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Policy Mix Coherence: What Does it Mean for Monetary Policy in West Africa?

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Abstract

This article examines the influence of Policy Mix coherence in Economic Community of West African States (ECOWAS). The paper innovates in two ways. First, through an interaction between the monetary conditions index and the primary structural fiscal balance, we highlight coherence-type complementarities between monetary policy and fiscal policy with regard to their effects on economic activity. Second, we show that the influence of the coherence of policy mix on the effect of monetary policy is different according to the stance of the economy within the four possible regimes of policy mix, mostly in the WAEMU subsample, where integration is deeper than in the non-WAEMU countries, thanks to the common currency (the Franc CFA) they share. The analysis is based upon a panel dataset from 1990 to 2006 and remains robust to alternative specifications used to calculate the monetary conditions index. Our results contribute to the debate regarding the prospect of an ECOWAS-wide common currency. Indeed, given the heterogeneity in the economic structure of its members States, more policy mix coherence seems necessary to avoid unexpected impacts of monetary policy on economic activity.

JEL Classification: E63, O55,

Key Words: Policy Mix, Structural Fiscal Balance, Monetary Conditions Index, Economic Community of West African States.

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1. Introduction

The Economic Community of West African States (ECOWAS), created in 1975 by the Treaty of Lagos, regroups 15 countries and constitutes the regional organization providing the framework for the integration process now underway in West Africa.[1] Eight of these fifteen countries – Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo – belong to a smaller regional sub-group, the West African Economic and Monetary Union (WAEMU). Although the WAEMU's creation in 1994 followed that of the ECOWAS, internal coordination within the WAEMU has proceeded more quickly than within the ECOWAS. The common currency shared by WAEMU members, the Franc CFA, issued by Central Bank of West African States is the key factor behind the gap in the pace of integration. Gambia, Ghana, Guinea, Nigeria and Sierra Leone have decided in 2000 to create a second common currency zone called West African Monetary Zone (WAMZ) within the ECOWAS.

The ultimate goal of this zone (ECOWAS) is to achieve both monetary and fiscal integration for all 15 countries, the latter objective being a corollary, if not a prerequisite of the first one. A merger between the two currency zones (the WAEMU and the WAMZ) is thus the long-term target. The institutional framework guiding ECOWAS policies is essentially twofold: the fiscal integration and the common currency project. ECOWAS's fiscal integration framework is a set of benchmarks that promote fiscal governance. Similar to the standards criteria set out in the WAEMU's Growth, Convergence and Stability Pact, ECOWAS's economic convergence rules[2] intend to consolidate both public finances and overall macroeconomic environment, creating the orderly and positive context needed for a successful transition to an ECOWAS-wide common currency. The plan for a common West African currency has existed since the establishment of the ECOWAS. Today, the basic pattern that shapes the various economic policies in the region consists of two phases: strengthen monetary integration within the WAEMU and achieve the creation of the WAMZ. Next, merge the two unions to obtain full monetary integration for ECOWAS. This monetary integration was planned for 2004, but awaits the creation of the WAMZ, which has been delayed by the inability of expected WAMZ members to meet the convergence criteria, either because of short-term arbitrage with higher economic growth reasons, or due to political economy restrictions.

[1] The 15 ECOWAS member countries are Benin, Burkina Faso, Cape Verde, Ivory Coast, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

[2] These rules are also ranked in two groups. The four criteria in the top group are as follows: not more than 4% of fiscal deficit; inflation rate under 5%; net reserves to cover at least three months' exports, and central bank loans to revenue of not more than 10% of the previous year's fiscal revenue. In the second set of criteria, six guidelines: no new arrears are permitted, and all existing arrears must be cleared; fiscal revenue equivalent to 20% of GDP; wage bill of maximum 35% of total fiscal revenue; government investment equivalent to at least 20% of total fiscal revenue; and stable exchange rates as well as positive levels of real interest rates maintained by each country.

However, a number of obstacles including divergent national economic structures have hampered this project. Given the broad diversity of the national economies involved, it seems not evident for a common central bank to introduce a monetary policy that is appropriate for each national context.

Indeed, a substantial strand of the literature stressed out the importance of monetary and fiscal policy coordination mechanisms. First, a number of studies conducted outside the context of monetary unions have emphasized the pivotal role of coordinated policies in macroeconomic stabilization (Alesina et *al.*, 1987; Villieu et *al.*, 1998; and Beetsma et *al.*, 1998). In the case of currency unions, studies have demonstrated that consistency in policy mix is even more important given that the survival of the union is at stake. With regard to the European monetary union, Fatas and Mihov (2002) and Gali and Perotti (2003) show that the need for increased coherence between national fiscal policies and the objective of a common currency led to enhanced fiscal discipline immediately prior to and after the launch of this currency. However, the short-lived nature of this corrective effect threatens the survival of the Union (Klein and Marion, 1997). With respect to monetary unions in Africa, Guillaume and Stasavage (2000) show that under certain conditions, monetary unions can enhance the credibility of government fiscal commitments. Debrun et *al.* (2002), in a study of the effects of monetary unions on fiscal discipline, conclude that the survival of an ECOWAS monetary union project can only be achieved by establishing rules, institutions and mutual monitoring processes that will give the union the role of a fiscal policy control agency. Ary Tanimoune and Plane (2005) and Ary Tanimoune, Combes and Plane (2008), focusing on the WAEMU, highlighted respectively the cohesion among member countries and the presence of non-linear effects of fiscal policy within the union. Hefeker (2010) demonstrates that fiscal reform efforts made by monetary union countries are dependent on its level of asymmetry. Consequently, if the perspective of merging WAEMU and WAMZ takes place, the need for fiscal reform would become even clearer. This would make it more essential than ever an assessment of the impact of policy mix coherence on economic activity.

