inflation target quickly and to stay there going forward. Debelle (1998) estimations of the natural rate differed, in part because they made differing assumptions regarding inflation expectations. For the reason that Crosby and Olekalns (1998) believe that inflation expectations have, on average, equalled actual inflation and that the natural rate must, on average, resemble the actual unemployment rate, they arrive at such a high estimate of the natural rate. Debelle (1998) estimate, in contrast, takes into account the fact that inflation has consistently lagged behind their gauge of inflation expectations for the majority of the 1990s, and as a result, their estimate of the natural rate has consistently lagged behind the actual unemployment rate.

2.2. Monetary Policy and Inflation

In Pakistan, Gul, Mughal, and Rahim (2012) investigated the effects of monetary instruments on macroeconomic variables such inflation, interest rates, real GDP, exchange rates, and money supply. The link between the aforementioned factors was examined using Ordinary Least Squares (OLS) for 1995 through 2010. The study's findings revealed a high positive association between money supply and inflation but a weak negative correlation between money supply and output. The Pakistani economy is negatively impacted by exchange rates. Inflation is often reduced by tightening monetary policy, but in Pakistan's situation, a positive interest rate shock (contractionary monetary policy) caused a rise in price level.

Onwachukwu (2014) studied the necessity of using monetary policy to control inflation using Nigerian data for the period 1970 through 2010. With the OLS approach in use, it was revealed that bank rate, deposit with the central bank, liquidity ratio, and broad money supply all put forth a significant effect on the rate of inflation.

Ngerebo-A (2016) looked at the efficacy of monetary policy in reducing inflation in Nigeria. OLS was used to analyze and test relationships between various variables for data from 1985 to 2012. The study found that while the growth of the broad money supply, credit to the private sector, the growth of the narrow money supply, and the savings rate were statistically substantial in elucidating inflation in Nigeria, “the monetary policy rate, maximum lending rate, prime lending rate, net domestic credit, and treasury bill rate were not statistically momentous”.

For the Kenyan economy, Said (2018) explored the effect of monetary policy on inflation. It was recorded that a significant relationship between monetary policy and inflation exists, leading to the conclusion that monetary policy affects inflation.

The study by Silvia and Nugraha (2020) was geared towards analysing the effect of monetary policy on inflation in Indonesia. The study utilized the two-stage least squares approach to simultaneous equation estimation. The result indicated that the effect of money supply and it lagged values on inflation has been positive and significant within the period under review.

In Nigeria between 1985 and 2019, Henry and Sabo (2020) investigated the effects of monetary policy management on inflation. Time series data for the period were analyzed using autoregressive distributed lag approach. It was discovered that while the monetary policy rate and the foreign exchange rate had a negative influence on inflation, the broad money supply had a positive impact. The research thus suggested that monetary authorities set the exchange rate at a level where the value of the naira will increase.

2.3. Monetary Policy and Unemployment

The unemployment and monetary policy experiences in Sweden were examined by Alexius and Holmlund (2007). The study found that about 30% of the changes in unemployment were brought on by shocks to monetary policy using a structural VAR. The affects last quite a while as well. In the recommended model, after 10 years, roughly 30% of a shock's maximal impact is still present (Alexius & Holmlund, 2007).

For the years 1980 to 2010, Loganathan, Yussof, and Kogid (2012) examined the dynamic integration of monetary shock and overall unemployment in Malaysia. Numerous unit root tests, the Gregory-Hansen cointegration test, the VECM, and the Granger causality test were used in the study while taking the likelihood of a structural break into account. The findings indicate a structural rupture around the middle of the 1990s, with monetary shock and unemployment co-integrating over the long term. Between the two variables, there was no causal relationship, nevertheless.

Using a panel data analysis that considers structural breaks and cross-section dependence, Göçer (2013) scrutinized “the liaison concerning changes in money supply with regards to aggregate lending of the banking

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sector and unemployment in 14 chosen European Union countries for the 1980 through 2012 era". According to the data, these countries' lower unemployment rates can be attributable to an increase in lending.

In Nigeria, Essien et al. (2016) used a vector autoregressive (VAR) framework to evaluate the relationship between monetary policy and unemployment over the years 1983 Q1 to 2014 Q1. The findings demonstrate that over a period of 10 quarters, a positive shock to the policy rate increases unemployment. A dynamic link between monetary policy and unemployment in Nigeria is further implied by the fact that all the variables utilized as proxies in the model jointly cause unemployment.

In 36 advanced and emerging nations, Dedola, Rivolta, and Stracca (2017) examined the global spillovers of US monetary policy shocks on a variety of macroeconomic and financial variables. The findings demonstrated that unexpected United States (US) monetary tightening causes devaluation against the dollar, a decline in industrial production and real GDP, and an increase in unemployment in the majority of nations. Particularly in developed economies, inflation reduces.

From the first quarter of 1983 through the second quarter of 2018, Zhou (2021) researched the connection between monetary policy and unemployment in the US. Based on the occurrence of the global financial crisis of 2008, data were gathered and afterwards separated into two categories, ex-crisis and post-crisis. The idea of unemployment degree was added to the original Taylor's rule, which was expanded for the study. The findings imply that the unemployment gap degree does have a beneficial influence on the Fed interest rate in both eras and does so consistently. As a result, in order to pull the domestic economy out of recession, Central Banks should implement a lax monetary policy.

It is clear from the above that the literature reviewed has not captured a cohesive analysis on the influence of monetary policy of the economic misery. This study is channelled to filling the observed gap and to contribute to the existing body of knowledge.

