

MACROECONOMIC POLICY COORDINATION AND ECONOMIC GROWTH UNCERTAINTY IN WEST AFRICA

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Abstract

Research background: Understanding the rationale for macroeconomic policy coordination with the aim of achieving greater policy credibility and effectiveness in West Africa still remains the subject of debate.

Purpose: This study evaluates the effect of macroeconomic policy coordination on economic growth uncertainty in West Africa, utilizing a panel data set of the 15 member states from 1980 to 2020.

Research methodology: The study employed Pedroni's cointegration test procedure and the Generalized Linear Model, fixed effect procedure for evaluation.

Results: The stationarity test results show that the variables are stationary at first difference at the 5% significant level, for the common and individual effect tests respectively. The cross section dependence test result indicates that there exists a cross-sectional independence for the variables under consideration. Pedroni's cointegration test results indicate that there exists a long run relationship between economic growth uncertainty and macroeconomic policy variables. The fixed effect model result shows that monetary policy variable, inflation (INF) affect growth uncertainty negatively. The fiscal policy variable, government debts (DEBTS) indicates a positive sign to growth uncertainty and is significant statistically. The coefficient of the regional trade variable, (TRADE) and exchange rate indicate positive signs and are insignificant statistically.

Novelty: It is important to ascertain how uncertainty affect policy coordination gains. Thus this study has utilized the econometric models approach to evaluate the effect of policy decisions as economies encounter exogenous policy shocks in the face of uncertainty, in order to ascertain if coordination is preferred to individual policy decisions.

Keywords: Macroeconomic, policy coordination, Growth uncertainty, ECOWAS

JEL classification: C23, E02, E6, F42, D81, N17

Introduction

Since 1973 when the global economy started witnessing turbulent events, there was a call for economies to coordinate their macroeconomic policies. The finance ministers of the Organization for Economic Cooperation and Development (OECD) in the aftermath of the 1973 oil price shock, resolved to avoid deflationary policies designed to pass current account deficit on to partner economies (Oudiz, Sachs, 1984). The 1974–1975 recession prompted the United States Government to recommend a “locomotive approach” for the global economic recovery, leading to an action by most economies to stimulate an economic expansion. The policy was adopted at the Bonn economic summit of 1978 by the industrial economies (Oudiz, Sachs, 1984). According to the authors, there were calls for a joint global reflation by policy makers after the recession of 1980–1982, but such a coordinated policy was opposed by the US administration.

Also, economists advocated for expansionary fiscal policy measures for European economies in return for a reduced US long run fiscal deficit (Oudiz, Sachs, 1984). The implications of such policy measures according to Oudiz and Sachs (1984) and Layard (1984), was that while both the Europe and the US would benefit from such a swap policy, neither side could undertake the prescribed policies independently. D’Erman, Schulz, Verdun and Zagermann (2022) noted that in most cases, the implementation of policies are countered by some domestic actors especially when they are perceived that particular policies counters their constituency interest. Thus, there are domestic institutions in each member states that have great influence that affects regional macroeconomic policy measures (D’Erman *et al.*, 2022).

The Bonn economic summit of 1978 was the first macroeconomic policy measures adopted by the major industrial economies. Though there were few cases of successful

macroeconomic policy coordination after its first adoption, economists continued to illustrate the needs for such coordination (Oudiz, Sachs, 1984). Advocates of macroeconomic policies coordination noted that if countries are fearful of unilateral expansion, then all may be stuck in a low level equilibrium condition, even if all countries desire to expand (Oudiz, Sachs, 1984). Also, Zhang (2022) asserted that the coordination of global macroeconomic policies are based on the level of integration, unsymmetrical and spillover effects inherent in the integration, most especially macroeconomic policies' unsymmetrical spillovers in an unbalanced world economy. Thus, this result too conflicts in macro policies and hence there is a need for proper coordination (Zhang, 2022).

However, the absence of coordination could not have explained major global economic uncertainties that have taken place over time. For instance, in 1981 when Germany's economy experienced a contractionary policy while the French economy implemented expansionary policy measures, the former's fear was not merely that of external imbalances, but of rekindling inflationary pressures through a demand stimulus, either if it was matched from abroad or not. The US economy successfully conducted expansionary policies during the fourth quarter of 1982 and did not witness any currency depreciation. What determines whether conducting a unilateral expansionary policy is feasible, is the policy mix as well as the overall policy stance (Oudiz, Sachs, 1984).