The primary goal of this article is thus to examine the degree of influence exerted by policy mix coherence on the effects of monetary policy on economic activity. More specifically, this article tests the hypothesis that increased coherence between monetary and fiscal policies in ECOWAS countries would promote economic growth. The main contributions of this paper, derived from data provided by a 12-member ECOWAS panel, are twofold. First, through an interactive variable between the monetary conditions index (MCI) and the primary structural fiscal balance representing respectively the monetary policy trajectory and the fiscal policy trajectory, we highlight complementarity between the effects of monetary policy and the impacts of fiscal policy on

economic activity. Second, we demonstrate that this influence of policy mix coherence can be differentiated not only based on the economy's position within the four possible policy mix arrangements, but also relative to the two ECOWAS subsamples, namely the countries which already share a common currency in WAEMU on the one hand and the non-WAEMU countries on the other hand. Our results remain robust to alternative specifications used to calculate the MCI.

The rest of the paper is organized as follows: Section 2 presents the variables used to assess policy mix considerations in ECOWAS. The econometric modeling is exposed in Section 3, and the results are displayed and discussed in Section 4. Section 5 consists of a brief conclusion and economic policy recommendations.

2. Natures of Policy mix

In this section, we present the interactive variable of the policy mix and its different natures. We first present the variable as the proxy of monetary policy, the monetary conditions index. Then, we discuss the nature of the indicator of fiscal policy, the primary structural fiscal balance. Finally, on the basis of these two variables, we discuss the monetary and fiscal coordination-types regimes.

2.1. Monetary Conditions Index

Let us consider the Monetary Conditions Index (MCI) as a proxy of monetary policy orientation[3]. As defined in the literature, MCI is the weighted sum of the difference between the logarithm of the Central Bank real discount rate and its value of year base, and the difference between the logarithm of the real effective exchange rate (REER) and its value of the base year[4]. The MCI is given by equation (1),

$$MCI_{it} = \theta_{ir}\left(r_{it} - r_{it}^{base}\right) + \theta_{ie}\left(e_{it} - e_{it}^{base}\right) \quad (1)$$

The indices *i* and *t* refer respectively to country i and time period t. *r* represents the logarithm of the real discount rate and e, the logarithm of the real effective exchange rate. The MCI yields a synthetic indicator of monetary policy orientation, since it provides an evaluation of the joint effects of interest rate and exchange rate policies on aggregate demand. Given that an increase in real discount rate and REER represents respectively a restrictive Central Bank credit conditions and a real appreciation of the exchange rate, thus a higher MCI indicates a restrictive monetary policy.

One of the challenges in calculating MCI is the choice of the base year. In the absence of an objective reference (such as equilibrium level), average values for considered analysis period are conventionally used as reference value (Diarisso and Samba Mamadou, 2000). The MCI is then a

[3] See Duguay (1994), Ericsson et *al.* (1998), Eika et *al.* (1996), and Aubert (2003). Also see Diarisso and Samba Mamadou (2000) for WAEMU.

[4] Since the real discount rate contains both negative and positive values, log (r) is replaced by log (1+r).

summary measure of monetary policy stance compared to the period average. The other major difficulty in calculating MCI is identifying the weight of each parameter. The method used by the central banks of Canada, France, and the West African states consists of deducting θ_{ir} and θ_{ie} from the estimation of the aggregate demand, which represents the link between real GDP variations (Δy_{it}) to monetary policy instruments (r and e)[5]. The aggregate demand function is such,

$$\Delta y_{it} = \alpha_{i1} r_{it} + \alpha_{i2} e_{it} + \eta_i + \varepsilon_{it} \qquad (2)$$

η_i denotes the time invariant features specific to each country and ε_{it} the error term[6]. Estimated coefficients $\hat{\alpha}_{i1}$ and $\hat{\alpha}_{i2}$ are used to compile the respective weights to be used in the logarithm of the real discount rate and the REER (θ_{ir} *et* θ_{ie}),

$$\theta_{ir} = \frac{\hat{\alpha}_{i1}}{\hat{\alpha}_{i1} + \hat{\alpha}_{i2}} \text{ and } \theta_{ie} = \frac{\hat{\alpha}_{i2}}{\hat{\alpha}_{i1} + \hat{\alpha}_{i2}}.$$

2.2. Primary structural fiscal balance

The cyclically-adjusted primary fiscal balance, also known as primary structural balance, is used as an indicator of the nature of the fiscal policy. It is calculated as the estimated residual of the equation linking the primary fiscal balance (SBS_{it}) to the difference between effective and potential GDP (*output gap* : OG_{it})[7]:

$$SBS_{it} = \delta_{it} OG_{it} + w_{it} \qquad (3)$$

i refers to country i and t to time period t. w_{it} is the error term; it represents the portion of the primary balance not derived from the economic cycle. As such, w_{it} is considered as primary structural fiscal balance[8].

[5] Other central banks such as New Zealand's make use of aggregate demand function in which the dependent variable is the output gap (difference between the actual and the potential GDP).

[6] For robustness, we use an alternative specification that allows us to control for specific effects by country, but using homogenous coefficients between countries (α_1 and α_2). The calculated MCI values related to choice whether or not to use homogenous from the aggregate demand function are not markedly different: the indicators resulting from both variations are highly correlated at about 0.878 (see appendix 3).

[7] 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 of 6.25, but the results were not significantly different.

[8] We have used the primary structural fiscal balance instead of overall fiscal balance excluding grants (the principal criterion of fiscal convergence in ECOWAS) due to the lack of data over long enough periods for all countries.