3. Methodology

3.1. Model Specification and a priori Expectation

The misery index (M_t) is obtained by summing current unemployment rate (μ_t) and the current absolute inflation rate (π_t), thus:

$$M_t = \mu_t + |\pi_t| \quad (1)$$

where π_t denotes the percentage change of the consumer price index, conveyed in absolute value, due to the hitches connected with deflation (Lovell & Tien, 2000).

The model for this study is specified in terms of key variables that are likely to influence economic misery. Apart from the core variable of interest which is the monetary policy rate, other key control variables considered include growth in import, economic growth, and net foreign direct investment inflow. Based on this, the model for the study is specified thus;

$$MSI = f(MPR, IMP, GRT, FDI) \quad (2),$$

Of which:
MSI = economic misery captured by the misery index.
MPR = monetary policy rate (%).
IMP = growth in import (%).
GRT = economic growth (%).
FDI = net foreign direct investment inflow (% of GDP).

Equation 2 after being transformed to a form amendable for estimation, and accounted for other variables not captured in the model (μ) becomes:

$$MSI = \xi_0 + \xi_1 MPR + \xi_2 IMP + \xi_3 GRT + \xi_4 FDI + \mu \quad (3)$$

Where the variables are as earlier defined, ξ_0 is the constant of the regression function, and ξ_1 to ξ_4 are the parameters to be estimated.

With respect to the a priori expectation of the coefficients, it is expected that $\xi_1 \neq 0, \xi_2 > 0; \xi_3 < 0$; and $\xi_4 < 0$. Meanwhile, we are not sure of the sign of the ξ_1 hence, $\xi_1 = ?$. This therefore creates the gap since ξ_1 can either be positive or negative depending on the influence of monetary policy rate on either of inflation or unemployment. While an increase in monetary policy rate is expected to reduce inflation, such increase can hinder intensify unemployment. Thus, the net effect on the overall economic misery will be dependent on the weight of such policy stance on inflation or unemployment.

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3.2. Technique of Analysis

The study utilizes different techniques given the nature of the objectives to be achieved. the study proceeds from the Granger causality test to the unit root test and cointegration before advancing to the long-run estimation and impulse response function along with the variance decomposition.

3.2.1. Unit Root Test

The unit root test for the stationarity of the time series variables is done with the aid of the Augmented Dickey-Fuller (ADF) unit root test approach. Time series must be stationary at first difference I(1) or above if the results of a particular test (Dickey-Fuller) for them demonstrate that they are non-stationary at level I(0). By including several lagged dependent variables, the Augmented Dickey-Fuller test may be utilized to eliminate the issue of autocorrelation between data (Popescu & Diaconu, 2022). The following equations can be used to represent the specific version of the regression function employed in the ADF test:

$$\Delta MSI_t = \emptyset + \gamma MSI_{t-1} + \sum_{i=1}^{p} \beta_i \Delta MSI_{t-j} + \varphi t + \varepsilon_i \quad (4)$$

$$\Delta MPR_t = \emptyset + \gamma MPR_{t-1} + \sum_{i=1}^{p} \beta_i \Delta MPR_{t-j} + \varphi t + \varepsilon_i \quad (5)$$

$$\Delta IMP_t = \emptyset + \gamma IMP_{t-1} + \sum_{i=1}^{p} \beta_i \Delta IMP_{t-j} + \varphi t + \varepsilon_i \quad (6)$$

$$\Delta GRT_t = \emptyset + \gamma GRT_{t-1} + \sum_{i=1}^{p} \beta_i \Delta GRT_{t-j} + \varphi t + \varepsilon_i \quad (7)$$

$$\Delta FDI_t = \emptyset + \gamma FDI_{t-1} + \sum_{i=1}^{p} \beta_i \Delta FDI_{t-j} + \varphi t + \varepsilon_i \quad (8)$$

Equation 4 through Equation 8 captures the unit root test model with a constant and trend assumption for misery index (MSI), monetary policy rate (MPR), import growth (IMP), economic growth (GRT), and foreign direct investment net inflow (FDI) respectively. In this case, the variables are as earlier defined, $\emptyset$ is the drift term, t denotes the time trend and p is the largest lag length used. The equation has both intercept and trend. The value for p (number of lags) can be determined by making reference to some commonly produced information criteria such as the Akaike Information Criterion (AIC), Schwarz-Information (SIC) Criteria or Hannan and Quinn Information Criterion (HIC). The most stable method is AIC.

3.2.2. Granger Causality Test

Analysis of the direction of the short-term relationship between variables may be done using Granger causality. If P can be predicted more accurately using both the histories of Q and P than it can when using only the history of P, we claim that a variable Q Granger causes P.

Regression analysis of P on its own lagged values and on lagged values of Q is the approach most frequently used to assess Granger causality. This method also tests the null hypothesis that the estimated coefficients on the lagged values of Q are all zero. If the null hypothesis is accepted, Q does not have Granger causality with respect to P (Q does not Granger-cause P) (Granger, 1969). Therefore, having two variables Q and P, we first regress y on P lags without Q lags, meaning that we construct the restricted model:

$$P_t = \delta_1 + \sum_{i=1}^{m} \rho_j P_{t-i} + \epsilon_t \quad (9)$$

Subsequently, we add the Q lags and we regress again, which represents the unrestricted model:

$$P_t = \delta_1 + \sum_{i=1}^{n} \varphi_i Q_{t-i} + \sum_{i=1}^{m} \rho_j P_{t-i} + \epsilon_t \quad (10)$$

And

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$$Q_t = \delta_1 + \sum_{i=1}^{n} \varphi_i Q_{t-i} + \sum_{i=1}^{m} \rho_j P_{t-i} + \epsilon_t \qquad (11)$$

Lastly, the null hypothesis that $\varphi_i = 0\ \forall i$ and $\rho_j = 0\ \forall j$ is being tested for Equation 10 and Equation 11 respectively by using the F test.

