Fiscal Rules and Pro-cyclicality of the Fiscal Policy in CEMAC countries

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Abstract

The aim of this paper is to analyze the cyclicality of fiscal policy in the CEMAC zone and identify the link between this cyclicality effects and the multilateral supervision rules. Based on a non-dynamic panel data model inspired by Gali and Perotti (2003), and Cimadomo (2005), the results show that the fiscal policies applied in CEMAC zone are highly pro-cyclical. This pro-cyclicality is accentuated since the practice of multilateral supervision rules.Counter-cyclical fiscal policies appear as an alternative for the countries of this community to smooth out fluctuations in their business cycles and simultaneously reduce the probability of asymmetric shocks that seem harmful to the monetary policy.A review of the convergence criteria is therefore necessary since those used in CEMAC zone do not take into account the intrinsic characteristics of countries in the region.

JEL code: E3, E6, H3.
Key words: fiscal policy, Pro cyclicality, monetary union, multilateral supervision.

Résumé

L'objectif de cet article est d'analyser la cyclicité de la politique budgétaire en zone CEMAC et son lien avec les critères de surveillance multilatérale. A travers un modèle de panel dynamique, inspiré de Gali et Perotti (2003), et Cimadomo (2005), il ressort de notre étude que, les politiques budgétaires des pays de la CEMAC sont fortement pro cycliques. Cette pro cyclicité est accentuée par l'application des critères de surveillance multilatérale, ce qui renforce la volatilité des cycles. Les politiques budgétaires contra cycliques apparaissent comme une alternative pour les pays de la sous-région afin de pouvoir lisser les fluctuations de leurs cycles économiques et entrainer par la même occasion une diminution de la probabilité d'occurrence des chocs dissymétriques nuisibles à la politique monétaire. Une révision des critères de convergence s'impose donc en CEMAC car celles retenues ne tiennent pas compte des caractéristiques intrinsèques des pays de la zone.

Classification JEL: E3, E6, H3.
Mots-clés: Politique budgétaire, Pro cyclicité, Union monétaire, Surveillance multilatérale.

Contents

Non-technical summary

The present study builds upon the fact that fiscal policy in developing countries tend to be pro-cyclical. In other words, these countries in general lead expansionary fiscal policy (increase of public spending/reduction of taxes) in time of good conjuncture and restrictive policies (reduction of public spending/increase of taxes) during recessions. According to the economic theory, these behaviours strengthen the volatility of business cycle and damage the conduct of monetary policy.

Thus, the objective of this paper is to analyse the conduct of the fiscal policy of the countries of the Economic and Monetary Community of Central Africa (CEMAC) zone, according to the evolution of the business cycle, and to identify the effects of the implementation of the criteria of multilateral supervision on the behaviour of the latter.

This study leads to the following results:

1. Fiscal policies in CEMAC are pro-cyclical, mainly in expansion periods. This behaviour is explained in the economic theory by the fact that during the upturn time and because of the instability of the tax base, governments are regularly under political pressures coming from labour unions, associations, political parties, non-governmental organizations, local communities, what urges States to increase public spending during good economic phase.

2. In phase of recession, contrary to previous studies made on the CEMAC zone, we find that the fiscal policy of States are acyclic. In other words, States leave their level of spending unchanged when market conditions are unfavourable. This finding might be explained by the fact that, during recessions, owing to the price drop of raw materials and specifically oil, governments can be forced to keep unchanged some expenditure (sometime irreversible) in order to avoid potential reprisals from pressure groups which think of not benefiting enough from oil resources. Thus, to address the fall in government revenues, the States can finance their spending by the accumulation of arrears or while contracting debt with the central bank, knowing that the monetary financing of public deficits is not yet completely removed.

3. Since the implementation of the multilateral supervision, the pro-cyclical nature of fiscal policy has increased. It is worth noting that this finding may also be related to the good behaviour of commodity prices and to the increase of oil production and exploitation in the CEMAC zone.

Based on the above findings, we provide a number of policy recommendations:

1. States should conduct counter-cyclical fiscal policies in order to smooth out the business cycle and enhance the effectiveness of the monetary policy.

2. Fiscal rules should be amended in order to take into account the intrinsic characteristics of the economies of the sub-region. For instance, one could move toward a fiscal rule based on a structural balance or an optimal deficit rule. As for the debt, one may try to

make it sustainable by identifying an optimal debt threshold or to migrate toward a dynamic debt rule whose the threshold may change according to the trajectory of the economy, while remaining within a reasonable proportion.

