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Inflationary Pressions and the Effects of Optimal Coordination of Fiscal and Monetary Policies in the CEMAC Countries

Dukken Gaphi Ossouna[1]

Abstract

The main purpose of this paper is to examine the effects of optimal monetary and fiscal policy coordination on inflationary pressures in the Central African Economic and Monetary Community (CEMAC) countries. The paper uses a panel data set of 6 CEMAC countries from 2000 to 2022 and employs the generalized moment method (GMM) for dynamic panels. The paper empirical results indicate that the optimal monetary and fiscal policy coordination index as currently stated, contributes to countering inflationary pressures. The results also show that the adoption of a policy mix in which monetary policy is expansionary while fiscal policy is restrictive increase the inflation. The paper's finding suggest that the Bank of Central African States (BEAC) maintain the tightening of its monetary policy and work closely with member governments to ensure overall price level stability, such as commodity subsidy programs, to help alleviate inflationary pressures on consumers.

Key Words: Policy-mix, Dynamic panels, Inflation, CEMAC.

1. Introduction

The question of the effectiveness of macroeconomic policies has become a common concern for both developed and developing countries. This concern has sparked heated academic and political debates following the widening fiscal deficits in most countries because of the 2008 international economic crisis and following the 2011 Eurozone sovereign debt crisis. With the very high level of public debt ratios in most countries after the COVID-19 pandemic crisis and the largest increase in inflation in 2021 (IMF, 2023), the debate on the calibration of economic policy instruments is now experiencing renewed interest among policymakers. That said, aligning fiscal and monetary policies remains a major challenge for countries to support economic stability.

From a theoretical standpoint, since the work of Tinbergen (1952) and Mundell (1962), economic literature has emphasized the importance of coordinating monetary and fiscal policies, known as the "policy mix". According to the work of Mundell (1962), the policy-mix question is immediately posed as a problem of demand management in the sense of the optimal mix of monetary and fiscal policies from the point of view of activity or inflation objectives. For Tinbergen (1959), economic policy must have at least as many instruments as independent objectives, in order to limit contradiction. The budgetary theory of the price level (TBNP) developed by Leeper (1991), Sims (1994) and Woodford (1995) states that price stability requires the pursuit of sound monetary and fiscal policies. Similarly, the theory of Sargent and Wallace (1981) holds that it is not possible for monetary and fiscal policies to be uncoordinated, as the ability to stabilize inflation depends on how these policies are conducted. A change in one will influence the effectiveness of the other and, by extension, the overall impact of any policy change (Paul Hilbers, 2005).

However, the new classical macroeconomics defends the idea that fiscal and monetary policies are ineffective, because when money is issued, inflationary expectations take full effect. Economic agents are led to demand higher wage levels, and excess demand leads to higher prices. Consequently, according to this model, monetary policy should be geared towards price stability and simultaneous budgetary control. In the same vein, in a world increasingly marked by a trend towards trade liberalization, where nations are uniting more and more to ensure the dynamism of their trade sector, the use of monetary policy for cyclical regulation purposes appears very difficult, if not ineffective.

[1]Center for Economic, Statistical, and Computer Research and Studies(CREESI), Republic of Congo.
Email: dukkenossouna@gmail.com

Empirically, the work of Kenkouo et al. (2020) demonstrates that, through the budgetary theory of the general price level, a sound monetary policy is a necessary but not sufficient condition for controlling inflation, since fiscal policy can influence the general price level. The work of Kabamba Allegra et al (2021) also shows that coordinating the two policies has positive effects on the stability of the general price level. From this point of view, monetary policy no longer only targets its traditional final objective (stability of the general price level), but also takes into account the effects of fiscal policy on the general price level in a regime of fiscal dominance via the monetization of budget deficits. However, Kuttner (2002) doubts whether fiscal policy, given these delays, could achieve an interaction with monetary policy.

However, there is still an open debate in the literature on the effectiveness of optimal coordination of fiscal and monetary policies in reducing inflation. This research is part of this dynamic and seeks to demonstrate the effectiveness of macroeconomic policies by answering the following question: What is the role of optimal coordination of fiscal and monetary policies in efforts to promote price general stability?

