

Review Article

Monetary Policy and Financial Stability in Fixed Exchange: A Case Study of BEAC

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Received Date: 23 November 2020

Revised Date: 31 December 2020

Accepted Date: 01 January 2021

Abstract - This paper examines the policy mixes nature between monetary policy and macroprudential policy in the Bank of Central African States (BEAC) countries. An "augmented" monetary rule of the financial stability objective is tested using a Panel Transition Regression Models (PTR). The results show that the nature of the policy-mix between monetary policy and macroprudential policy depends on the prevailing economic situation appreciated by BEAC's net foreign assets' evolution.

Keywords - Policy-mix, Monetary policy, Financial stability, Macroprudential policy.

I. INTRODUCTION

Further to the international financial crisis of 2007, the link between monetary policy and macroprudential policy has gained particular interest both for the sake of literature and for operational point of view regarding the implementation of their policy instruments by the central banks (Smets, 2014, Antipa and Matheron, 2014, Gertrup et al., 2016, Svensson, 2016, Lavieuge, 2018).

The link between monetary policy and macroprudential policy raises debates between the separate approach economists and the integrated policy-mix approach. The separate approach developed by Svensson (2010, 2012), Goodhart and Schoenmaker (1995) builds on the principles of Tinbergen (1952) and Mundell (1963) to show the limits of the interest rate instrument and the efficiency of the macroprudential instrument regarding financial stability. Moreover, it argues that the central bank's credibility may have been subject to a dual objective of monetary and financial stability. In this respect, Goodhart (2010) argues that the macroprudential instrument has influenced more financial stability than the interest rate instrument. Yet, according to the Policy-mix's integrated approach, the rule is increased by a financial target so that the interest rate completes the action of macro-prudential policy, or at least to ensure that the action of the macro-prudential policy interest rate does not go against financial stability. It is about combining

monetary and macroprudential policies. Proponents of the Policy-mix integrated approach argue

that a standard Taylor (1993) rule accentuates financial risks through Mishkin's 'risk-taking channel' (Borio and Lowe, 2002). They also signal out the limits of macroprudential policy (Mishkin, 2011) and the interest of associating an increased Taylor rule, not only subject to the banks but also the whole market, including shadow banking, to an interest rate adjusted according to financial tensions. This approach highlights, among other things, the narrow nature of macroprudential instruments. Indeed, as they are more targeted, they can also be more easily bypassed, hence the need to supplement their action by that the interest rate (Angeloni, 2014).

In Africa, the monetary policy of the Bank of Central African States (BEAC) aims to guarantee monetary stability, namely a low rate of inflation and an adequate external coverage rate of the currency (the threshold minimum is 20%) to support the fixed exchange rate between the FCFA, the currency issued by the BEAC on behalf of the member states (Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic, and Chad) and the euro without prejudice to this objective, BEAC supports the economic policies of the Member States. Finally, since 2010, BEAC has integrated the objective of financial stability among its missions.

This research address the following question: What is the nature of the policy mix that the BEAC should implement to carry out its missions? This question raises at least two reasons: i) the main economies of BEAC member States have been exposed in the past, particularly during the 1980s, to bank crises; ii) the pursuit of financial stability can become an important objective in the event of a turnaround in the oil market as a result of the increase in bad debts in case of deteriorating credit quality in the private sector.

This research is a contribution to the study of the link between monetary policy and macroprudential policy. Thus, it relies on a monetary policy rule elaborated by Mc



Callum (1987), which considers the monetarist orientation of BEAC's monetary policy. To assess the policy mix's nature that BEAC implements, the selected rule should be increased by a financial stability objective. In addition, this survey is based on Panel Transition Regression Models (PTR) as is used (Hansen 1999, Gonzalez et al., 2005). This choice seems appropriate to the extent that the level of foreign exchange reserves in the zone is subject to recurring fluctuations due to BEAC member countries' dependence on changes in commodity prices and the exchange rate between the euro and us dollar. In this respect, a regime change model allows taking into account the uncertainty (Friedman 1960, Brainard 1967, Wieland 2002, Grigoli et al. 2015, Drew-D-Creel 2017) that BEAC faces in the conduct of monetary policy as regards the evolution of the international environment. Thus, this research's novelty lies in that the link between monetary policy and macroprudential policy is sensitive to the conjuncture. The study is organized as follows: Section 2 is devoted to reviewing the literature; Section 3 presents the model; Section 4 provides an empirical analysis. Finally, section 5 concludes this study.