3.2.3. Bounds Test for Cointegration and Levels Estimation

The Bounds test for cointegration is conducted based on the autoregressive distributed lag (ARDL) approach to detect the existence of levels relationship among the variables. Upon detection of cointegration, the estimation of the levels coefficients is also conducted using the ARDL framework since the framework can facilitate the estimation of both the short-run and the long-run estimates of the model.

3.2.4 Impulse Response Function and Variance Decomposition

With the aid of the Vector Autoregression (VAR) approach, the impulse response function is obtained to detect how the variables responds to innovations in the other variables. The variance decomposition also facilitates the detection of the proportion of the forecasted error variances that is being associated with a given variable.

3.3. Sources of Data

The data, which are time series in nature, covers the period of 1991 through 2021 and were gotten from the Central Bank of Nigeria (2021) statistical bulletin and the World Bank (221) database focusing on world development indicators. The data used for the construction of the misery index (unemployment rate and inflation rate) along with GDP growth, and FDI inflow were all obtained from the world Bank database while data on monetary policy rate and import were gotten from the Central Bank of Nigeria statistical bulletin.

3.4. Measurement of Variables

The economic misery is measured by the misery index. The misery index is measured as the sum of unemployment rate and the rate of inflation. Given that the unemployment rate in 2021 was 9.79% (ILO modelled) and the rate of inflation in the same period was 15.50%, then the misery index was 25.29% (i.e., 9.79% + 15.50%). The monetary policy rate (MPR) is measured in percentages, with higher values indicating a tight monetary policy stance and a smaller value portraying an easy monetary policy stance. The MPR reflects the three market rates (prime lending rates, the interbank rates and the Treasury Bills rate) constituting the lending pathways of Deposit Money Banks as they change directly with a change in the MPR (Ndekwu, 2013). Import growth is measured in percentages as an annual growth rate of total imports. Economic growth is measured in percentages as an annual growth in the real gross domestic product; and net foreign direct investment inflow is measured in percentage as a proportion of GDP.

4. Empirical Findings

4.1 Descriptive Measures

The variables captured include economic misery (MSI), monetary policy rate (MPR), import growth (IMP), economic growth (GRT), and net foreign direct investment inflows. Table 2 captures the descriptive statistics of these variables for the 31 years' data spanning from 1991 through 2021.

In line with Table 2, MSI is observed to have a mean of 23.228% with a standard deviation of 16.430%. The distribution of MSI is positively skewed given the skewness coefficient of +2.025, implying an elongated distribution on the right side of the tail. Also, the distribution is leptokurtic given that the its coefficient of kurtosis (6.172) is greater than 3. The distribution being positively skewed and leptokurtic is not normally distributed as portrayed by the 1% significance of the Jarque-Bera statistics where $p<0.005$.

Monetary policy rate averaged 13.50% having a standard deviation of 3.797%, and the distribution is also positively skewed given the +0.921 coefficient of skewness. Since the coefficient of kurtosis being 5.665 is greater than 3, the distribution is therefore leptokurtic and is not normally distributed as the Jarque-Bera statistic is significant at 5% level. Similar case of a positively skewed distribution plus being leptokurtic can be observed in the case of import demand (IMP) which is also not normally distributed as the Jarque-Bera

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statistic is also significant at the 1% level. Meanwhile, IMP averaged 30.551% with a standard deviation of 67.051% and having 363.869% and -25.492% as the maximum and minimum values respectively.

Table 2. Series' descriptive statistics.

Descriptive Components	MSI	MPR	IMP	GRT	FDI
Mean	23.228	13.500	30.551	4.068	1.642
Median	17.498	13.500	13.970	4.205	1.552
Maximum	76.896	26.000	363.869	15.329	5.790
Minimum	9.225	6.000	-25.492	-2.036	0.195
Std. Dev.	16.430	3.797	67.051	3.867	1.220
Skewness	2.025	0.921	4.128	0.482	1.781
Kurtosis	6.172	5.665	21.110	3.646	6.544
Jarque-Bera	34.205	13.562	511.751	1.744	32.627
Probability	0.0000	0.0011	0.0000	0.4181	0.0000
Observations	31	31	31	31	31

Economic growth (GRT), measured as the growth rate of real GDP, averaged 4.068% with a standard deviation of 3.867% and maintaining a maximum and minimum values of 15.329% and -2.036% respectively. The distribution has a long tail to the right which portrays a positively skewed distribution as reflected by the positive skewness coefficient of +0.482. Meanwhile, the distribution is leptokurtic since the coefficient of kurtosis (3.646) is greater than 3. However, the distribution is normal given that the Jarque-Bera statistic is not statistically significant. Lastly, FDI averaged 1.642% with a standard deviation of 1.220 away from the mean. The distribution is also leptokurtic and positively skewed, with a distribution that is not normal.

4.2 Correlation Analysis

Though correlation does not in any way imply causation, detecting the correlation among the variables is of importance since it will give us an idea on the behaviour of two variables, along with helping in detection of multicollinearity. Table 3 captures this behaviour among the variables.

Table 3. Correlation result.