The aim of this article is to demonstrate empirically the role of optimal coordination of fiscal and monetary policies in efforts to promote price stability. To my knowledge, this issue has not yet been studied empirically in the CEMAC context. Unlike previous papers that use either the monetary and fiscal policies, or the policies indicators monetary and fiscal in isolation, the present paper has built the optimal monetary and fiscal policy coordination index that combines both the monetary and fiscal indices. Thus, this paper provides important insights into the role of policy-mix in the struggle against the inflation.

From the above, this article is structured as follows: the first part presents the theoretical and empirical approaches on the interrelations between policy mix and price stability.The second describes the methodology and data sources. The third section presents the results and discusses the results obtained and the last section offers some recommendations.

2. Literature review

This review presents the theoretical foundations and empirical studies on the effectiveness of the policy mix and its effects on price stability. From a theoretical point of view, the policy-mix issue arises as a problem of managing aggregate demand through stabilization policies (Mundell, 1962). The aim is to identify the optimal mix of monetary and fiscal policies needed to stimulate economic activity and stabilize inflation. The Keynesian model postulates that, since these two macroeconomic policy instruments pass through the same channel - that of aggregate demand - no optimal allocation of instruments to objectives can be isolated. It would therefore be indifferent to assign monetary or fiscal policy to prices or activity. This is what the literature refers to as the Keynesian funnel or Tobin's "common funnel principle".

In this new analytical framework, the work of Mundell (1968) advocates assigning monetary policy to external equilibrium and fiscal policy to internal equilibrium. Such a rule generates four types of disequilibrium, of which only situations of excess domestic demand and external surplus, then excess domestic supply and external deficit, require the use of an accommodating policy mix. However, in the presence of a liquidity trap, Keynes (1936) subordinated monetary policy to fiscal policy. Such an accompanying policy avoids the crowding-out effect of interest rates, while maintaining the stimulating effect on activity.

However, faced with the stagflation of the 70s, the Keynesian policy mix was challenged not only by monetarists, but also by the New Classical Economics (Neoclassical). However, the essence of their recommendations was weakened by empirical evidence (Blinder, 1982), giving greater weight to the adoption of the policy mix, as the authorities had doubts about the economy's ability to stabilize itself. Thus, following Kydland and Prescott's (1977) time-inconsistency model of optimal policies, the policy-mix issue shifted from the problem of allocation to that of strategic coordination between economic policy authorities. In this way, monetary-budgetary theory provides a less common explanation for the episode of high and galloping inflation that affected Brazil in the 1980s. Loyo (1999) suggests that this phenomenon was caused by a combination of active monetary and fiscal policies.

Also, the link between the policy mix and prices has its origins in the Quantitative Theory of Money (QTM), which was developed by several schools of economic thought, including the classics, Keynesians, neoclassicals, and neo-Keynesians. It shows the causal relationship between growth in the money supply and the rise in the general price level. Friedman (1970) admits that inflation is always and everywhere a monetary phenomenon, in the sense that it is and can only be generated by an increase in the quantity of money that is faster than that of production. However, the classicists believe that there is a dichotomy between the real sector and the monetary sector.

All in all, the theoretical formalization of the different combinations of a coherent policy mix has revealed three possible scenarios. The table below summarizes the different scenarios and their theoretical frame of reference.

In total, the theoretical formalization of the different combinations of a coherent policy mix made it possible to note three possible scenarios. The table below summarizes the different scenarios and their theoretical frame of reference.

Table 1: Policy mix regimes and their theoretical frames of reference.

Type of policies	Expansive budgetary	Restrictive budgetary
Expansive monetary	Optimal Keynesian Policy mix	Optimal monetarist Policy mix
Restrictive monetary	Optimal neoclassical Policy mix	No theoretical references

Source: Authors based on Houngbedji (2017).