3. States should operate a double diversification of the productive structures and tax revenues in order to reduce the dependence on oil. The latter recommendation is based on the fact that non-oil tax revenues are low in CEMAC while in some emergent and developed countries, these incomes which are less volatile are more important and sometime superior to 50% of the total revenues. The idea is not to recommend an increase of the fiscal pressure, but rather an improvement of methods used for tax collection (reforms, use of secured and traceable methods, and decrease of the size of the informal sector….etc) and mainly to proceed to the extension of the tax base.

Introduction

It is widely acknowledged today that fiscal policies in developing countries tend to be pro-cyclical. In other words, these governments tend to increase their public expenditures during expansion phases and reduce them during recession. On the other hand, it is also recognized that the fiscal policies of the industrialized (developed) countries appear sometimes countercyclical or acyclical[2], then giving rise to budget deficits (Gavin et al., 1996; Gavin and Perotti 1997a; Talvi and Vegh 2005, Alesina and Tabellini 2005, Perotti, 2007).

According to Frankel, Végh and Vuletin (2011), some countries may have a "degree" in the application of pro-cyclical policies. Even if these policies increase the volatility of cycles, they remain a predominant reality in the developing world.

Since Keynes (1936) we recognize in fiscal policy an ability to play a stabilizing role in the economic activity. Indeed, the standard Keynesian model teaches us that fiscal policy should be countercyclical, that is, expansionary during recession phases and restrictive during expansion ones. Being restrictive during booms, fiscal policies allow the economy to preserve itself against crisis, this measure is also relevant today following the various crises in the world. Frankel (2010)[3] also explains that one of the most success policy carried out by the Chilean government was to apply counter-cyclical policies during the surge in copper prices allowing it to cope with the crisis of 2008/2009 and the 2010 economic earthquake. This example is according to Frankel ideal for all countries producing raw materials in order to avoid the Dutch Disease.

Concerning the Central African Economic and Monetary Countries [4] (CEMAC), this community has since 1994 adopted a set of rules[5] not only to avoid fiscal skids, but also to ensure macroeconomic stability in the whole sub-region. Among the rules that interests us, one of them outlawed budget deficits within the Member States and is followed by the one that limits states debt rate at 70% of their GDP.

Thus, in regards to the difficulties faced by most countries to respect the rules and maintain an effective framework of macroeconomic stability, it is reasonable to question the relevance of the multilateral supervision criteria in CEMAC zone. Indeed, if countries are forced to make a null or a positive budget balance, this also implies that they will have to make spending cuts to avoid deficits during recession[6]. Also, during expansion[7] (and when the debt is at a desired level), these countries tend to increase their spending for example due to pressure from voters

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[2] Public expenditures remain unchanged whatever the evolution of business cycle.

[3] "how to make less pro-cyclical fiscal and monetary policies in countries producing raw materials?", during a conference in Alger.

[4] CEMAC zone is made up of six countries including Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic, and Chad.

[5] Commonly called multilateral supervision criteria.

[6] During which revenue declines.

[7] During which revenue increases.

and groups such as political parties, non-governmental organizations, which typically require more public goods and services in expansion phases (Alesina and Tabellini, 2005)

It is therefore important to ask whether or not the criteria in the context of multilateral surveillance accentuate the pro-cyclical bias of fiscal policy in CEMAC zone?

To answer this question, we present in a first section the context and the effects of multilateral supervision in CEMAC zone; the second section deals with the literature on how fiscal policy is conducted over the cycle; the third section in turn exposes the model results and the economic policy recommendations.

1. Context and effects of multilateral supervision in CEMAC zone[8]

Multilateral supervision was established in 1994 following the signature of the Treaty establishing CEMAC community. This implementation has been carried out in a crisis situation where almost all countries in the region were under Structural Adjustment Program with the Bretton Woods institutions. It was sort of a framework of macroeconomic stability to prevent fiscal skid and to maintain a certain fiscal discipline in order to achieve a convergence of economic policies and their consistency with the common monetary policy (Avom and Gbetnkom, 2003).

Since January 2002, the main criteria (first row) provide that: (i) the ratio of basic fiscal balance to GDP must be positive or null, (ii) the debt ratio must not exceed 70% of GDP, (iii) countries should not accumulate arrears of interest to both internal and external debt, (iv) and finally the maximum inflation rate is 3%.

Under those rules, the fiscal balance was to be achieved by 2004, which has also been facilitated by the discovery and exploitation of oil in some countries (Equatorial Guinea in 1998 and Chad in 2003), but at the cost of volatility cycles and only the Central African Republic (non-oil) could have surpluses during this period as shown in the table below.