2.3. Monetary and fiscal coordination-types regimes

Policy mix is the joint orientation of monetary and fiscal policies. Interactions between monetary authorities and governments take the form of coordination for maximizing economic activity. A policy mix is said coherent when that interaction is in the same direction. For example, in a Keynesian perspective, an expansionary monetary policy should be implemented when fiscal policy is expansionary too. Similarly, in a perspective of coherence, it is expected that the monetary and fiscal policies are both restrictive. However, these patterns are not the only ones expressing the policy mix. Typically, it may be that monetary policy is accommodative while fiscal policy is restrictive, or vice versa.

Let consider SBS a proxy of the fiscal policy; MCI a proxy of the nature of the monetary policy and $SBS * MCI$ an interactive variable of the policy mix. In order to distinguish between monetary policy effects, we have disaggregated the MCI into a combination of two indicators: *MCI_sup* that represents *restrictive* monetary policy "regime" and *MCI_inf,* the *expansionary* monetary policy "regime". For each country, we have set *MCI_sup* as equal to MCI if MCI is equal or greater than *median* value of MCI (MCI_{median}) for that country, and 0 otherwise. At the opposite, *MCI_inf* is equal to MCI if MCI is lower than MCI_{median} and 0 otherwise[9]:

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

In a similar way, the primary structural fiscal balance is also disaggregated into two indicators: *SBS_sup* to sketch a restrictive fiscal "regime" and *SBS_inf* for an expansionist fiscal "regime". For each country, *SBS_sup* is equal to SBS if SBS is equal to or greater than 0 (level of a balanced SBS), and *SBS_sup* is equal to 0 otherwise; *SBS_inf* is equal to SBS if SBS is lower than 0 and *SBS_inf* is equal to 0 otherwise[10]:

$$SBS\_\sup = \begin{cases} SBS \text{ if } SBS \geq 0 \\ 0 \text{ otherwise} \end{cases} \quad \text{and} \quad SBS\_\inf = \begin{cases} SBS \text{ if } SBS < 0 \\ 0 \text{ otherwise} \end{cases}$$

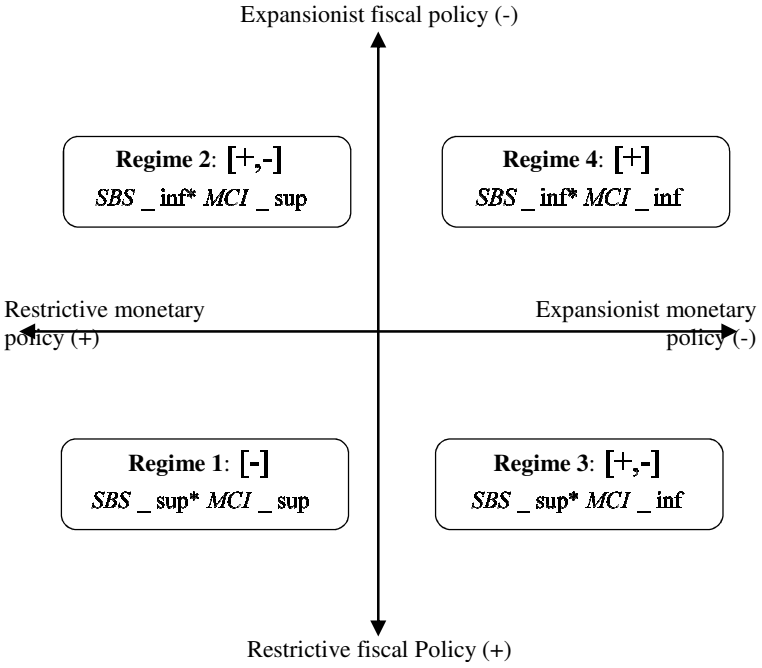
In order to determine the (non)coherent-type of policy mix regime, we have divided the policy mix indicator into four interactive variables that can be classified in two groups. On the one hand, we have the coherent regimes with $SBS\_sup * MCI\_sup$ a restrictive policy mix regime; $SBS\_inf * MCI\_inf$ an expansionary policy mix regime. On the other hand, it remains the non-coherent (or *indeterminate*) policy mix regimes, that is to say $SBS\_sup * MCI\_inf$ and $SBS\_inf * MCI\_sup$. Note that the sum of these four interactive variables is equal to the single

[9] Note that $MCI\_sup + MCI\_inf = MCI * Dummy[1 | MCI \geq MCI_{médian}] + MCI * Dummy[1 | MCI < MCI_{médian}] = MCI$

[10] Note that $SBS\_sup + SBS\_inf = SBS * Dummy[1 | SB \geq 0] + SBS * Dummy[1 | SBS < 0] = SBS$

interactive variable ($SBS*MCI$)[11]. The four policy mix regimes and their expected signs on economic activity on a Keynesian perspective are represented in the quadrant (Fig.1), below:

Figure 1: Policy mix regimes



3. Modeling policy mix and data

In this section, we introduce the econometric models followed by the presentation of data.

3.1. Econometric models

One of our objectives is to underline the influence of policy mix coherence on economic activity. We proceed in two steps. First, we estimate a "basic" equation as follows,

$$\Delta y_{it} = \alpha_i + \gamma_1 SBS_{it} + \gamma_2 MCI_{it} + \lambda SBS_{it} * MCI_{it} + \phi X_{it} + \mu_{it} \quad (4)$$

Δy_{it} is the real GDP growth rate of country i in year t, and X_{it} is a vector of control variables including external debt, terms of trade volatility, institutional quality as reflected in the control of corruption, political stability and official development assistance. α_i represents country fixed effects, while μ_{it} is the error term.