Variables	MSI	MPR	IMP	GRT	FDI
MSI	1				
MPR	0.401	1			
IMP	0.546	0.036	1		
GRT	-0.452	-0.287	-0.154	1	
FDI	0.405	0.222	-0.118	-0.016	1

Table 3 indicates that while MPR, IMP, and FDI correlates positively with MSI, GRT has a negative correlation with MSI. It follows that as MPR, IMP, and FDI increases/decreases, MSI also increases/decreases. However, as GRT increases/decreases, MSI decreases/increases. Thus, there exist a direct relationship between: MPR and MSI; IMP and MSI; and FDI and MSI, while an inverse relationship exists between MSI and GRT.

The positive correlation between MSI and IMP seems to be the highest followed by the negative correlation with FDI. With the MPR being our core variable of interest, the scatter diagram capturing correlation between it and MSI is given in Figure 2 where it is observed that the two variables move in the same direction.

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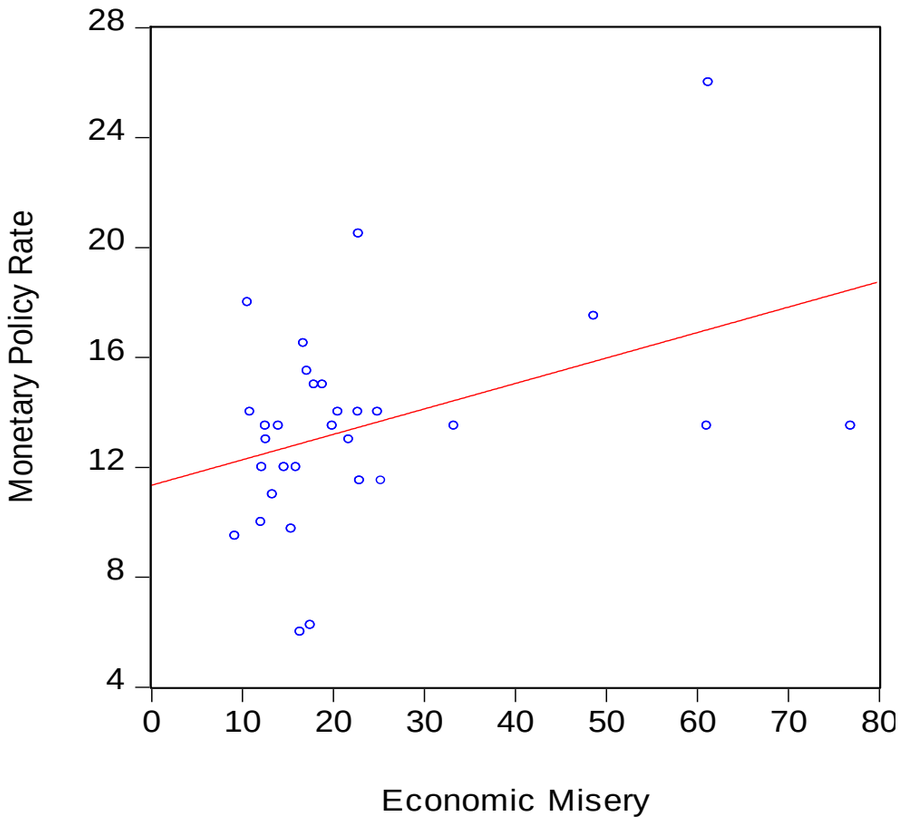

Figure 2. Scatter plot of the relationship between economic misery and monetary policy rate.

It is clear that due to the widespread scatter in the scatter plot, the correlation is likely to be fairly high as reflected in the +0.4006 correlation coefficient.

The explanatory variables exhibit no form of multicollinearity among them as none of them has a correlation coefficient that is ± 0.800 or above. For instance, the correlation coefficient between: MPR and IMP is +0.036 (very weak positive); MPR and GRT is -0.287 (very weak negative); MPR and FDI is 0.222 (very weak positive); IMP and GRT is -0.154 (very weak negative); IMP and FDI is -0.118 (very weak negative); and GRT and FDI is -0.016 (very weak negative). As such, our model is free from any form of multicollinearity problem.

4.3. Granger Causality Test

Apart from detecting the direction of the relationship between variables, we can also detect if a variable causes the other. Table 4 captures the result of the Granger causality test of the key variables of interest.

Table 4. Granger causality test result.

Null Hypothesis:	Observations	F-Statistic	Probability
MPR does not Granger Cause MSI	29	5.106	0.014**
MSI does not Granger Cause MPR		0.923	0.411
IMP does not Granger Cause MSI	29	17.353	0.000***
MSI does not Granger Cause IMP		12.488	0.000***
GRT does not Granger Cause MSI	29	0.302	0.742
MSI does not Granger Cause GRT		0.054	0.947
FDI does not Granger Cause MSI	29	9.423	0.001**
MSI does not Granger Cause FDI		3.656	0.041**

Note: The significance at 1% and 5% is given by *** and ** respectively.

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The Granger causality test result so presented in Table 4 reflects that a unidirectional causality flows from MPR to MSI, implying that it is only monetary policy rate that causes economic misery and not the other way round. Also, a bidirectional causality flows between IMP and MSI. This follows that the two variables cause each other. No causality is reported to exist between GRT and MSI. Lastly, a bidirectional causality also flows between FDI and MSI. This points to the facts that the two variables do cause each other.

4.4. Stationarity Test

Detecting the time series properties of the variables in of importance in order to ascertain the appropriate technique of estimation. Table 5 reflects on the stationarity test result of the Augmented Dickey-Fuller (ADF) unit root test which is conducted under the constant and trend assumption.