II. REVIEW OF LITERATURE

The literature highlights two types of relationships between monetary policy and macroprudential policy. The first advocates the separation between monetary policy and macroprudential policy, each of which is entrusted to separate bodies in charge of monetary stability and financial stability (Svensson, 2012; Bernanke 2012, Beau et al., 2012). Based on a strict reading of both Tinbergen's rule of coherence (1952) and Mundell's (1963) rule of efficient allocation of instruments, the separate approach admits relating monetary policy to price stability and macroprudential policy to financial stability. Under this approach, the central bank should be more involved in the prudential supervision of financial institutions. This is the consensus of the "modified Jackson Hole" (Dees, 2019), claiming that monetary policy should keep its usual framework, that is, the standard Taylor rule.

On the other hand, the last approach favors integrating monetary policy and macroprudential policy; both should be entrusted to the same institution for a better matching between the respective objectives (Adrian and Shin, 2009; Mishkin, 2011; Eichengreen et al. 2011). Under this approach, financial stability must be a secondary objective of monetary policy. The central bank must integrate financial stability considerations when implementing its interest rate decisions. Price stability and financial stability can therefore be incorporated into an "augmented" Taylor rule that includes one or more financial variables, such as credit (Christiano et al. 2010) or indicators of financial imperfections (Curdia Woodford, 2010). Theoretically speaking, this approach seems limited by applying the Tinbergen (1952) rule of coherence since the interest rate itself cannot achieve three objectives: price stability, economic stability, and financial stability. In practice, such an articulation is possible whence financial stability is a secondary objective, and monetary policy supports a

macro-prudential policy that cannot manage the financial cycle itself.

Finally, it should be noted that between these two approaches, intermediate positions are possible. Following Beau et al. (2012), the optimal policy mix depends on the type of shock, the crossing of inflation, and financial stability conditions. Thus, for some central bankers, the integrated scheme is an emergency solution that should only be used when it remains "the unique possible option" during an extreme crisis. Bernanke (2012) "does not exclude" the use of the interest rate to fight against financial instability in these exceptional circumstances. On the other hand, in a normal situation, a decoupled policy-mix is appropriate. Finally, in case of a conflict of objective, when there is no synchronization of the real and financial cycles, priority is given to a single objective. When it is achieved, we look at the second. The policy-mix choice is not just a theoretical question; it is rather empirical since it varies according to macroeconomic conditions. Empirically, in economies where Taylor's rule conducts monetary policy, the latter is augmented by financial conditions to determine the link between monetary policy and macroprudential policy. The estimation methods used for this purpose are the Bayesian's approach (Smets and Wouters, 2003), or techniques for matching the reaction functions (Christiano et al., 2005). However, the results do not conclude the debate on whether or not to increase the Taylor rule (Carré et al., 2015).

III. MODEL

The present research suggests an Mc Callum-type rule because of BEAC's main mission: the pursuit of monetary stability, taken as a low level of inflation and a sufficient level of foreign exchange reserves. Indeed, this suggests that the monetary policy of the BEAC has a monetarist theoretical anchorage because it combines the internal theory of money on the internal level and the monetary approach of the balance of payments on the external level. In addition to the monetary stability and the cyclical smoothing variables, the financial stability objective, as measured by the difference between bank loans and their long-term trend (Curdia and Woodford, 2010), is of particular interest in the BEAC zone because the financing of the economy is essentially based on the banking system, financial markets being embryonic in this zone.