Given the possible different policy mix regimes as discussed previously, a negative sign of λ is not sufficient to conclude to a Keynesian hypothesis of a coherence-type complementarity between for example an expected recessionary effect of restrictive fiscal and monetary policies ($\gamma_1 < 0$ and $\gamma_2 < 0$). Indeed, a closer analysis of effects resulting from different combinations of SBS

[11] After factorizing and given that (MCI_sup+MCI_inf)=MCI and (SBS_sup+SBS_inf)=SBS, the sum is equal to MCI*SBS.

and MCI is somewhat needed. The second step consists of estimating a "refined" model that includes the different policy mix regimes. Thus, the equation to estimate becomes,

$$\begin{aligned}\Delta y_{it} = {} & \alpha_i + \gamma_1 SBS_{it} + \gamma_2 MCI_{it} + \lambda_1 (SBS\_sup_{it} * MCI\_sup_{it}) + \lambda_2 (SBS\_inf_{it} * MCI\_sup_{it}) \\ & + \lambda_3 (SBS\_sup_{it} * MCI\_inf_{it}) + \lambda_4 (SBS\_inf_{it} * MCI\_inf_{it}) + \phi X_{it} + \mu_{it}\end{aligned} \quad (5)$$

Still in a Keynesian perspective (which also underlies the calculations of the MCI in section 2), we expect $\gamma_1 < 0$, $\gamma_2 < 0$, $\lambda_1 < 0$, $\lambda_2 < 0$, $\lambda_3 < > 0$ and $\lambda_4 > 0$.[12] We estimate equations (4) and (5) using the panel Method of Fixed Effects with bootstrapped standard errors (given that two explaining variables, namely the MCI and SBS have been derived from previous estimated equations).

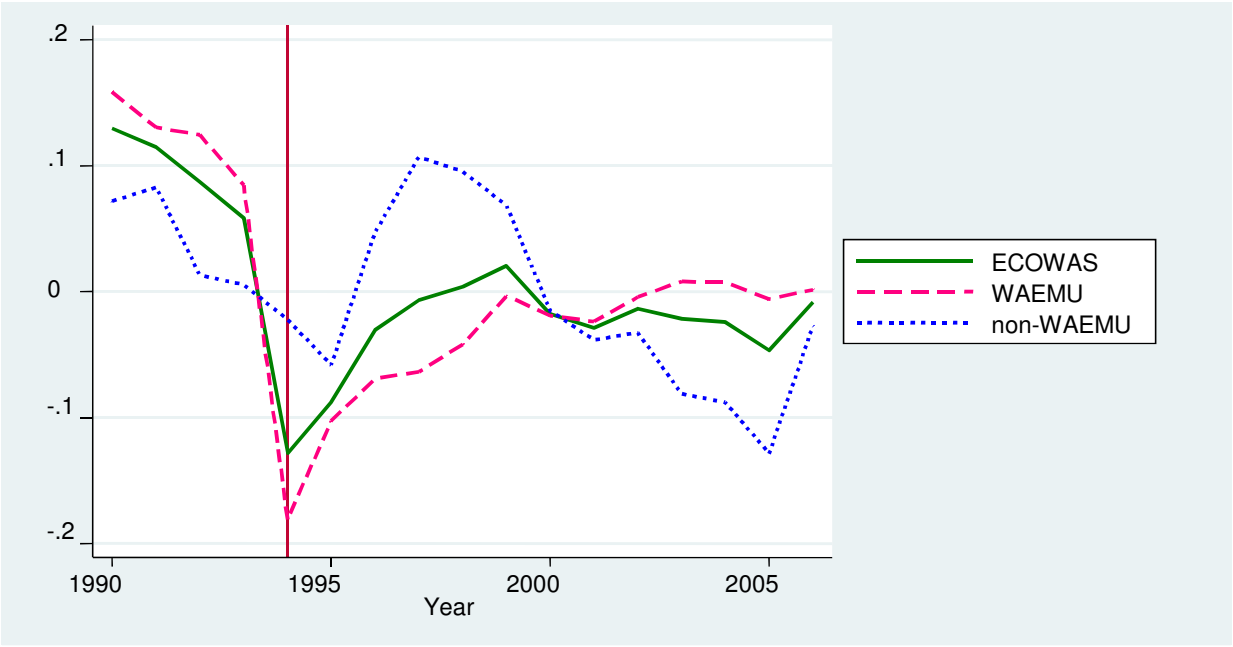
3.2. Data

The analysis covers ECOWAS countries (except Cape Verde, Liberia and Sierra Leone) from 1990 to 2006 due to availability of data. The Central Bank discount rate data are taken from *International Financial Statistics* (*IFS, 2007*). The real effective exchange rate data are from the *Centre d'Etudes et de Recherches sur le Développement International* database (*CERDI, 2007*). The primary fiscal balance data are those of the *World Economic Outlook* (*WEO, 2009*) and real GDP growth rate are from *World Development Indicators* (*WDI, 2010*)[13].

From the evolution of the monetary conditions index presented below in Figure 2, it appears a major break in 1994 for WAEMU countries. This break represents the devaluation of the franc CFA, a typical measurement of restrictive monetary policy. This is probably why the rupture is less pronounced in the non-WAEMU countries. On the side of the nature of fiscal policy, represented by the primary structural fiscal balance, no clear pattern emerges from Figure 3.