Table 5. Stationarity test result.

Variables	Levels I(0)	First Difference I(1)	Order of Integration
MSI	-2.427 (0.359)	-5.095 (0.002)**	I(1)
MPR	-3.452 (0.063)	-7.649 (0.000)***	I(1)
IMP	-7.065 (0.000)***	-------	I(0)
GRT	-2.805 (0.207)	-7.508 (0.000)***	I(1)
FDI	-3.857 (0.028)**	---------	I(0)

Note: The significance at 1% and 5% is given by *** and ** respectively.

With the probabilities being enclosed in the brackets, Table 5 captures the unit root test result of the variables. It is clear that only import growth (IMP) and net foreign direct investment inflows (FDI) were stationary at levels, I(0). All other variables in the model (MSI, MPR, and GRT) only become stationary after first difference hence, they are all I(1) variables. It is clear in this regards that since the variables are not all stationary at levels, the need to check for long-run relationship arises and the appropriate approach for I(0) and I(1) order of integration is the ARDL bounds test for levels relationship.

4.5. ARDL Bound Test for Levels Relationship

As stated earlier, we could be interested in determining the existence of long-run (equilibrium) relationship as the variables are not all stationary at levels. Table 6 captures the test result.

Table 6. Result of the ARDL bounds test for cointegration.

Test Statistic	Value	Significance	Lower Bound I(0)	Upper Bound I(1)
F-statistic	10.711	10%	2.200	3.090
k	4	5%	2.560	3.490
		2.5%	2.880	3.870
		1%	3.290	4.370

It is expected that for cointegration to exists, the F-statistic must be outside the 5% upper and lower bounds. As Table 6 clearly indicates, the F-statistic of 10.711 is outside the 5% upper bounds (3.490) and lower bounds (2.560) values. This portrays a clear evidence of the existence of cointegration among the variables. Thus, a long-run relationship exists between monetary policy rate and economic misery in Nigeria. With the existence of the levels relationship, we therefore proceed to estimate the long-run estimates of the model.

4.6. Long-Run Regression Analysis

In examining the influence of monetary policy rate on economic misery in Nigeria, Table 7 captures the result.

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Table 7. ARDL levels equation - restricted constant and no trend.

Variables	Coefficient	Standard Error	t-Statistic	Probability
MPR	1.164	0.531	2.191	0.039**
IMP	0.163	0.031	5.215	0.000***
GRT	-2.063	0.563	-3.663	0.001**
FDI	6.914	1.597	4.329	0.000***
C	0.419	8.369	0.050	0.961
EC = MSI - (1.164MPR + 0.163IMP -2.063GRT + 6.914FDI + 0.419)				

Note: The significance at 1% and 5% is given by *** and ** respectively.

The long-run estimates of our model as presented in Table 7 reveals that MPR, IMP, and FDI all put forth a positive and significant long-run effect on economic misery in Nigeria. The implication here is that if MPR, IMP, and FDI increases/decreases, economic misery also increases/decreases in a significant manner. A 1% increase in monetary policy rate is associated with a 1.164% increase in economic misery on the average; while a 1% increase in import growth will cause a 0.163% increase in economic misery. Also, a 1% increase in FDI will put forth a 6.914% increase in economic misery in Nigeria. The reverse is the case of economic growth where we observed a negative and significant influence of the variable on economic misery. Thus, an increase in economic growth will likely reduce the economic misery through reduction in unemployment. A 1% increase in economic growth is associated with a 2.063% decrease in economic misery.

It could be expected that monetary policy should be able to avert the economic misery of the nation by ensuring price stability and intensifying full employment. However, our study has reported a positive effect of monetary policy on economic misery pointing to the fact that monetary policy has be exasperating economic misery in Nigeria. The observed positive and significant effect of monetary policy rate on economic misery can further be validated by examining the individual effect of MPR on inflation and on unemployment. This is because it is the sum of the two variables that gives the misery index. This is done using the fully modified ordinary least squares (FMOLS) regression. The results are as seen in Table 8 and Table 9.

Table 8. Fully modified OLS result for MPR and inflation (INF) relationship.

Variables	Coefficient	Standard Error	t-Statistic	Probability
INF(-1)	0.703	0.077	9.103	0.000***
MPR	0.793	0.344	2.305	0.029**
C	-6.118	4.614	-1.326	0.196
R-squared	0.673	Adjusted R-squared		0.647

Note: The significance at 1% and 5% is given by *** and ** respectively.

As can be seen in Table 8, monetary policy rate is observed to put forth a positive and significant effect on the rate of inflation, with a 1% increase in MPR being associated with a 0.793% increase in the rate of inflation. it follows that the current rate of MPR was not sustainable in curbing inflation in Nigeria, hence the need for a contractionary monetary policy. Also, the previous years' value of inflation is observed to put forth a positive and significant influence on current rate of inflation by increasing the current rate of inflation by 0.703%.

For the case of unemployment, Table 9 reflects on the effect of MPR on unemployment (UNM) in Nigeria.

Table 9. Fully modified OLS result for MPR and unemployment relationship.

Variables	Coefficient	Standard Error	t-Statistic	Probability
UNM(-1)	1.051	0.050	20.84	0.000***
MPR	-0.001	0.023	-0.030	0.976
C	-0.122	0.407	-0.299	0.768
R-squared	0.909	Adjusted R-squared		0.902

Note: The significance at 1% given by ***.

From the result presented in Table 9, we realized that the past value of unemployment put forth a positive and significant effect on the current rate of unemployment by increasing it by 1.0514% on the average.