Uncertainty is a lack of clarity about the future course of monetary policy, taxes, trade policy and other business regulations (Krol, 2018). Economic policy uncertainty leads to difficulty in estimating return on business decision making. Hence the future course of economic policy decisions could not be easily forecast, especially during the periods of election and early stages of a new administration (Krol, 2018). When it comes to the economic policy making process, there are divergent of views, even within a particular administration regarding the best policy options to adopt. As a result, there is no clarity regarding the future course of taxation, monetary policy and trade policy (Krol, 2018). When there is the existence of high economic policy uncertainty, entrepreneurs and businesses are likely to put a halt to decisions, since market entry and investment decisions have non-recoverable costs (Krol, 2018). As uncertainty over US international economic policy looms, Bunge (2017) noted that countries bordering the US, which include Mexico started moves to diversify its agricultural imports away from the US, as well as putting into hold, a plan to expand a port at Lazaro Cardenas, a city near the US border. Thus, as uncertainty increases, it also leads to a delay in business and investment decisions for both the international and domestic decisions making process (Pindyck, 1991; Higgs, 1997).

Founded in 1975, the Economic Community of West African States (ECOWAS), comprises fifteen member states. The regional economic block was formed to promote the integration of economic activities in all fields, which include, commerce and industry, monetary and fiscal policies, agriculture, transport and telecommunications, energy, natural resources, and social and cultural affairs. The ECOWAS has embarked on an extensive range of activities to coordinate macroeconomic policies among the member states (USAID report, 2021). The West African sub region is divided into two main economic blocks: the Anglophone and the Francophone countries. The Anglophone countries comprises, Ghana, Gambia, Nigeria, Liberia and Sierra-Leone; while the Francophone countries include, Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Guinea, Mali, Niger, Senegal and Togo. There are equally two Lusophone countries which include, Cape Verde and Guinea Bissau (Onakoya, Oseni, Onakoya, 2013). The eight francophone countries including Guinea –Bissau, in 1994 established the West African Economic and Monetary Union (WAEMU), having a common monetary policy rule with a common central bank implemented by the Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO). The common currency among the WAEMU countries is backed by the French central bank. The WAEMU economies have made more progress towards integration than the other ECOWAS members (Onakoya *et al.*, 2013). The non-WAEMU economies which include, Sierra-Leone, Nigeria, Liberia, Guinea, Ghana, and the Gambia established the West African Monetary Zone (WAMZ) in the year 2000.

The economy of the Economic Community of West African States, (ECOWAS) between the period of 2011 to 2017 indicate that the real Gross Domestic Product (RGDP) stood at 6.2% in 2011 but reduced to 2.8% in 2015. Most of the economies in the West African monetary zone, which include, The Gambia, Ghana, Guinea, Liberia, Nigeria, Sierra-Leone and Cape – Verde in 2016 went into a recession as result of the fall in commodity prices. The most primary export of the member states are commodities which include, agricultural commodities and solid minerals. The fluctuations in the global commodity usually affects most macroeconomic fundamentals either indirectly and directly. Compared to other countries in the region like the UEMOA countries, the WAMZ countries were hit hardest regarding low GDP growth. All these were as a result of a slowdown in commodity exports as well as other structural issues that affected most of the economies. For instance, the recession in Nigeria impacted greatly on the neighboring economies.

In 2017, the growth rate of the ECOWAS economies was 2.2% which was less than the population growth rate of 3%. For the growth rate to have an effect on poverty reduction, it must average about 10% and be sustained for periods of 10 to 15 years. Also, the economy of the

sub-region witnessed both trade and current account deficits (twin deficit) from 2009 to 2017. In 2019, of the whole ECOWAS member states, only Togo recorded a fiscal surplus of 2.3% of the GDP. In 2020, there was a contraction of economic activities in most of the ECOWAS member states as a result of the COVID-19 pandemic. The International Monetary Fund (IMF) report (2020) noted that nine of the fifteen member states of ECOWAS recorded negative real GDP growth. Among the countries included are, Nigeria (−4.3%), Mali (−2%), Sierra Leone (−3.1%), Liberia (−3%), Guinea Bissau (−3%), Burkina Faso (−2%), Cape Verde (−6.8%), The Gambia (−1.8%), and Senegal (−0.7%). Despite embarking on expansionary fiscal policy measures in order to curb the effect of the COVID-19 pandemic, ECOWAS member states recorded high levels of fiscal deficits. The ECOWAS bank for investment and Development (EBID) report (2020) noted that member states were unable to reach the sub-regions' convergence criteria of a fiscal deficit of equal to three percent of the GDP in 2020.