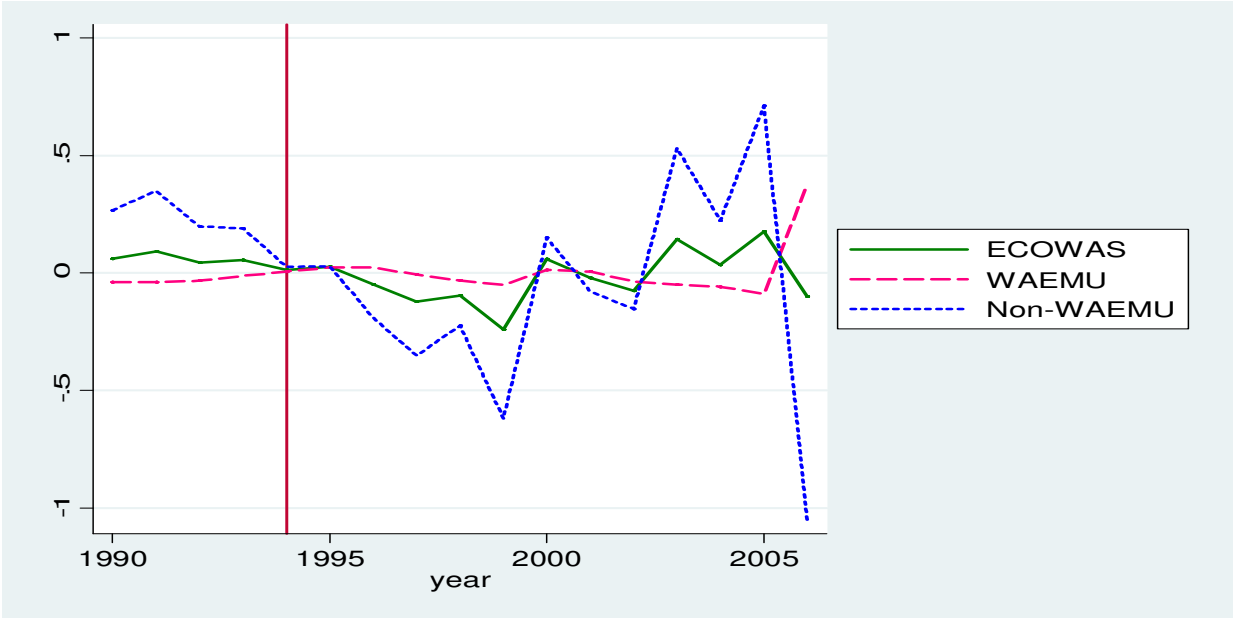
[12] See Appendix 4 for a detailed analysis of the expected signs associated with the variables of interest.
[13] Further information on the definitions and descriptive statistics of these variables can be found in Appendices 1 and 2 respectively.

Figure 2: Monetary Conditions Index in ECOWAS countries: 1990-2006*



*: Based on heterogeneous coefficients in the aggregate demand. Sources: Authors' calculations, based on IFS (2007) and CERDI (2007) data.

Figure 3: Primary Structural Fiscal Balance in ECOWAS countries: 1990-2006



Sources: Authors' calculations based on WEO (2009) data.

4. Results and discussion

Table 1 below shows the results of the basic model estimation. The MCI in this instance was obtained using a specific weight for each country. Given that MCI and SBS, the variables of interest, were calculated using parameters from a prior estimation of equations, the estimation of equations (4) and (5) with the simple Fixed Effects estimator would result in biased standard errors

(Pagan, 1984). To remedy this problem, the regression standard errors were bootstrapped with 500 iterations.

Column [1] of Table 1 shows the results for all 12 ECOWAS countries: the MCI and SBS estimated coefficients have the expected signs. The MCI seems to have a negative and significant impact on the economic growth rate: a one-point increase in the MCI lowers the economic growth rate by 1.11 percentage points in ECOWAS countries. However, the structural budget balance seems not to affect significantly economic growth. The control variables also appear with the expected signs: external debt coefficient is positive. That seems to demonstrate that debt in ECOWAS countries is contained within sustainable limits with no negative impact on economic activities. Also, the quality of institutions, as approximated by control of corruption, favorably impacts economic activity. The estimated coefficients of political stability and official development assistances, while appearing with the expected positive signs, seem to be not statistically significant. At the opposite, the terms of trade volatility seems to burden heavily economic activities in ECOWAS. Column [2] in Table 1 illustrates the results from WAEMU. The estimated MCI coefficient remains negative; the fiscal balance now has a significant negative impact on economic activity. The last column of Table 1 shows results for non-WEAMU members of ECOWAS. These results are very close to those in the overall sample in both qualitative and quantitative terms.

Table 1: Influence of Policy mix coherence in ECOWAS over 1990-2006 (basic model)

Dependent Variable : Real GDP Growth	**ECOWAS countries**	**WAEMU countries**	**Non-WAEMU[1] countries**
	(1)	**(2)**	**(3)**
Monetary Conditions Index (MCI)	-1.109***	-0.905***	-1.525***
	(0.202)	(0.217)	(0.342)
Structural Primary Fiscal Balance (SBS)	-0.069	-0.260**	-0.062
	(0.071)	(0.124)	(0.082)
MCI*SBS	**-1.325****	**-4.583****	**-1.383*****
	(0.579)	**(2.269)**	**(0.483)**
External Debt/GDP	0.056*	0.129***	0.043
	(0.032)	(0.050)	(0.034)
Instability of Terms of Trade	-0.010***	-0.010**	-0.009*
	(0.002)	(0.004)	(0.005)
Control of Corruption	0.101***	0.070**	0.156
	(0.038)	(0.033)	(0.123)
Political Stability	0.015	0.021	0.007
	(0.012)	(0.017)	(0.021)
Public Aid/GDP	0.470	0.770	-0.545
	(0.532)	(0.754)	(0.537)
Country Fixed Effects	Yes	Yes	Yes
Number of observations	187	119	68
R^2	0.400	0.307	0.597
Wald Test (MCI=0, SBS =0, MCI*SBS =0): Chi-Square [P-value]	36.37 [0.000]	18.46 [0.000]	31.67 [0.000]