Mc Callum's "augmented" rule looks as follows:

$$\Delta b_{i,t} = \theta(y_{i,t} - y_{i,t}^*) + \tau(aen_{i,t} - aen_{i,t}^*) + \theta(\text{crepr}_{i,t} - \text{crepr}_{i,t}^*) + \delta(\pi_{i,t} - \pi_{i,t}^*) + \epsilon_{i,t} \quad (1)$$

For $i = 1, 2, \dots, N$; $t = 1, 2, \dots, T$

With:

- $\Delta b_{i,t}$, the variation of the monetary base;
- $\text{crepr}_{i,t}$, credit to the private sector;
- $\text{crepr}_{i,t}^*$, potential credit to the private sector;
- $aen_{i,t}$, net foreign assets;
- $aen_{i,t}^*$, potential net foreign assets;
- $\pi_{i,t}$, inflation rate ;
- $\pi_{i,t}^*$, the target of inflation rate ;

- $y_{i,t}$, gross domestic product;
- $y_{i,t}^*$, potential gross domestic product;
- $\epsilon_{i,t}$, the error term.

A non-linear panel is estimated by integrating the gross domestic product's log as the variable defining the regime change. This approach seems appropriate to determine the nature of the policy-mix between monetary policy and macroprudential policy due to the prevailing economic situation (recession or expansion) prevailing in the area. In fact, in fixed exchange rates, as is the case between the CFA and the euro, foreign exchange reserves constitute the central bank's adjustment variable. Their level influences the parity of the currency concerned. Moreover, the model adopted seems appropriate for determining the nature of the policy-mix between monetary policy and macro-prudential policy according to BEAC's external assets' evolution. Mc Callum's 'augmented' rule of financial stability then results in the following non-linear form:

$$\Delta \text{bm}_{i,t} = \theta_{0i} + [\partial^1(y_{i,t} - y_{i,t}^*) + \tau^1(\text{aen}_{i,t} - \text{aen}_{i,t}^*) + \theta^1(\text{crepr}_{i,t} - \text{crepr}_{i,t}^*) + \delta^1(\pi_{i,t} - \pi_{i,t}^*)] * I(\text{lpib}_{i,t} \leq \gamma) + [\partial^2(y_{i,t} - y_{i,t}^*) + \tau^2(\text{aen}_{i,t} - \text{aen}_{i,t}^*) + \theta^2(\text{crepr}_{i,t} - \text{crepr}_{i,t}^*)] + \delta^2(\pi_{i,t} - \pi_{i,t}^*) * I(\text{lpib}_{i,t} > \gamma) + \epsilon_{i,t} \quad (2)$$

With:

- $\text{dlpib}_{i,t}$, the log differential of the gross domestic product per capita (threshold variable);
- γ , is the threshold;
- Exponents 1 and 2 are marginal effects, respectively in regimes 1 and 2;
- I am an indicator function that takes the value 1 if the condition in parenthesis is respected and 0 otherwise.

The value of the threshold γ is determined to minimize the sum of the squares of the residues (SSR), according to the following formula:

$$\hat{\gamma} = \text{argmin SSR}(\gamma)$$

The estimation of the "augmented" Mc Callum rule also enables determining whether the monetary base is an appropriate instrument for ensuring the link between monetary policy and macroprudential policy following the phases (good or bad) of changes in net foreign assets.

IV. EMPIRICAL ANALYSIS

The data issued from the World Bank database and the Bank of Central African States (BEAC) for the 2006-2017 period. They include gross domestic product per capita (GDP), credits to the private sector (crepr), net foreign assets (aen), inflation rate (inf), and the monetary base (bmo). To harmonize quantities, the GDP and the monetary base are linearized by the logarithm. In addition, series

trends are determined using the Hodrik and Prescott (HP) filter. Annual data are transformed into quarterly data using Mansouri and Afroukh (2008) method.

The threshold model is estimated using the Hansen (1999) method and the Stata14 software to identify the nature of the policy-mix between monetary policy and macroprudential policy.

According to the preliminary panel tests, the Fischer heterogeneity test results show that the BEAC countries are heterogeneous, hence confirming the possibility of estimating the model in terms of a panel (prob> F = 0.000). Kennedy's multicollinearity tests (1985) show that the variables are not strongly correlated with each other. In addition, the Hausman test supports the idea that the most relevant model for estimating the Mc Callum rule is fixed-effect (prob> khi2 = 0.000). All these results are available on request.