Table 1: Evolution of the basic fiscal balance as a percentage of GDP in CEMAC

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cameroon	4,1	2,4	3,7	3,9	2,8	4,9	5,6	5,2	4,5	**3,3**	0,1	-0,4
CAR	**-0,8**	**-1,0**	**-0,5**	**-3,4**	**-4,0**	**-4,6**	**-1,1**	**-0,7**	**-1,7**	**-0,3**	**-0,9**	**-2,0**
Congo	1,5	-0,7	-7,2	1,0	4,9	17,4	17,8	10,2	27,3	**5,0**	25,5	19,8
Gabon	12,3	4,2	2,6	7,4	7,9	9,6	10,2	9,5	12,5	**8,5**	3,3	4,6
EG	8,5	15,9	12,9	13,4	11,4	20,9	25,7	20,7	17,6	**-4,2**	-5,5	1,0
Chad	-2,9	-2,2	-3,2	-1,7	2,1	1,1	3,8	3,6	4,5	**-8,4**	-1,6	2,5
*Number of states**	3	3	4	5	5	5	5	5	5	**3**	3	4
Oil GDP	4,54	4,20	4,36	4,67	6,07	10,00	11,66	12,06	15,87	**10,82**	14,79	18,37

*Which respected the rule.

Source: Author with BEAC data.

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[8] For the history, see Avom and Gbetnkom (2003).

It thus appears that, the rule of the basic fiscal balance is respected by the oil-producing countries and mainly when the incomes resulting from the oil exploitation are significant. So, it is normal to think that, the respect of this criterion does not have a link with the fiscal policy, but more with the behavior of the raw materials. It would be thus interesting that the States of CEMAC follow true prospective budget policies in order to cover risks related to the volatility of the raw materials prices on the international markets. In addition, if a State is forced to have a positive or null net budgetary position, this State will necessary use procyclical budget policies in order to limit the expenditure in recession to avoid an excessive accumulation of deficits.

Indeed, we see that the convergence criteria established in the framework of multilateral supervision appear as copies of Maastricht European standards but without deficits (Avom, 2002). In fact:

• The criterion based on the fiscal balance does not encourage the implementation of counter-cyclical policies to stabilize economic activity and induce further synchronization of cycles;

• The debt criterion limits the flexibility of governments to finance expenditures, but encourages the pressures on taxation and discourages private investment;

• The inflation criterion is closer to that of developed countries but may represent a target short term due to the anchorage of the CFA franc to the euro. However, studies show that developing countries would need inflation rates well above 3% (Ghosh and Phillips, 2003; Druker et al, 2005; Bikai and Kamgna, 2012).

Given these effects, it is tempting to think a substantial revision of the main convergence criteria in the CEMAC zone.

In fact, non-compliance with these criteria in different CEMAC countries highlights the problem of heterogeneity in the sub-region, mainly heterogeneities cycles that also interfere with the conduct of monetary policy. Indeed, if in the sub-region one country is in an expansion phase while another is in a recession, to stabilize the cycles of the two countries the monetary authorities should conduct a restrictive policy for the first country and an expansive policy for the second. However, monetary policy is common; it will be either restrictive or expansive but not both. As a result, one of the countries will be charged a monetary policy that accentuates cyclical fluctuations. Thus, monetary policy has asymmetric effects on different countries. Use national fiscal policies for economic stabilization using counter-cyclical fiscal policies in CEMAC can prove to be a mitigating factor for asymmetric shocks. It can also improves the effectiveness of monetary policy and the convergence because Cameroon and Gabon are the main States which sometimes respect the majority of convergence criteria like we see in table 2.