Despite the recorded performance in key macroeconomic sectors, the ECOWAS economy recorded little or no development as the region's fiscal deficit kept rising with rising unemployment, rising inflation and high trade deficit (Obayori, Nwogwugwu, Omozuawo, 2016). The continuous deterioration of the ECOWAS economy is attributed to the fact that macroeconomic policies have not been properly articulated and coordinated. The need for a proper macroeconomic policy coordination led to the establishment of various monetary and fiscal policy committees in most of the ECOWAS countries to harmonize monetary, fiscal, exchange rate and debt policies with the aim of settling disputes in policy goals and the enhancement of macroeconomic stability (Shobande, 2019). Furthermore, the lack of coordinated budgetary operations among the tiers of government as well as poor macroeconomic policy coordination among the managers of the ECOWAS economy impacts negatively on the macroeconomic stability thereby leading to uncertainty about growth objectives, maintenance of exchange rate stability, strong balance of trade and macroeconomic stability. Thus, understanding the rationale for macroeconomic policy coordination with the aim of achieving greater policy credibility and effectiveness among the ECOWAS members' states still remains a subject of debate (Shobande, 2019). The questions this study intends to answer is therefore stated as follows: What is the effect of macroeconomic policy coordination on economic growth uncertainty in the ECOWAS sub-region? The objective of this study is to evaluate the effect of macroeconomic policy coordination on Economic growth uncertainty in the ECOWAS sub-region. This study therefore contributes to the existing literature, by evaluating the coordination of macroeconomic policies across the member states of ECOWAS in both the short and long run, for macroeconomic stabilization in the region. The implication

of considering key macroeconomic factors will help in generating results for a more reliable economic analysis and forecasts.

1. Literature review

The existing literature on macroeconomic policy coordination are divided into three generations, based on the impacts of macroeconomic policy coordination being undertaken in a partner economy (Bhattarai *et al.*, 2016). The first generation models of macroeconomic policy coordination started with studies conducted by Lucas (1976), and Kydland and Prescott (1977) who applied a rational expectation hypothesis and argued for the advantages of rule based macro policies in order to generate a rational expectation equilibrium approach. Applying a differential games approach in line with the Mundell-Fleming model, authors which include Obstfeld and Rogoff (2000) in their studies provided a robust review of estimation models for macroeconomic policy coordination, utilizing the Mundell-Fleming-Dornbusch type models. The model states that there is little gain when there is a coordinated macroeconomic policy in an economy.

The second generation model of macroeconomic policy coordination evaluation are contained in the works of Canzoneri, Cumby and Diba (2005), Juillard and Villemot (2011) and Clerc, Dellas and Loisel (2011). The authors concluded that the payoff from macroeconomic policy coordination is bigger. The second generation model of macroeconomic policy coordination agents are an extension of the Keynesian macroeconomic models where there are microeconomic foundations thus assuming monopolistic competition, individual representative agents with utility functions and nominal and real rigidities. The studies maintained the short run dynamics and disregarded the long run economic growth dynamics (Conzoneri *et al.*, 2005). The second generation macroeconomic policy coordination adopted disequilibrium dynamics, however their studies focused on short run growth dynamics or business fluctuations. They did not take into consideration the medium run and long run economic trends, as well as the different economic strategies that nations adapted. There has been an improvement in the supply and strategic modeling approaches in the recent literature on macroeconomic policy coordination, thus indicating that there is more gain emanating from coordination (Conzoneri *et al.*, 2005). Other second generation models include, Dedola, Karadi and Lombardo (2013), and Kempf and von Thadden (2013) in their studies they showed information asymmetry where there are bigger welfare gains as countries in such deals began to increase. While Nordhaus

(2015) showed that membership of the club was utilized as a coordination mechanism to mitigate global warming as well as pollution control across the nations.

The third generation macroeconomic policy coordination focuses on international macroeconomic coordination and it could be traced to the studies conducted by Cooper (1969) and Hamada (1976). While evaluating the implications of economic policy formulation in an open economy Cooper (1969) noted that with the movement of capital across borders, and with an increase in international dependency between countries, there is a decline of the effectiveness of decentralized policies and thus a compelling macroeconomic policy coordination between countries. Using a two – country model procedure, the author selected unemployment level economic growth rate as target variables. For economic policy instruments, Cooper (1969) selected government spending or open market operations that are controlled directly by the country's economic authorities and influences the values taken by the target variables. Policy formulation and its effectiveness was used in measuring the speed of adjustment of the target variables to their target variables, given the level of interdependencies among countries. Hamada (1976) applied game theory to solve the same economic problem, thus the study was the first to apply game theory in economic policy coordination. The author explained the importance of monetary policy interdependencies between countries in the course of explaining the gains of economic policy coordination. Hamada (1976) formulated an n-country game by which each country's monetary policy is in line with the objectives of the monetary authority, especially maintaining price stability and the balance of payment equilibrium. The study noted that if there exists a differences in nations' preferences regarding inflation and balance of payments, it affects the gained outcome of the global rate of inflation. In line with the study, Hamada (1979) expanded fixed exchange rate issues to a flexible exchange rate evaluation.