Empirically, a few studies have assessed the coordination of fiscal and monetary policies using different approaches. A first group of work highlighted a possible relationship between economic policy instruments using a structural vector autoregressive model. Among these works, we can mention the articles of Dramani (2007); Sarr (2011), Ndiaye and Konte (2012), and Allegra Mbuyi and Kondolo Kojack (2021). This work has shown that fiscal policy behaves as a substitute for monetary policy in the WAEMU zone, whereas in the CEMAC zone, the complementarity effect prevails. The work of Combey Adama (2014) constructing the policy-mix index has shown the existence of this coordination for a few years and this coordination has positive effects on the stability of the general price level. In the same way, Hassan and al. (2014) and Al-shawarby & El Mossallamy (2019) affirm the effectiveness of both monetary and fiscal policy in achieving output and inflation stability.

The second group assessed the efficiency conditions of a policy mix by adopting three types of approach (Computable General Equilibrium model; Dynamic Stochastic General Equilibrium model (DSGE); and the game-theoretic approach of Nordhaus, 1994), with associated numerical calibrations. This group includes the articles by: Menguy (2005); Badarau Semenescu et al. (2008); Gaffard (2010); Combey and Nubukpo (2013). The work of Combey and Nubukpo (2013) sought to assess the effect of a policy mix on the main macroeconomic variables using game-theoretic simulations. The results showed that the coordinated equilibrium achieves social optimum levels for the main macroeconomic variables (output, inflation, interest rate and deficit). On the other hand, the Stackelberg equilibrium produces a lower level of deficit and interest rate than the Nash equilibrium. The work of Combey A. (2014) on the UEMOA zone's policy mix and its guarantee for domestic stability and growth has shown that the articulation of monetary and fiscal policy only contributes to price stability, without producing overall macroeconomic stability effects to support long-term economic growth.

In summary, the results obtained by these approaches (Célestin Balla et al, 2022 and Honoré Sèwanoudé, 2017) although they are relevant, but they can be questioned because of the calibration parameters used for the different simulations. In addition, the parameters used for the most part are not based on economic or empirical justifications. They are considered random variables to which the analyst assigns distributions a priori in order to be able to make estimates. Similarly, the values taken by these parameters are identical to those used in studies of this kind within industrial countries. Any attempt to transpose these parameters into studies of economies that do not have the same structures as those of industrial countries would bias the results.

To remove the ambiguities of the above approaches, another empirical literature has tackled new techniques. This concerns the evaluation of monetary and budgetary indicators. Examples include the work of Célestin Mekongo et al (2022), Ary Tanimoune et al (2012) and Honoré Houngbedji (2017). This third group of studies is based on an extension of neo-Keynesian policy-mix theory. Such an extension is based on the evaluation and subsequent estimation of indicators of fiscal and monetary conditions.

3. Methodology and sources of data

In this section, we describe the main steps involved in building the ICPM. We then present the data used and their sources. Initially, we identify the two regimes for monetary policy, based on the monetary conditions index (MCI), and for fiscal policy, based on the structural budget balance (SBS). Then, based on the two variables, we discuss the optimal coordination regimes for monetary and fiscal policy. Finally, we specify the model that allows us to characterize and highlight the different policy-mix regimes likely to influence inflation.

3.1 Nature of policy-mix

The methodological framework for constructing the policy-mix index in order to analyze these effects on inflation across these regimes follows on from the work of Ary Tanimoune et al. (2011) and Honoré Houngbedji (2017), with some specifications in the construction of policy-mix indices.

Monetary conditions index (MCI)

Consider the monetary conditions index (MCI) as an indicator of the stance of monetary policy. As defined in the literature, the MCI is the weighted sum of the difference between the logarithm of the central bank's real discount rate and its base-year value, and the difference between the logarithm of the real effective exchange rate (REER) and its base-year value (Eika et al, 1996). In the light of the foregoing developments, for the evaluation of the MCI, we consider two variables, namely the BEAC tender interest rate (TIAO) on the interbank market, the real effective exchange rate (REER), the nominal exchange rate (NER) and the deposit interest rate (DIR). Here, the specification is made for three variables. The equation for this index is as follows:

$$ICM_{i,t}=\alpha(R_{i,t}-R^{*}_{i,t})-\beta(E_{i,t}-E^{*}_{i,t})-\lambda(NER_{i,t}-NER^{*}_{i,t})-\cdots \quad (1)$$