[1]: Except Cape Verde, Liberia and Sierra Leone. Bootstrapped (via 500 replications) standard errors in bracket. *** p<0.01, ** p<0.05, * p<0.1. Constant included (but not reported)

From all three columns, it appears that the policy mix $(MCI * SBS)$ coefficient has the expected negative sign and is significantly different from zero, indicating that restrictive monetary

policy and restrictive fiscal policy feed positively on each other to undermine economic activity[14]. In particular, for WAEMU countries, that coefficient is almost three times greater than the one estimated for all ECOWAS and even the non-WAEMU countries. These results seem to highlight the expected fact that policy mix coherence has an influence on the individual effect of monetary (MCI) or fiscal (SBS) policy on economic activity, especially in the WAEMU where monetary integration is more advanced. Nevertheless, as indicated at the previous section, an estimated negative coefficient of the interactive variable is not relevant to assess the total impact of monetary or fiscal policy on economic activity. Estimations based on disaggregated policy mix variables are thus carried out. The results are depicted in Table 2.

Two important results emerge from the first column of Table 2. Firstly, when policy mix is coherent, that is to say either in restrictive $(MCI\_sup * SBS\_sup)$ or expansionary $(MCI\_inf * SBS\_inf)$ regime, the total marginal effect of restrictive monetary conditions seems to be recessionary in ECOWAS. Specifically, in the regime of "coherent-restrictive" policy mix, the recessionary effect of a restrictive monetary policy seems to appear even more marked than fiscal policy is also restrictive. This is typically a Keynesian effect. On the other side, in the case of "coherent-expansionist" policy mix, an expansionist fiscal policy seems to strengthen the recessionary effect of a restrictive monetary policy. That may be explained by the fact that a restrictive monetary policy implemented in an undisciplined fiscal context leads to a growing debt burden. As a result, there would be an increased inflationary pressure due to private sector anticipation of monetization of the government deficit, consistently with the unpleasant monetarist arithmetic (Sargent and Wallace, 1981). The second main result is that when the policy mix is *incoherent* $(MCI\_sup * SBS\_inf$ or $MCI\_inf * SBS\_sup)$, the marginal effect of monetary policy sends an ambivalent signal, since the recessionary effect of restrictive monetary conditions can be offset by the expansionist fiscal policy[15].

[14] The Wald test for the joint significance of the coefficients of variables MCI, SBS and *MCI*SBS* also shows that these 3 coefficients are jointly significant.

[15] For a detailed analysis of the disaggregation of the marginal effects of monetary policy according to policy mix regimens, see Appendix 4.

Table 2: Influence of Policy mix coherence in ECOWAS over 1990-2006 (refined model)

Dependent Variable : Real GDP Growth	ECOWAS countries	WAEMU countries	Non-WAEMU[1] countries
	(1)	(2)	(3)
Monetary Conditions Index (MCI)	-0.890***	-1.210***	-1.066*
	(0.214)	(0.399)	(0.624)
Structural Primary Fiscal Balance (SBS)	-0.053	-0.089	-0.026
	(0.090)	(0.170)	(0.101)
MCI_sup*SBS_sup	**-1.720***	**6.651**	**-1.942***
	(0.877)	**(7.974)**	**(0.991)**
MCI_sup*SBS_inf	**-2.043***	**-11.08*****	**-1.905***
	(1.042)	**(4.227)**	**(0.972)**
MCI_inf*SBS_sup	**-0.680**	**1.690**	**-0.436**
	(2.001)	**(7.330)**	**(3.340)**
MCI_inf*SBS_inf	**3.532***	**-2.812**	**3.268**
	(1.802)	**(8.209)**	**(3.588)**
External Debt/GDP	0.046*	0.134***	0.037
	(0.027)	(0.044)	(0.034)
Terms of Trade Volatility	-0.009***	-0.009**	-0.007
	(0.003)	(0.004)	(0.005)
Control of Corruption	0.088***	0.067*	0.071
	(0.031)	(0.037)	(0.115)
Political Stability	0.018*	0.025	0.006
	(0.011)	(0.019)	(0.016)
Public Aid/GDP	0.601	0.764	-0.448
	(0.578)	(0.683)	(0.498)
Country fixed effects	Yes	Yes	Yes
Number of observations	187	119	68
R^2	0.442	0.327	0.665
Wald Test (MCI=0; SBS=0; MCI_sup*SBS_sup=0; MCI_sup*SBS_inf=0; MCI_inf*SBS_sup=0; MCI_inf*SBS_inf=0):			
Chi-Square [P-value]	53.32 [0.000]	18.89 [0.004]	23.72 [0.000]

[1]: Except Cape Verde, Liberia and Sierra Leone. Bootstrapped (500 replications) standard errors in bracket. *** p<0.01, ** p<0.05, * p<0.1. Constant included (not reported)

Column 2 in Table 2 illustrates the effects based on differentiated policy mix regimes in WAEMU. These results show that inconsistent policy mix situations are the only ones that have a significant influence on the effect of monetary conditions on economic activity. However, the marginal impact of monetary policy in these situations is undetermined. By contrast, in the cases of coherent policy mix, the effects of monetary policy seem not to have a relevant link with the nature of the fiscal policy, probably because of the prevailing coordination provided by the WAEMU Economic and Growth Stability Pact implemented within the union.

In order to test the validity of results for the specification used, an alternative specification of the estimation of the aggregated demand equation was substituted. The MCI 's were then calculated based on estimations equation of the aggregated demand using equal weights for each country. The results are quantitatively and qualitatively similar to those noted above, except for the estimated coefficient of $MCI\_sup * SBS\_inf$ that then becomes statistically significant, whereas that of $MCI\_sup * SBS\_sup$ becomes insignificant[16].

[16] The robustness test for both the basic model and the refined model appear in Appendix 5.