1.1. Macroeconomic policy uncertainty

The most recent major uncertainty shocks that have negatively impacted the global economy is Macroeconomic policy uncertainty. The uncertainty ranges from the Brexit scenario to China's currency manipulation and other unexpected political outcomes around the globe. These global events have resulted to uncertainties about economic and social programme implementations. Evaluating the implication of such events is difficult, and most recent literature analyses these outcomes using textual approaches as well news based metrics to ascertain the macroeconomic policy uncertainty of this nature (Ferrara *et al.*, 2017). Recent studies on the Macroeconomic policy uncertainty measures like that of Julio and Yook (2012) employed the election cycle approach to evaluate political uncertainty. Also, Baker, Bloom

and Davis (2015) suggested that there should be monthly economy policy uncertainty indices for advanced economies which include, the UK, the US, Japan, Canada, Australia and EU countries, as well as countries like Brazil, India, South-Korea, Russia and Chile, generated from the coverage of news relating to macroeconomic uncertainty. According to the authors, the notion of using news coverage is based on taking into account the number of occurrences of words specific or sequence in the national dailies of each country. The word to be incorporated in the count include words relating to the economy, either economy or economics, and others relating to policy, for instance, central bank, budget deficit or taxes, and the one relating to uncertainty. An index is then computed after normalization, ensuring that the information generated are compared over time.

The type of macroeconomic policy uncertainty indexes contain the largest global database to be utilized for international macroeconomic policy uncertainty shocks investigation (Baker *et al.*, 2015). Also, the authors proposing specific measures for macroeconomic policy uncertainty, generated indexes for global subsectors such as Brexit for the UK, health, migration fears, fiscal, monetary and trade policies as well as regulatory policies. The authors also generated indexes of daily macroeconomic policy uncertainty both for the US and the UK to investigate the high frequency effect of uncertainty shocks.

Further, the study evaluated recent empirical studies conducted in this area of research, for instance a study by Iheoma (2022) on the dynamic effect of economic growth uncertainty on public health spending in the ECOWAS sub region using the panel ARDL model procedure, show that economic growth uncertainty and population growth are the core determinants of public health spending in the ECOWAS. Komlan (2021) examines the effect of economic growth uncertainty on intra-regional trade flows in the ECOWAS region from 1995 to 2015 using the Poisson pseudo maximum likelihood procedures for estimation. The study results indicate a negative and statistically significant effect of economic growth uncertainty on the trade flows of the member states. Otoakhia (2021) investigates the relationship between inflation and inflation uncertainty and the intra state inflationary trend in the ECOWAS region using the GARCH model and stochastic volatility model approaches for evaluation. The empirical findings indicate the existence of information from inflation to inflation uncertainty using the GARCH model, while from inflation uncertainty to inflation there exists no information except for two countries, Gambia and Burkina Faso.

Tarawalie and Jalloh (2021) examine the impact of external debt on economic growth in the ECOWAS region from 2000 to 2019 using a panel least square regression. The findings indicate that external debt, the control of corruption and trade openness are the core economic

growth determinants in the ECOWAS. Caldara *et al.* (2019) documented the recent rise in trade policy uncertainty for the US economy between 2018 to 2019. The study employed two complementary approaches based on a text-search analysis, one focusing on newspaper articles and another from transcripts of the earning calls of firms. Utilizing an econometric approach on joint movement in aggregate in trade policy uncertainty, industrial production and other macro variables, the results show that a rise in trade policy uncertainty accounted for a decline in the level of global GDP of about 0.8% in the first half of 2019. Omojolaibi *et al.* (2019) evaluate the relationship between fragility and macroeconomic outcomes in the ECOWAS region from 1995–2016. Utilizing a panel vector Autoregressive technique, the empirical results indicate that seven macroeconomic outcomes negatively respond to fragility. The study equally notes that fragility is major source of economic shocks in the region's economy.

2. Research methodology

In order to measure economic growth uncertainty, the study adopted the measure used by Takaendesa (2005), and Yarmukhamedov (2007) and utilizes the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) proposed by Nelson (1991). While comparing the GARCH and EGARCH models, Nelson and Cao (1992) argued that in the linear GARCH model procedure, the non-negativity constrain inherent in it are too restrictive. Hence, the GARCH approach imposes on the parameters estimated, the non-negativity constraints, while in the EGARCH models there are no restrictions in the model parameters. In this study, the residuals from the variable $\text{Log}(\text{GDP})$ will be derived from the GARCH term representing the last period's forecast variance as follows:

$$\text{Log}(\text{GDP})_t = \alpha + \alpha_1 \text{Log}(\text{GDP})_{t-1} + \varepsilon_t \quad (1)$$

where α is the parametric constant; α_1 is the parameter estimates, while ε_t is the stochastic term. The uncertainty based on the generated estimation might be ambiguous, implying that it can either be positively or negatively associated with macroeconomic policy variables or trade policy variables. The EGARCH model addresses three major deficiencies of the GARCH model which include, restrictions of parameters to ensure positive conditional variance, when it is insensitive to irregular shocks and when it becomes difficult to measure persistency in a stationary series. The EGARCH model's log of the conditional variance implies an exponential leverage effect instead of being quadratic (Majose, 2010).