R^{*}_{it} and $E^{*}_{i,t}$ respectively represent the base values of the interest rate and the real exchange rate to be determined by considering the average values over the analysis period as the base year value (Diarisso and Samba, 2000). However, there is no consensus in the literature on the determination of base values. The weighting coefficients in equation 1 are calculated by adopting the standard methodology used by the central banks of Canada, France and other countries. Effect, we estimate the equation between aggregate demand (change in real GDP, $\boldsymbol{\Delta y_{i,t}}$) and the two monetary policy instruments in the presence of the control variables ($\boldsymbol{Z_{i,t}}$). The equation is as follows:

$$\Delta y_{i,t}=\theta_{i1}R_{i,t}+\theta_{i2}E_{i,t}+\theta_{i3}Z_{i,t}+\pi_{i,t} \quad (2)$$

Equation two is estimated by the ordinary least squares (OLS) method if the variables are stationary. In the case of non-stationary variables, equation 2 is estimated based on an error-correction model. In contrast to other works, where nothing was mentioned, the coefficients of both instruments must be significant, and the residuals must follow a normal distribution. The estimated coefficients $\widehat{\theta_{i1}}$ and $\widehat{\theta_{i2}}$ to determine the coefficients of equation 1 whose formula is as follows:

$$\alpha=\frac{\widehat{\theta_{i1}}}{\widehat{\theta_{i1}}+\widehat{\theta_{i2}}} \quad \text{et} \quad \beta=\frac{\widehat{\theta_{i2}}}{\widehat{\theta_{i1}}+\widehat{\theta_{i2}}}$$

Furthermore, in order to distinguish between the effects of monetary policy in a phase of monetary restriction (increase in MCI) and in a phase of monetary expansion (decrease in MCI), we derive two indicators from the MCI calculated in this way: MCI_sup and MCI_inf. These characterize the regimes of monetary restriction and expansion respectively.

$$\mathrm{MCI_{sup}}=\begin{cases}MCI\ if\ MCI \geq MCI median\\ 0 \quad\quad if \quad otherwise\end{cases} \text{ And } \mathrm{MCI_{inf}}=\begin{cases}MCI\ if\ MCI < MCI median\\ 0 \quad\quad if \quad otherwise\end{cases}$$

Budgetary Conditions Index (BCI)

The cyclically adjusted primary budget balance, also known as the primary structural balance, is used as an indicator of the nature of fiscal policy. It is calculated as the estimated residual of the equation linking the primary budget balance ($\mathrm{SBP_{i,t}}$) to the difference between actual and potential GDP (output gap=Y-Y*)[2]. Thus, we have the following equation:

$$\mathrm{SBP_{i,t}}=\mu X_{i,t}+\boldsymbol{\Phi_{i,t}} \quad (3)$$

With $\boldsymbol{\Phi_{i,t}}$ the error term, the predicted values that make up the part of the SBP not explained by the business cycle, constitute the BCI for convenience. This characterizes the discretionary orientation of fiscal policy. The more it increases (decreases), the more this reflects an increasingly restrictive (expansionary) fiscal policy. Following the same approach in calculating the ICM, we derive two indicator variables from the BCI: BCI_Sup and BCI_Inf, which characterize respectively austere (restrictive) and lax (expansionary) fiscal regimes.

[2]The output gap is calculated as the difference between the logarithm of real GDP and its trend. The trend is obtained using the Hodrick-Prescott filter, with a smoothing parameter of 100. We also conducted estimations with a smoothing parameter and the results were significantly different.

$$\mathrm{BCI_{sup}} = \begin{cases} BCI if BCI \geq 0 \\ 0 \quad if otherwise \end{cases} \text{And } \mathrm{BCI_{inf}} = \begin{cases} BCI if BCI < 0 \\ 0 \quad if otherwise \end{cases}$$

In order to determine the coherence of the policy-mix by discriminating the effect of the interaction between the MCI and the BCI according to the nature of the regime, we will have four policy-mix regimes. Indeed, we construct four indicator variables for the nature of the policy-mix regime:
R1= (restrictive MP and FP); or R1 = MCI_Sup*BCI_Sup
R2= (restrictive MP and expansionist FP); or R2 = MCI_Sup*BCI_Inf
R3= (expansionistMPand restrictive FP); R3=MCI_Inf*BCI_Sup
R4= (MP and FP are expansionist); or R4 =MCI_Inf*BCI_Inf.