5. Conclusion

In this paper, we have highlighted the role of policy mix coherence on economic activity in ECOWAS from 1990 to 2006. In ECOWAS, little has been said about the coherence of policy mix. Our contribution to the literature on policy mix coherence in monetary unions is twofold.

First, based on monetary conditions index and the structural primary fiscal balance (used to assess the orientations of respectively monetary and fiscal policies in ECOWAS), we have shown that a "coherent-restrictive" policy mix amplifies the recessionary effect on economic activity of monetary and fiscal policies separately considered. Second, we have identified heterogeneities regarding monetary impacts on economic activity influenced by different regimes of policy mix. Indeed, the disaggregation of the policy mix interactive variable into four possible combinations of monetary-fiscal policies orientation allowed us to demonstrate that the total marginal effect of monetary policy is conditional to (none-)coherence-type of the policy. Our results corroborate the idea that the influence of coordinated policy mix is more pronounced in monetary unions, as illustrated by the WAEMU sub-sample. When policy mix in these countries is coordinated, the effect of monetary policy is no longer dependent on fiscal policy. This effect becomes ambivalent, or even unintended, in the absence of coordination.

These results, which remained robust to alternative specifications used to calculate the MCI, have major policy implications for a potential transition to a common currency within ECOWAS. A common currency signals the end of national control over monetary policy. To minimize the potential negative impacts on growth resulting for such scenario, coordination between national fiscal policies must be ensured. Otherwise, the policy mix is likely to be incoherent, exerting unintended influence on the effects of monetary policy on economic activity, and undermining or even offsetting the positive effects expected from the common currency. This scenario would seriously erode momentum toward monetary integration or threaten the survival of an existing one.

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Appendices

Appendix 1: Sources and Definitions of Data

Variables	Definition	Sources
Real discount rate	Central bank discount rate adjusted for inflation	IFS (2007)
Real effective exchange rate (REER)	Weighted mean of bilateral exchange rates adjusted for inflation differential between 2 countries. The weights used are those of the top 10 trading partners (import + export)	CERDI (2007)
Primary structural fiscal balance (SBS)	Cyclically-adjusted primary fiscal balance, as GDP percentage.	Authors' calculations based on WEO (2009)
Monetary conditions index (MCI)	Weighted mean of the difference between the logarithm of the real discount rate and its historic mean and the difference between the REER logarithm and its historic mean. The weights come from the estimations of the aggregated demand.	Authors' calculations
SBS_sup	Restrictive fiscal *regime*. Variable equal to SBS if SBS $\geq$ 0, and 0 otherwise	Authors' calculations
SBS_inf	Expansionist fiscal *regime*. Variable equal to SBS if SBS < 0, and 0 otherwise.	Authors' calculations
MCI_sup	Restrictive monetary *regime*. Variable equal to MCI if MCI $\geq MCI_{médian}$, and 0 otherwise	Authors' calculations
MCI_inf	Expansionist monetary *regime*. Variable equal to MCI if MCI < $MCI_{médian}$, and 0 otherwise	Authors' calculations
Real GDP growth rate	Annual GDP (at constant prices) variation rate	WDI (2010)

Appendix 2: Descriptive statistics

Variable	Obs.	Mean	Standard error	Min	Max
ECOWAS					
Monetary conditions index (MCI)	204	-6.8e-09	0.1029	-0.3161	0.3719
MCI (model with homogenous coefficients)	204	3.65e-09	0.1008	-0.2836	0.3847
Primary structural fiscal balance (SBS)	204	2.4e-09	0.6013	-6.0112	2.6907
Real effective exchange rate (REER)	204	85.885	34.953	45.881	359.27
Real discount rate	204	0.0208	0.0946	-0.3429	0.1957
Primary fiscal balance	204	-0.0677	1.0121	-12.738	2.6482
Output gap	204	-0.0186	0.1319	-0.9577	0.4008
Real GDP Growth rate	204	1.0440	0.7164	0	4.3491
External Debt/GDP	204	-0.086	1.403	-16.580	1.935
Public Aid/GDP	204	0.1353	0.1132	0.0037	0.7400
Terms of Trade Volatility	204	12.712	8.467	0.363	39.388
Political Stability	187	7.603	2.209	2.333	11.000
Control of Corruption	187	2.429	0.833	0	4.000

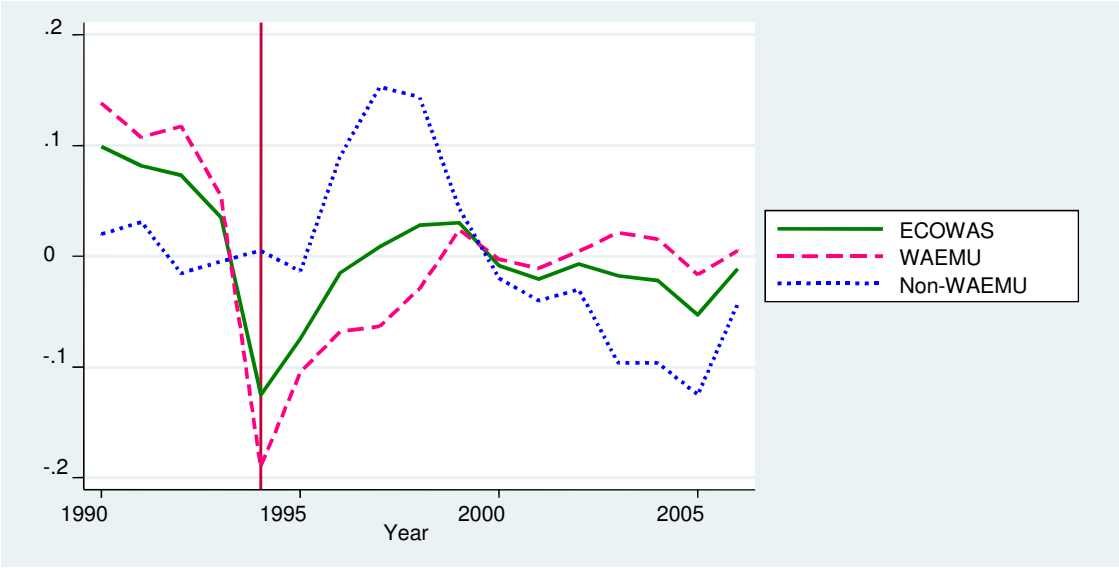
Appendix 3: Partial correlation between the two methods of MCI calculation