2.1. Theoretical framework

The modern growth theories take into consideration both physical and human capital accumulation as factors determining economic growth. Thus, as there is a rise in capital productivity and human capital accumulation, there is equally a corresponding rise in the level of domestic production leading to a rise in the growth of the economy (Jakoba,2020). Therefore, one can consider a Cobb-Douglas production function of the form:

$$Y = AK^\alpha L^{(1-\alpha)} \quad (2)$$

where Y denotes the economy's output, A represents technological progress, K denotes the amount of physical capital, while L represents the accumulation of human capital. α denotes output elasticity with respect to K , and $1 - \alpha$ with respect to L . Thus, from the equation, the annual output growth can therefore be computed as follows:

$$y = a + \alpha k + (1 - \alpha)l \quad (3)$$

where y , a , k and l denote respectively, rate of growth of Y , A , K and L .

2.2. The panel model

The macroeconomic policy coordination on the economic growth uncertainty model is estimated within a Generalized Linear Model (GLM) framework. The model assumed that there exists a strict exogeneity of explanatory variables conditional on being unobserved within a general linear model (GLM) framework. The model is an extension of the multivariate regression model in two main ways. First, it allows for a linear transformation or has combinations of multiple dependent variables, providing the ability to analyse the effects of repeated measures and to encapsulate the panel data model. Second, since GLM uses generalised inverse, it can provide a solution to normal equations when the regressors are not linearly independent. In this study, the fixed effects model is simpler to conduct and is defined according to the following regression model:

$$Y_{it} = \alpha_i + \beta' X_{it} + \varepsilon_{it} \quad (4)$$

where $i = 1, \dots, N$; $t = 1, \dots, N$.

Y_i indicates the dependent variables while X_i determines the vector of the κ explanatory variables. $\alpha_i = 1, \dots, N$ are constant coefficients specific to each of the countries. Their presence assumes that differences appear by means of differences in the constant term. These individual coefficients are estimated together with the vector of coefficients β .

In order to validate the fixed effects specification, the question is to prove, according to the empirical application, that the individual coefficients α_i , $i = 1, \dots, N$ are not all equal. This corresponds to the following joint null hypothesis:

$$H_0: \alpha_i = \dots \alpha_N = \alpha \quad (5)$$

It is rather the acceptance of the alternative hypothesis which is interesting if we want to differentiate between the situations in each of the countries considered in the sample and confirms the existence of significant heterogeneity across the region. The assumption made about the intercept variable (α_i) had implications for the consistency and efficiency properties of the estimates of β' in equation (4). Assuming heterogeneity across units implies that the effect of all omitted variables is the same for a given cross sectional unit through time but varies across cross-sectional units for a given point in time. The appropriate statistic of the test is a Fisher distributed one with $(N-1, \sum_{i=1}^N T_i - N - K)$ degrees of freedom under the null hypothesis and is defined as follows:

$$F = \frac{SSR_0 - SSR_1 \sum_{i=1}^N T_i - N - K}{SSR_1 N - 1} \quad (6)$$

where SSR_0 and SSR_1 are, respectively, the sum of squared residuals provided by the estimation of the constrained model (under the null hypothesis that no individual specific coefficients are considered) and the sum of squared residuals relative to the fixed effects model is obtained.

2.3. Model specification

To estimate of the impact of macroeconomic policy coordination on economic growth uncertainty in the ECOWAS region could be stated as follows:

$$\text{UNCERTAIN} = F(\text{INF}, \text{DEBTS}, \text{TRADE}, \text{EXCH}) \quad (7)$$

Set definition

UNCERTAIN = Economic growth uncertainty (proxied by the variable residuals),

INF = Inflation (which is the monetary policy variable across the region),

DEBTS = Government debts (denotes fiscal policy variable across the region),

TRADE = Total trade values,

EXCH = Exchange rate.

Assuming a linear relationship between our dependent variable and independent variables, the equation can be stated as follows:

$$UNCERTAIN_t = \alpha_0 + \alpha_1 INF_t + \alpha_2 DEBTS_t + \alpha_3 TRADE_t + \alpha_4 EXCH_t + \mu_t \quad (8)$$

where μ_t – error term.