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Meanwhile, monetary policy is seen to wield a negative but insignificant influence on the rate of unemployment in Nigeria. This means that though the MPR has been put forth to reduce the rate of unemployment, its effect has not been substantial in that regards.

From Table 8 and Table 9, we can see that MPR which has been reducing up to 11.50% in 2021 (an indication of an expansionary monetary policy) has been steering inflation significantly and the intended purpose of such policy in reducing unemployment has not been significant. Thus, the misery index will increase given these circumstances. This proves why the MPR has been having a positive and significant influence on the economic misery in Nigeria.

4.7. Impulse Response Function

To construct the impulse response function portraying the response of the variables to shocks, the Vector Autoregressive (VAR) basic model is estimated and the impulse graphs are being created. Figure 3 captures the impulse response function. For example, the first line on the top of the graph shows the response of MSI to shocks in MPR, IMP, GRT, and FDI. Thus, MSI is the response variable while MPR, IMP, GRT, and FDI are the shock variables.

It can be observed that economic misery responds quickly to shocks in MPR in the short run. As such, it can be adduced that MSI respond quickly in the short-run to policies geared towards reducing unemployment and the rate of inflation. It is observed that the response in all the period has been positive which portrays the direct link between economic misery and monetary policy rate. Meanwhile, it can be seen that the effect dies off during the long run as the response converges to the baseline right from period 9.

Also, the impulse response function shows that economic misery responds quickly to shocks in import growth in the short run. As such, short-run policies geared towards reducing import growth will reduce economic misery. The response is negative from Period 1 up to Period 5 portraying the inverse link between economic misery and import growth. In the long-run, such effect dies off as the response line returns to the base line throughout Period 6 through Period 10.

For the response of economic misery to short-run shocks in economic growth, MSI responds a bit slowly to shocks in economic growth. From period 1 to Period 3, the response has been negative pointing to the fact that policies geared towards increasing productivity will reduce unemployment and inflation which will hitherto reduce the economic misery. This therefore proves the negative effect of economic growth on economic misery. Meanwhile, the effect dies off in the period 4 through Period 5 before maintaining a very slow negative response in the long-run.

The response of economic misery to the short-run shocks in FDI is observed to be a quick one. The effect has been positive from Period 1 through Period 4, pointing to the direct link between economic misery and net FDI inflow. As such, economic misery will respond positively to policies geared towards increasing financial liberalization and such policies will likely increase inflation and unemployment which are the core measures of economic misery. In the long-run, the effect dies off as the response line converges to zero from Period 5 through Period 10.

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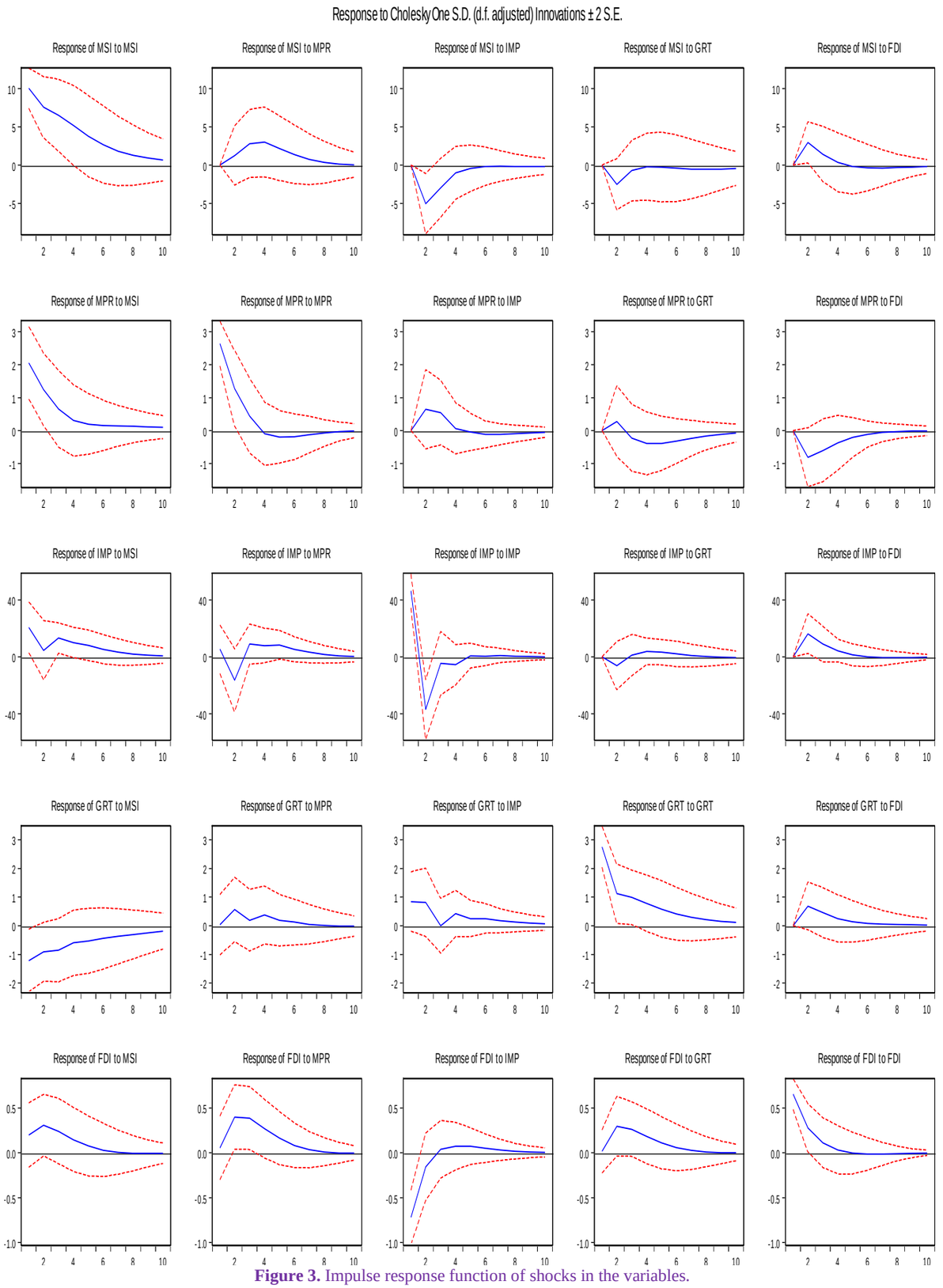