	MCI (with heterogeneous coefficients)	MCI (with homogenous coefficients)
MCI (with heterogeneous coefficients)	1.0000	
MCI (with homogenous coefficients)	0.8786*	1.0000

Appendix 4: Signs of MCI subject to policy mix regimes (Keynesian perspective)

	Regime 1: *MCI_sup*SBS_sup*	Regime 2: *MCI_sup*SBS_inf*	Regime 3: *MCI_inf*SBS_sup*	Regime 4: *MCI_inf*SBS_inf*
Marginal effect MCI in a case of balanced fiscal balance (SBS=0)	-	-	-	-
Expected sign of *MCI*SBS:* (A)	-	-	?	+
Expected sign of SBS: (B)	+	-	+	-
Expected sign of (A*B)	-	+	?	-
Total marginal effect of *MCI*	- -	- +	- ?	- -

Appendix 5: Monetary Conditions Index (with homogenous coefficients in the aggregate demand function) in ECOWAS countries: 1990-2006



Sources: Authors' calculations, based on IFS (2007) and CERDI (2007) data.

Table 3: Robustness Checks (basic Model)

Dependent Variable : Real GDP Growth	**ECOWAS countries**	**WAEMU countries**	**Non-WAEMU[1] countries**
	(1)	**(2)**	**(3)**
Monetary Conditions Index (MCI)	-1.010***	-0.618***	-1.590***
	(0.190)	(0.239)	(0.306)
Structural Primary Fiscal Balance (SBS)	-0.072	-0.223*	-0.078
	(0.083)	(0.126)	(0.097)
MCI*SBS	**-1.437****	**-4.189***	**-1.723*****
	(0.664)	**(2.404)**	**(0.561)**
External Debt/GDP	0.064*	0.132***	0.050
	(0.037)	(0.049)	(0.044)
Instability of Terms of Trade	-0.010***	-0.010**	-0.009*
	(0.003)	(0.004)	(0.005)
Control of Corruption	0.080**	0.057*	0.162
	(0.040)	(0.034)	(0.155)
Political Stability	0.022*	0.027*	0.016
	(0.011)	(0.016)	(0.024)
Public Aid/GDP	0.553	0.912	-0.252
	(0.527)	(0.728)	(0.574)
Country Fixed Effects	Yes	Yes	Yes
Number of observations	187	119	68
R^2	0.342	0.271	0.528
Wald Test (MCI=0, SBS =0, MCI*SBS =0): Chi-Square [P-value]	34.82 [0.000]	8.33 [0.039]	27.92 [0.000]

[1]: Except Cape Verde, Liberia and Sierra Leone. Bootstrapped (via 500 replications) standard errors in bracket. *** p<0.01, ** p<0.05, * p<0.1. Constant included (but not reported)

Table 4: Robustness Checks (Refined Model)

Dependent Variable : Real GDP Growth	**ECOWAS countries**	**WAEMU countries**	**Non-WAEMU[1] countries**
	(1)	**(2)**	**(3)**
Monetary Conditions Index (MCI)	-0.760***	-0.812*	-1.125**
	(0.198)	(0.449)	(0.492)
Structural Primary Fiscal Balance (SBS)	-0.038	-0.158	-0.019
	(0.139)	(0.229)	(0.160)
MCI_sup*SBS_sup	**-2.740***	**5.605**	**-2.903**
	(1.398)	**(9.031)**	**(4.245)**
MCI_sup*SBS_inf	**-1.931***	**-9.115***	**-2.096***
	(.985)	**(5.220)**	**(1.069)**
MCI_inf*SBS_sup	**-0.658**	**-2.553**	**-0.317**
	(2.289)	**(8.582)**	**(3.722)**
MCI_inf*SBS_inf	**5.203***	**-0.601**	**4.899***
	(2.976)	**(12.23)**	**(2.499)**
External Debt/GDP	0.051*	0.143**	0.039
	(0.026)	(0.062)	(0.051)
Instability of Terms of Trade	-0.009***	-0.009**	-0.005
	(0.003)	(0.004)	(0.006)
Control of Corruption	0.069**	0.058*	0.054
	(0.034)	(0.035)	(0.141)
Political Stability	0.024*	0.033*	0.013
	(0.012)	(0.018)	(0.019)
Public Aid/GDP	0.664	0.888	-0.259
	(0.530)	(0.747)	(0.518)
Country fixed effects	Yes	Yes	Yes
Number of observations	187	119	68
R^2	0.392	0.286	0.616
Wald Test (MCI=0; SBS=0; MCI_sup*SBS_sup=0; MCI_sup*SBS_inf=0; MCI_inf*SBS_sup=0; MCI_inf*SBS_inf=0):			
Chi-Square [P-value]	31.66 [0.000]	14.81 [0.022]	17.70 [0.007]

[1]: Except Cape Verde, Liberia and Sierra Leone. Bootstrapped (via 500 replications) standard errors in bracket. *** p<0.01, ** p<0.05, * p<0.1. Constant included (not reported)