However, the dependent and some of the independent variables were not in the same unit, hence, they were logged so as to bring the data to the same level. Thus, the above equation can be re-specified as:

$$UNCERTAIN_t = \beta_0 + \beta_1 INF_t + \beta_2 DEBTS_t + \beta_3 TRADE_t + \beta_4 LOG(EXCH)_t + \pi_t \quad (9)$$

where π_t – error term.

3. Data/results analysis

3.1. The descriptive statistics

The descriptive statistics for the variables under study are presented in Table 1 .

Table 1. The Descriptive statistics

	UNCERTAIN	INF	DEBTS	TRADE	EXCH
Mean	0.006006	11.21501	12.90819	42.10901	650.0192
Median	0.324461	4.620670	8.750620	42.49814	346.3059
Maximum	22.15655	219.0028	119.6801	99.29065	9,829.927
Minimum	-30.24598	-29.17246	0.000000	0.000000	0.000275
Std.Dev.	4.329134	21.46242	14.80642	17.30243	1,388.343
Skewness	-1.250241	4.174950	3.005963	0.073340	4.469484
Kurtosis	12.83188	27.80646	16.70864	3.738450	24.03718
Jarque–Bera	2,624.414	17,469.57	5,713.789	14.45400	13,322.94
Probability	0.000000	0.000000	0.000000	0.000727	0.000000
Sum	3.675596	6,863.587	7,899.814	25,770.72	397,811.7
SumSq.Dev.	11,451.00	281,448.3	133,949.6	182,917.5	1.18E+09
Observations	612	612	612	612	612
Crossections	15	15	15	15	15

Source: authors' computation from the E-views 9 output.

From the descriptive statistics in Table 1, the results indicate that all the variables under consideration have positive mean values with 612 observations and 15 cross sections. The standard deviation indicates the highest number for the exchange rate (1,388.343) showing that the values are wide spread about the mean, while the least number is recorded by uncertainty (4.329134) indicating that the values are very close to the mean. The Jarque-Bera test of normality showed that all the variables under consideration are significant at the 5% level, thus indicating that the variables are normally distributed.

3.2. Correlation

The relationships among the variables studied are equally evaluated in the correlation matrix results in Table 2.

Table 2. Correlation matrix

	UNCERTAIN	INF	DEBTS	TRADE	EXCH
UNCERTAIN	1.000000	−0.063216	0.071906	0.007752	−0.015412
INF	−0.063216	1.000000	0.280624	0.060466	−0.019913
DEBTS	0.071906	0.280624	1.000000	0.002321	−0.071867
TRADE	0.007752	0.060466	0.002321	1.000000	0.120826
EXCH	−0.015412	−0.019913	−0.071867	0.120826	1.000000

Source: authors' computation from the E-views 9 output.

The correlation test results showed that two variables, total government debts (DEBTS) which represent the fiscal policy measures, and total trade values (TRADE) indicate a positive correlation with the uncertainty with percentage values, 0.07% and 0.007% respectively. The variables, the monetary policy variable, inflation (INF) and exchange rate (EXCH) indicate negative signs with values −0.06% and −0.015% respectively. The overall results showed that issues of multicollinearity among the variables under study does not exist.

3.3. Panel unit root/stationarity test

The panel unit root tests results are presented in Table 3.

Table 3. The panel unit root test

Commoneffects Levin, Lin and Chut				Individual effects Im, Pesaranand Shin W-stat				
variable	statistics	prob.	cross-section	observation	statistics	prob.	cross-section	observation
Leveldifference								
UNCERTAIN	-21.22550	0.0000	15	567	-25.10010	0.0000	15	567
INF	-13.54550	0.0000	15	584	-11.75660	0.0000	15	584
DEBTS	-1.94954	0.0256	15	583	-1.97710	0.0240	15	583
TRADE	-1.48271	0.0691	15	584	-2.10853	0.0175	15	584
LOG(EXCH)	-5.26590	0.0000	15	584	-2.52383	0.0058	15	584
Firstdifference								
UNCERTAIN	-21.22550	0.0000	15	567	-25.10010	0.0000	15	567
INF	-18.83560	0.0000	15	569	-18.83560	0.0000	15	569
DEBTS	-16.37200	0.0000	15	568	-16.92830	0.0000	15	568
TRADE	-13.94560	0.0000	15	569	-15.62210	0.0000	15	569
LOG(EXCH)	-7.96968	0.0000	15	569	-11.11720	0.0000	15	569

Source: authors' computation from the E-views 9 output.

The test results showed that three of the variables (UNCERTAIN, INF, DEBTS and LOG(EXCH)) are stationary at level difference at the 5% level of significance both for the common and individual effect tests respectively. While the variable (TRADE) is not stationary at level difference. However, at first difference, all the variables are stationary at the 5% significance level.