In regime 1, ICB and ICM take on increasingly positive values, while in regime 4, they take on increasingly negative values. However, the situation is less clear-cut in regimes 2 and 3, where ICB and ICM alternate between positive and negative signs.

3.2 Theoretical model framework and specification

In this section, we present the econometric models. One of our objectives is to highlight the influence of the consistency of the policy mix on overall price stability in the CEMAC. The equation is as follows:

$$\Delta y_{i,t} = \alpha_i + \lambda_t + \beta_1 SBP_{i,t} + \beta_2 ICM_{i,t} + \beta_3 (ICM_{i,t} * SBP_{i,t}) + \beta_{it} Z_{i,t} + \epsilon_{i,t} \qquad (4)$$

To estimate equation 4, we use the generalized method of moments (GMM) for dynamic panels, which has the advantage of taking into account certain dimensions of endogeneity between variables (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell et al., 2000). The instrumentation method chosen is as follows: (a) for the control variables, values lagged one period are used, while the endogenous variable is lagged two periods (Stock, 2001).

3.3 Data sources

The analysis covers CEMAC countries from 2000 to 2022. Data on tender interest rates (TIAO); real effective exchange rate (REER); monetary growth (M2) are taken from BEAC reports. Data on GDP economic growth; inflation (INF), investment (INV) and trade (TR) are taken from the World Bank's World Development Indicators (WDI,2023) database. Data on debt (DEBT); public expenditure (PEXP); primary fiscal balance (SBP) are from the IMF's World Economic Outlook (WEO, 2023), nominal exchange rate (NER) and deposit interest rate (DER) are from IMF data. Descriptive statistics for the various variables, for a sample of the 6 CEMAC countries, are presented in Appendix Table A1. The list of variable sources is also presented in the same table.

4. Presentation and analysis of results

4.1. Results of stationarity test on analysis variables

We first test the order of integration of our series and then the existence or non-existence of a co-integration relationship using non-stationary panel econometric techniques. The root tests are the first-generation Im, Pesaran and Shin (IPS) and Levin-Lin-Chu (LLC) tests, and the second-generation Im, Pesaran and Shin test to correct the limitations of the first-generation tests. Overall, the unit root tests suggest that all variables are stationary at the level except the nominal exchange rate.

Table 2. Stationarity test of panel data

Variables	Levin-Lin-Chu (LLC)		Im, Pesaran et Shin (IPS)	
	Values	Results	Values	Results
Inflation	-6.652 (0.0000)	I (0)	-9.300 (0.0000)	I (0)
GDP growth	-4.919 (0.0000)	I (0)	-3.149 (0.0000)	I (0)
Money supply	5.105 (0.0000)	I (0)	-5.928 (0.0000)	I (0)
TIAO	-3.753 (0.0001)	I (0)	Insufficient number	-
Real effective exchange rate	-7.723 (0.0000)	I (0)	-6.702 (0.0000)	I (0)
Public debt	-2.605 (0.0046)	I (0)	-0.7652 (0.222)	I (1)
Public spending	-2.549 (0.0054)	I (0)	-2.000 (0.022)	I (0)
Primary fiscal balance	-2.961 (0.0015)	I (0)	-3.112 (0.001)	I (0)
Nominal exchange rate	-1.1919 (0.1167)	I (1)	-	-

***NB**: If the P-values (in brackets) are less than 0.01; 0.05; 0.10, this means that the variables are stationary at the 1%; 5%; 10% threshold, respectively.*

4.2. Econometric estimation results

After constructing the policy-mix consistency index (PMCI) for CEMAC countries, we attempt to analyze the link between policy-mix consistency and stabilization of the general price level using the consumer price index (CPI). Panel regression methods with fixed and random effects are used. These estimation techniques do not address the problem of endogeneity.