The following table provides the estimation of the single threshold by the bootstrap method:

Table 1: Threshold Effect Test

Tests (bootstrap = 300)	Seuil	Minimal	Maximal	p-value
Single	0.0176	0.0127	0.0177	0.053***

Notes: The Student tests on each coefficient are based on a null hypothesis of significance at zero and an alternative hypothesis of non-significance at zero. When the coefficient is preceded by (*), then the null hypothesis is rejected at the 1% threshold; for (**), the null hypothesis is rejected at the 5% threshold; for (***) it is rejected at the 10% threshold.

Thus, the transition from regime 1 (low-growth) to regime 2 (high-growth) occurs when the logarithm of net external assets (laen) goes above 28.2809. The confidence interval for this threshold is between 28.2527 and 28.2998 at the 95% level.

The estimate of Mc Callum's 'augmented' rule of financial stability leads to the table below results.

Table 2: Mc Callum 'Augmented' Rule

Endogenous variable: the monetary base (lbmo_{i,t})

Exogenous variables	Coefficients	
	Regime 1 $\gamma < 0.0176$	Regime 2 $\gamma > 0.0176$
Output gap (spib _{i,t})	(3) 6.98e-07*	1.06e-08
Price stability (sprix _{i,t})	-0.0365*	-0.0785*
Financial Stability (sfin _{i,t})	6.37e-07	-1.33e-06**
Stability of net foreign assets (smoe _{i,t})	4.53e-06**	2.83e-05*
Constant	13.319*	13.319*

Notes: The Student tests on each coefficient are based on a null hypothesis of significance at zero and an alternative hypothesis of non-significance at zero. When the coefficient is preceded by (*), then the null hypothesis is rejected at the 1% threshold; for (**), the null hypothesis is rejected at the 5% threshold; for (***) it is rejected at the 10% threshold.

The global significance of the estimated Mc Callum rule ($\text{prob} > F = 0.0000$) and that of the threshold (5%) reinforces the relevance of the two-regime non-linear relationship.

Indeed, the results in Table 2 show that the monetary base is a relevant instrument for identifying the nature of the policy-mix between monetary policy and macroprudential policy. Indeed, the choice of an "integrated" or "separate" policy mix depends on the area's prevailing economic situation. In particular, it appears that in periods of the bad economic situation (Regime 1: $\text{dlpibh}_{i,t}$ lower than 0.0176), financial stability does not have a significant effect on the monetary base. This suggests that the policy-mix between monetary policy and macroprudential policy is "separate." On the other hand, during boom periods (Regime 2: $\text{dlpibh}_{i,t}$ above 0.0176), the monetary base reacts to changes in financial stability. This suggests that the policy mixes nature between the monetary and macroprudential policies of an "integrated" nature.

Thus, according to the results, in regime 1, the objective of financial stability can be achieved through a "separate" policy mix. The aim is to develop an interaction between the monetary and macroprudential policies, led respectively by the BEAC and the Banking Commission of Central Africa (COBAC), taking into account the other's measures. In this respect, the BEAC, when conducting monetary policy, will ensure, inter alia, the proper functioning of the credit channel so as not to prejudice the financial stability measures taken by COBAC. On the other hand, in regime 2, it is suggested, in the context of an "integrated" policy mix, that the steering of monetary policy instruments by BEAC anticipates cyclical downturns, a source of financial instability insofar as the level of doubtful debts held by banks may become significant in bad economic conditions. In other words, it is the responsibility of BEAC to consider all the appropriate measures to prevent adverse effects on financial stability, which could be observed during a recession (regime 1), which would be triggered by the euphoric behavior of banks during the expansion phase (regime 2).

V. CONCLUSION

This contribution attempts to identify the nature of the policy-mix between the monetary policy and the macroprudential policy of BEAC. For this purpose, an "augmented" monetary rule of a financial stability objective is tested using a regime panel data model change. The results show that the policy mixes nature between monetary policy and macroprudential policy depends on the economic situation, precisely the evolution of net foreign assets. Indeed, it appears that the monetary authorities should use a "separate" policy-mix during a "bad economic situation" (regime 1). However, during "good economic conditions" (regime 2), those authorities should implement an "integrated" policy mix in terms of a McCallum rule augmented by a financial stability objective.

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