Figure 3. Impulse response function of shocks in the variables.

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4.8 Variance Decomposition

With the variance decomposition, we are able to captures how much of the forecasted error variance in economic misery is being explained by the shocks in the explanatory variables both in the short run and in the long-run. Table 10 captures the proportion of the forecasted error variance of MPR on economic misery.

Table 10. The variance decomposition of monetary policy rate (MPR).

Variance Decomposition of MPR:						
Period	**S.E.**	**MSI**	**MPR**	**IMP**	**GRT**	**FDI**
1	3.349	37.764	62.236	0.000	0.000	0.000
2	3.941	37.156	55.431	2.701	0.504	4.209
3	4.107	36.771	52.204	4.224	0.760	6.040
4	4.155	36.462	51.059	4.150	1.629	6.699
5	4.188	36.118	50.473	4.094	2.468	6.847
6	4.210	35.873	50.149	4.130	3.005	6.843
7	4.223	35.772	49.942	4.174	3.293	6.820
8	4.230	35.748	49.808	4.211	3.431	6.801
9	4.234	35.759	49.724	4.232	3.495	6.790
10	4.236	35.778	49.673	4.241	3.524	6.784

In the short-run, it can be observed that, in Period 1 for instance, that MPR accounts for 37.76% of the total forecasted error variance of economic misery. This continues to decline over time (the effect decomposing or dying off) till it reaches about 35.78% in the long-run (Period 10).

For Table 11, the variance decomposition of import growth (GRT) on economic misery (MSI) is being captured.

Table 11. The variance decomposition of import growth (IMP).

Variance Decomposition of IMP:						
Period	**S.E.**	**MSI**	**MPR**	**IMP**	**GRT**	**FDI**
1	51.079	16.421	1.114	82.465	0.000	0.000
2	67.582	9.8361	6.575	76.991	0.864	5.734
3	70.182	12.677	7.728	71.801	0.826	6.969
4	71.769	14.068	8.573	69.252	1.079	7.029
5	72.806	14.919	9.665	67.307	1.246	6.864
6	73.205	15.259	10.065	66.577	1.309	6.790
7	73.367	15.399	10.218	66.301	1.318	6.765
8	73.414	15.452	10.251	66.219	1.317	6.762
9	73.430	15.472	10.255	66.192	1.317	6.764
10	73.436	15.480	10.254	66.181	1.320	6.765

In the short-run, it can be observed that, in Period 1 for instance, that IMP accounts for just 16.42% of the total forecasted error variance of economic misery which declined to 9.83613% in the second period before rising slightly to 12.677% in the third period. This this was followed by a continues increase over time till it reaches about 15.48% in the long-run (Period 10). This portrays an increasing effect of shocks on import demand on economic misery even in the long-run.

For the variance decomposition of economic growth (GRT), Table 12 captures the result thereof.

In the short-run, it can be observed that, in Period 1 for instance, that GRT accounts for about 15.021% of the total forecasted error variance of economic misery which rose to 19.849% in the third period before rising slightly to 21.147% in the fifth period. This was followed by a continues increase over time till it reaches about 22.795% in the long-run (Period 10). This portrays an increasing effect of shocks on economic growth on economic misery even in the long-run.

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Table 12. The variance decomposition of economic growth (GRT).

Variance Decomposition of GRT:						
Period	**S.E.**	**MSI**	**MPR**	**IMP**	**GRT**	**FDI**
1	3.131	15.021	0.011	7.286	77.682	0.000
2	3.653	17.273	2.415	10.314	66.446	3.552
3	3.913	19.849	2.350	8.990	64.340	4.471
4	4.081	20.389	2.997	9.342	62.780	4.493
5	4.171	21.147	3.075	9.304	62.050	4.424
6	4.226	21.685	3.087	9.428	61.448	4.352
7	4.257	22.136	3.053	9.457	61.047	4.307
8	4.275	22.449	3.028	9.473	60.770	4.280
9	4.286	22.661	3.013	9.472	60.590	4.264
10	4.293	22.795	3.004	9.469	60.477	4.255

Lastly, Table 13 captures the variance decomposition of foreign direct investment as it forecast economic misery in Nigeria.

Table 13. The variance decomposition of foreign direct investment (FDI).