To solve this problem, we use the «GMM-SYS[3] » estimator proposed by Blundell and Bond (1998) and the « SPGMM-DIFF[4]» estimator by Arrelano and Bond (1991). The results of the inflation equation estimations are presented in Table 3 below. Column 1 shows the results of the Bover/Blundell and Bond estimator and column 2 shows the results of the Arrelano and Bond estimator. For reasons of robustness, the various tests, including those for overall model validity, identification of spatial autocorrelation, identification of heteroscedasticity and residual normality, are also presented in the table. These tests validate the specification of this model through the probability associated with the Wald statistic, and the normality of the residuals through the Jarque Bera test. In other words, the variables selected effectively explain inflation in CEMAC countries. Table 3 shows that the policy-mix variables, money supply and debt are all significant at the 1 percent, 5 percent, and 10 percent thresholds. However, control variables such as public spending and terms-of-trade instability are not significant.

Whether using the SPGMM-DIFF or SPGMM-SYS technique, the results suggest that there is a relationship between the policy mix indicator and inflation. The coefficient of the optimal coordination variable is significant. In other words, the results show that optimal coordination of monetary and fiscal policy, in its current state, contributes to price stability in CEMAC (this result was obtained in the work of Adama C., 2014 and Allegra Kabamba and al; 2021). Similarly, the results also show that the adoption of a Policy-mix in which monetary policy is expansionary while fiscal policy is restrictive, increases inflationary pressures in the sub-region. In other words, the monetarists' optimal policy mix of expansionary monetary policy and restrictive fiscal policy increases inflationary pressures.

The control variables used also deliver important results. Firstly, there is a positive and significant relationship between the value of money supply and inflation. Thus, the increase in money supply increases inflationary pressures in CEMAC countries in both models. Its sign is not contrary to expectations and is in line

[3](Spatial Autoregressive Generalized Method of Moments) in system

[4] (Spatial Autoregressive Generalized Method of Moments) in first difference

with the quantitative theory of money based on the work of Friedman (1970), who admits that inflation is always and everywhere a monetary phenomenon. Similarly, the monetary conditions index (MCI) and the fiscal conditions index also influence price stability. Similarly, an increase in debt as a percentage of GDP translates into higher inflation in CEMAC countries. However, control variables such as public spending and terms-of-trade instability do not appear to have statistically significant effects on inflationary pressures.

Table 3:Estimation of the GMM panel model

Dependent variables: Inflation	ARELLANO-BOVER/ BLUNDELL-BOND	ARELLANO-BOND
Inflation (-1)	-0.194***	-0.254***
	(0.067)	(0.087)
Policy-mix (MCI*ICB)	-0.495**	-0.524**
	(0.192)	(0.216)
Regime 3 (MCI_inf*ICB_sup)	1.199***	1.303***
	(0.327)	(0.361)
Regime 4 (MCI_inf*ICB_inf)	-1.187	-1.609
	(2.048)	(2.048)
Budgetary Conditions Index (SBS)	1.322***	1.337***
	(0.304)	(0.349)
Monetary conditions index (MCI)	-0.584	-0.732
	(0.546)	(0.570)
Money supply growth	0.043**	0.036*
	(0.020)	(0.021)
Public spending (percentage of GDP)	0.035	0.021
	(0.052)	(0.054)
Debt (percentage of GDP)	0.028*	0.032**
	(0.015)	(0.016)
Terms of trade instability	-0.033	0.010
	(0.027)	(0.051)
Constant	2.054	-0.922
	(2.324)	(4.004)
Observations	132	132
Number of countries	6	6
Global validity test of the model		
Wald test [Wald chi2(10)]	44.14***	36.49***
Prob > chi2	0.00000	0.0001
Test of overidentifying restrictions		
Sargan test [chi2(129)]	142.4	117.24
Prob > chi2	0.198	0.256
Residual normality test		
Jarque Bera	6.5	1.4
Prob (J – statistic)	0.038	0.498