3.4. Cross section dependence test

The assumption for a cross section dependence test is that the error terms are independent across cross – sections. The cross-section dependence test result is therefore presented in Table 4.

Table 4. The cross-section dependence test result

Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in residuals			
Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	116.402100	105	0.2102
Pesaran scaled LM	-0.248281		0.8039
Pesaran CD	-0.864557		0.3873

Source: authors' computation from the E-views 9 output.

The results from the table above indicate that there exists a cross-sectional independence for the variables under consideration.

3.5. Panel Cointegration test

Since the variables under consideration are integrated a cointegration test was therefore conducted. Table 5 shows the panel Pedroni cointegration test results.

Table 5. The panel Pedroni Residual Cointegration Test results

Series: UNCERTAIN INF DEBTS TRADE LOG(EXCH)				
Sample: 1980 2020				
Included observations: 614				
Cross-sections included: 15				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
User-specified lag length: 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
Alternative hypothesis: common AR coeffs. (within-dimension)				
	statistic	prob.	weighted	
			statistic	prob.
Panel v-Statistic	-0.601070	0.7261	-2.691976	0.9964
Panel rho-Statistic	-6.756529	0.0000	-6.478220	0.0000
Panel PP-Statistic	-14.36041	0.0000	-17.84799	0.0000
Panel ADF-Statistic	-8.233152	0.0000	-10.20525	0.0000
Alternative hypothesis: individual AR coeffs. (between-dimension)				
Group rho-Statistic	-5.812976	0.0000		
Group PP-Statistic	-21.90624	0.0000		
Group ADF-Statistic	-10.55215	0.0000		

Source: authors' computation from the E-views 9 output.

The results from the Pedroni statistics indicate that the null hypothesis cannot be rejected. This shows that there exists a long run relationship between economic growth uncertainty and the macroeconomic policy variables under consideration.

3.6. The Hausman test

Before panel estimation, the Hausman test was conducted to make a choice between the fixed effect model and the random effect model of the panel data analysis. The Hausman test detects which of these two models is superior. The null hypothesis of the Hausman test is that random effect is the preferred model and the alternative hypothesis is that the fixed effect model is preferred.

Table 6. The Hausman test results

Redundant Fixed Effects Tests			
Equation: Untitled Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.233793	(14; 593)	0.9984
Cross-section Chi-square	3.368690	14	0.9982
Correlated Random Effects – Hausman Test			
Equation: Untitled Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.189510	4	0.5266

Source: authors' computation from the E-views 9 output.

From the Hausman test results, the null hypothesis is therefore rejected since both the P-values of the variables are not significant at 5% respectively. Thus, the fixed effect model estimation was therefore conducted.

3.7. The Panel regression results analysis

In order to control for all time invariant differences between variables, the fixed effect model is therefore applied. This implies that there is no biased information for the estimated fixed effect coefficients as a result of omitted time invariant characteristics. Stock and Watson (2003) noted that when there are no changes in the unobserved variables, then changes in the dependence variable could be other influences instead of fixed effect characteristics.

Table 7. The panel fixed effect results

Cross-section fixed effects test equation				
Dependent Variable: UNCERTAIN				
Method: Panel Least Squares				
Sample: 1980 2020				
Periods included: 41				
Cross-sections included: 15				
Total panel (unbalanced) observations: 612				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	−0.452168	0.621008	−0.728119	0.466800
INF	−0.017483	0.008799	−1.986902	0.047400
DEBTS	0.028734	0.012296	2.336868	0.019800
TRADE	0.003234	0.010108	0.319898	0.749200
LOG(EXCH)	0.029404	0.071790	0.409583	0.682300
R-squared	0.013162	Mean dependent var		0.006006
Adjusted R-squared	0.006659	S.D. dependent var		4.329134
S.E. of regression	4.314696	Akaike info criterion		5.770067
Sum squared resid	11,300.28	Schwarz criterion		5.806152
Log likelihood	−1,760.641	Hannan–Quinn criter.		5.784102
F-statistic	2.023995	Durbin–Watson stat		1.858272
Prob(F-statistic)	0.089559			

Source: authors' computation from the E-views 9 output.

From the panel results table above, the intercept value indicates a value of -0.452168 . This implies that if the independent variables are held constant, the value of the macroeconomic policy variables on economic growth uncertainty will be reduced by 45%. The coefficient of the monetary policy variable, inflation (INF) indicates a negative sign and is significant statistically at the 5% level. This shows that monetary policy measures affect growth uncertainty negatively. The result is in line with the findings of Castelnovo and Pellegrino (2018) that a purely macroeconomic related policy approach which features firm specific capital generates a worsening of output–inflation trade off during a period of uncertainty. The authors noted inflation to be positive and statistically significant when there exists a high level of uncertainty. Thus, it shows a trickier output inflation trade off to be handled in the presence of high uncertainty. Also, Lucas, Rogers and Sun (2020) found that monetary policy uncertainty results to firms' investments decline through financial frictions and the real options channel. However, other studies which include, Fountas (2010) in a study of industrial economies noted that there is strong evidence that inflation uncertainty poses no detrimental effect on economic growth.