Variance Decomposition of FDI:						
Period	**S.E.**	**MSI**	**MPR**	**IMP**	**GRT**	**FDI**
1	0.994	3.930	0.294	52.650	0.021	43.105
2	1.194	9.275	11.189	38.203	6.071	35.261
3	1.309	11.069	17.959	31.862	9.052	30.057
4	1.358	11.420	20.542	29.869	10.214	27.955
5	1.376	11.420	21.382	29.379	10.582	27.237
6	1.381	11.382	21.578	29.306	10.679	27.055
7	1.382	11.365	21.604	29.313	10.697	27.021
8	1.382	11.363	21.602	29.320	10.698	27.017
9	1.382	11.366	21.600	29.320	10.698	27.016
10	1.382	11.369	21.600	29.319	10.697	27.015

In the short-run, it can be observed that, in Period 1 for instance, that FDI accounts for only 3.9299% of the total forecasted error variance of economic misery which rose sharply to 11.069% in the third period before rising slightly to 11.420% in the fifth period. This was followed by a steady decline over time till it reaches about 11.369% in the long-run (Period 10). This portrays a decreasing effect of shocks on FDI on economic misery in the long-run.

In summary, the short run (Period 1) forecasted error variance in the variables shows that: MPR accounts for 37.764%; IMP accounts for 16.421%; GRT accounts for 15.0212%; and FDI accounts for 3.930% of the total forecasted error variance in economic misery, pointing to the fact that monetary policy accounted for the greatest proportion. In the long-run (period 10), the total forecasted error variance indicates that: MPR accounts for 35.778%; IMP accounts for 15.480%; GRT accounts for 22.795%; and FDI accounts for 11.369% of the total forecasted error variance in economic misery, pointing to the fact that monetary policy still accounts for the greatest proportion in the long-run. This proves the potency of monetary policy in curtailing economic misery in Nigeria.

4.9. Stability Test

The stability test is conducted using the Inverse Roots of the AR Characteristic Polynomial. This is captured in Figure 4.

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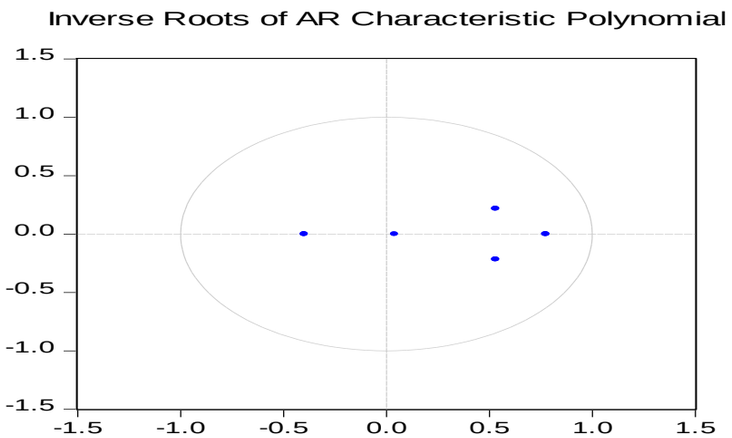

Figure 4. Inverse root of the Auto Regressive characteristic polynomial test for stability.

As no root lies outside the unit circle, the stability condition of the VAR framework is fully satisfied.

5. Conclusion

The need for attaining price stability and full employment along with achieving economic growth and a favourable balance of payments are the core goals of macroeconomics. These goals are pursued using macroeconomic management policy tools. The monetary policy stands to be one of these tools for charting the direction of economy. Our study has been on determining if this policy tool has been effective in curbing economic misery in Nigeria from 1990 through 2021. The paper utilized the Granger causality test, ARDL bounds test for cointegration, ARDL long-run regression result, the impulse response function, and the variance decomposition. From the Granger causality test, we realized that: a unidirectional causality flows from monetary policy rate to economic misery; a bidirectional causality flows between import growth and economic misery; no causality flows between economic growth and economic misery; and a bidirectional causality flows between foreign direct investment and economic misery. The bounds test for cointegration reported that the variables were integrated after the unit root test reported stationary at mixed order of levels and first difference.

Our study has revealed that within the period of analysis, the monetary policy has been putting forth a positive and significant effect on economic misery in Nigeria. By implication, the monetary policy rate utilized within the study period has not been able to drive down the economic misery in Nigeria. This lead to a further analysis to check what could have been the reason for this upward trend in economic misery despite the monetary policy stance of the Central Bank of Nigeria. The analysis further revealed that within the study period, the effect of the monetary policy rate on inflation was positive and significant while the effect of monetary policy rate on the rate of unemployment was negative but insignificant. Thus, a rising economic misery is inevitable if the monetary policy rate caused inflation to rise without significantly reducing the rate of unemployment. This therefore points to the fact that the rising economic misery was as a result of the rising rate of inflation. Consequently, these findings support the recent policy of the Central Bank of Nigeria in raising the monetary policy rate to 14% in order to curtail inflation which will in turn reduce the economic misery. Also, there is need to curb excessive importation as it is one of the core variables that drives up economic misery given its positive and significant influence. Emphasis should also be in boosting domestic production given that it wields a negative and significant influence on economic misery within the study period.

The impulse response function has also portrayed that economic misery responds quickly to shocks in MPR in the short run. It is observed that the response in all the period has been positive which portrays the direct link between economic misery and monetary policy rate. Meanwhile, the effect dies off during the long run as the response converges to the baseline. The variance decomposition further proved this as the monetary policy rate accounted for about 37.764% of the total forecasted error variance of economic misery in the short run, but only turns out to 35.778% in the long-run, portraying a declining effect of policy shocks in the long-run. However, 35.778% is still high, indicating a greater long-run influence of monetary policy shocks on

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economic misery. Given this scenario, monetary policy will serve as both a short-term and long-term potent policy action in curbing economic misery in Nigeria.

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