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*Note: The other schemes R1= MCI_Sup*BCI_Sup and R2= MCI_Sup*BCI_Inf had null values in their constructs using the methodology and because of the sample size and the model did not take them into account.*

Concluding remarks and future research

In this article, we have highlighted the role of policy mix consistency in overall price stability in CEMAC between 2000 and 2022. In CEMAC, little has been said about the coherence of the policy mix and its effects on overall price stability. The use of the Generalized Method of Moments (GMM) for dynamic panels yielded

important results. Our contribution to the literature on policy mix consistency in monetary unions is twofold. Firstly, on the basis of the monetary conditions index and the structural primary budget balance (used to assess monetary and fiscal policy stances in the CEMAC), we have shown that a policy mix contributes to price stability in the CEMAC. Similarly, the adoption of a Policy-mix in which monetary policy is expansionary while fiscal policy is restrictive, increases inflationary pressures. To minimize the potential negative impact on rising inflation, coordination between national fiscal policies must be ensured. Otherwise, the policy-mix is likely to be inconsistent, exerting an unintended influence on the effects of monetary policy on inflation and undermining, if not nullifying, the positive effects expected from the common currency. This scenario could seriously hamper the drive towards monetary integration or threaten the survival of existing integration.

This article opens the window for future research into the transmission of policy-mix shocks on inflation. It would be useful to use other empirical models that can incorporate regime shifts and nonlinearities, such as the Switching Markov and Threshold VAR models. These alternative methods may be useful for examining the effects of shocks on inflation components in the presence of asymmetric and non-linear relationships between fiscal and monetary variables. The inclusion of unconventional monetary policies in future studies would also be useful in the analysis of the policy mix.

In the light of the results, we propose some of suggestions to the BEAC and the governments of the CEMAC member countries. It is indeed crucial that the Central Bank (BEAC) maintains the tightening of its monetary policy and works closely with the governments of member countries to ensure overall price level stability. It would be important for the BEAC to continue to maintain a restrictive monetary policy in order to reduce credit demand and curb the growth of money supply.

In addition, the BEAC could consider working with its member states to implement stricter fiscal and budgetary policies to reduce budget deficits and limit the growth of public debt. Finally, BEAC could work with member governments to implement price stabilization policies, such as commodity subsidy programs, to help alleviate inflationary pressures on consumers.

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Appendices

Appendix 1: Description of Variables

Variable	Description	Source
INFL	Inflation	WDI
GDP growth	Real GDP growth rate	WDI
TIAO	Policy bid interest rate(Taux d'intérêt des appels d'offres (BEAC)	BEAC
REER	Real effective exchange rate	BEAC
SBP	Primary fiscal balance	IMF
DIR	Deposit interest rate	IMF
NER	Nominal exchange rate	IMF
PEXP	Public expenditure as a percentage of GDP	IMF
DEBT	Public debt as a percentage of GDP	IMF
TR	Trade	WDI
M2	Monetary supply	BEAC
BCI	Budgetary conditions index	Author
MCI	Monetary conditions index	Author
INV	Public Investment as a percentage of GDP	WDI

Appendix 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
TIAO	138	4.5	1.4	2.5	7.1
REER	138	0.2	6.8	-20.6	38.4
SBP	138	2.6	7.7	-17.2	29.0
TR	138	80.2	32.1	31.5	156.9
M2	138	12.0	15.8	-22.8	68.4
INFL	138	3.0	3.1	-9.0	14.9
GDP GROWTH	138	3.3	7.1	-36.4	33.6
DEBT	138	47.0	28.1	0.5	112.1
PEXP	138	20.3	7.0	10.8	48.6
INV	138	24.3	12.6	4.7	81.0
DIR	138	3.5	1.0	2.5	5.0
NER	138	557.0	76.1	446.0	732.4
MCI	138	0.1	1.4	-2.5	2.4
BCI	138	2.6	1.9	-0.7	9.6