Also, Mughall, Aslam, Jabbar and Ullah (2012) in a study of the South East Asian economies found no significant relationship between inflation uncertainty and economic growth.

The fiscal policy variable government debts (DEBTS) indicates a positive sign to growth uncertainty and is significant statistically. The results are in line with the findings of Butkusa, Cibulskienea, Garsvienea and Seputiene(2022) which showed that a lower level of uncertainty translates to a bigger positive effect of government debt on economic growth. While a higher level of uncertainty results in a lower and negative effect of debt on economic growth. Equally, Fowler and Young (2007) while evaluating the uncertainty effect on the optimal size of Government, found that small government size leads to a high level of output fluctuations, while the response of a government to technological shocks results in countercyclical taxation rates. Also, the coefficient of the regional trade variable, (TRADE) and exchange rate indicate positive signs and are insignificant statistically.

Statistically, the coefficient of determination R^2 shows a value of 0.013162, and the adjusted R^2 with a value of 0.006659 respectively. This indicates that about 0.06% of variations in the dependent variable is explained by independent variables. The F-statistics results indicate that the overall model is significant with a value of Prob (F-statistic) = 0.000000; while the Durbin-Watson (DW) statistics value of 1.858272 indicate the absence of serial correlation in the models under consideration.

Table 8. The panel cross section fixed effect results for the equation

Fixed Effects (Cross)	
_BENIN	-0.151779
_BURKINA	-0.174706
_CAPEV	0.276869
_COTE	-0.815112
_GUINEA	-0.388210
_MALI	-0.257761
_NIGER	-0.430811
_SENEGAL	-0.393235
_TOGO	-0.237383
_BISSAU	-0.208417
_GHANA	1.573717
_GAMBIA	0.644385
_NIGERIA	0.626473
_LIBERIA	0.230210
_SIERRA	-0.256926

Source: authors' computation from the E-views 9 output.

The panel cross section fixed effect results for the uncertainty equation show that the constant term of the regression coefficients of the 15 member countries under consideration indicate positive signs for Cape Verde, Ghana, Gambia, Nigeria and Liberia. This indicates that holding all other things constant the macroeconomic policy coordination increases the growth uncertainty by 0.276869, 1.573717, 0.644385, 0.626473 and 0.230210 respectively. Also, there is a constant term for the ten other West African countries which include, Benin, Burkina Faso, Cote d'Ivoire, Guinea, Mali, Niger, Senegal, Togo, Guinea Bissau and Sierra Leone. The results indicate that all thing being equal, the macroeconomic policy coordination during the period under study decreased the uncertainty level by -0.151779 , -0.174706 , -0.815112 , -0.388210 , -0.257761 , -0.430811 , -0.393235 , -0.237383 , -0.208417 , and -0.256926 respectively.

Conclusions

As the global economy started witnessing turbulent events, major economies collaborated to coordinate their macroeconomic policies. It was noted that the absence of macroeconomic coordination could not have explained major global economic uncertainties that have taken place over time. Economic policy uncertainty leads to difficulty in estimating return on business decision making. When there is the existence of high economic policy uncertainty, entrepreneurs and businesses are likely to put a halt to decisions, since market entry and investment decisions have non-recoverable costs. The ECOWAS has embarked on an extensive range of activities to coordinate macroeconomic policies among the member states. However, the overall macroeconomic policy coordination among the ECOWAS member countries still remains weak. This study therefore evaluates the effect of macroeconomic policy coordination on economic growth uncertainty in West Africa, utilizing a panel data set of the 15 member states from 1980 to 2020. The Pedroni cointegration test results indicate that there exists a long run relationship between economic growth uncertainty and the macroeconomic policy variables. The Hausman test results supports the fixed effect model estimation.

The panel regression test results indicated that the coefficient of the monetary policy variable, and inflation affected growth uncertainty negatively. The fiscal policy variable, and government debts indicate a positive sign to growth uncertainty and is significant statistically. For an effective macroeconomic policy coordination in the ECOWAS member states, there is a need to pursue a tight fiscal policy measure and an expansionary monetary policy in order to attain higher rates of growth in both the short and long run. This can be achieved by conducting institutional reforms on individual economies. Also, there is a need for improved cooperation

among the authorities in the ECOWAS in order to enhance export growth. This will go a long way in improving access to international markets by the region's small and medium scale enterprises.

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