Table2 : Multilateral supervision criteria in CEMAC

Criteria	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cameroon												
Mean annual inflation rate (≤ 3%)	+	-	+	+	+	+	-	+	-	+	-	+
The ratio of basic fiscal balance to GDP (≥0)	+	+	+	+	+	+	+	+	+	+	+	+
Arrears of interest to both internal and external debt (< 0)	-	+	+	+	-	+	+	+	+	-	-	+
The debt ratio (< 70%)	-	+	+	+	+	+	+	+	+	+	+	+
Central Africa Republic												
Mean annual inflation rate (≤ 3%)	-	-	+	-	+	+	-	+	-	-	+	+
The ratio of basic fiscal balance to GDP (≥0)	-	-	-	-	-	-	-	-	-	-	-	-
Arrears of interest to both internal and external debt (< 0)	-	-	-	-	-	-	-	-	+	-	-	-
The debt ratio (< 70%)	-	-	-	-	-	-	-	-	+	+	+	+
Republic of Congo												
Mean annual inflation rate (≤ 3%)	+	+	+	+	-	+	-	+	-	-	+	+
The ratio of basic fiscal balance to GDP (≥0)	+	-	-	+	+	+	+	+	+	+	+	+
Arrears of interest to both internal and external debt (< 0)	-	-	-	-	-	-	-	-	+	-	-	-
The debt ratio (< 70%)	-	-	-	-	-	-	-	-	+	+	+	+
Gabon												
Mean annual inflation rate (≤ 3%)	+	+	+	+	+	+	-	-	-	+	+	+
The ratio of basic fiscal balance to GDP (≥0)	+	+	+	+	+	+	+	+	+	+	+	+
Arrears of interest to both internal and external debt (< 0)	+	-	-	-	-	+	+	+	+	+	+	-
The debt ratio (< 70%)	-	-	-	+	+	+	+	+	+	+	+	+
Equatorial Guinea												
Mean annual inflation rate (≤ 3%)	-	-	-	-	-	-	-	-	-	-	-	-
The ratio of basic fiscal balance to GDP (≥0)	+	+	+	+	+	+	+	+	+	-	-	+
Arrears of interest to both internal and external debt (< 0)	-	+	-	+	+	+	+	+	+	+	+	+
The debt ratio (< 70%)	+	+	+	+	+	+	+	+	+	+	+	+
Chad												
Mean annual inflation rate (≤ 3%)	-	-	-	+	+	-	-	+	-	-	+	+
The ratio of basic fiscal balance to GDP (≥0)	-	-	-	-	+	+	+	+	+	-	-	+
Arrears of interest to both internal and external debt (< 0)	-	-	-	-	-	-	-	-	+	-	-	-
The debt ratio (< 70%)	+	+	+	+	+	+	+	+	+	+	+	+
Number of State respected all the criteria	**0**	**0**	**1**	**1**	**0**	**2**	**0**	**1**	**0**	**1**	**1**	**1**
- = don't respect criteria ; + = respect criteria												

Source : Author with BEAC data.

However, before checking the relevance of these analyzes, in an econometric model, it is wise to recall the theoretical developments on how the fiscal policy is conducted over the cycle.

2. Contribution of the literature on the link between the management of the fiscal policy and the business cycle.

Initially, the Keynesian analysis (1936), showing how changes in public spending can affect the behaviour of economic agents and also show that an effective way to regulate economic activity was to conduct counter-cyclical fiscal policies. The government then should estimate the likely level of demand for the next two years and if it is too low, the government has to increase its expenditure, decrease taxes or interest rates. In contrary, if it seemed too high, the context will be exactly the opposite. This approach has been effective in several countries as far as the crisis years 70-80.

According to the neoclassical view, the use of fiscal policy to stabilization created distortions on economic activity. That is why, inspired by David Ricardo, Barro (1974) has contributed to reject Keynesian analysis of fiscal policy by the principle of Ricardian equivalence. For this author, private agents include in their calculation the inter-temporal budget constraint of the state and anticipate its behaviour. However, Barro (1979) stated the fiscal policies should be neutral or acyclical, nowadays we still speak of "smoothing fiscal policy." The establishment of a neutral fiscal policy aims to avoid inter-temporal distortions by leaving unchanged primary spending and tax rates whatever the evolution of the cycle, and in this case, only the automatic stabilizers play a role in the economy.

However, some studies show that the industrialised countries have generally countercyclical or acyclical fiscal policies. Fiorito and Kollintzas (1994), Fiorito (1997) show that the correlation between public consumption and the product is not always established and tends to be null in the G7 countries. However, the relationship between tax rates and activity is difficult to highlight as shown in Barro (1990), Huang and Lin (1993), and Strazicich (1997), these authors conclude with the case of USA that, tax rates are generally fixed for smoothing forecasts government spending. Cooley and Hansen (1995) on the other hand believe that, although difficult to determine tax rates generally tend to rise during booms and fall during recessions.

Thus, it is generally accepted that pro-cyclical fiscal policies are used in developing countries. Gavin et al. (1996), Gavin and Perotti (1997a) show why the fiscal policies of Latin American countries are generally pro-cyclical. Indeed, these authors show that during booms, public consumption increase and taxes decrease, while the opposite effect is observed during expansion. This result highlights a negative correlation between the product cycle and the taxation rate. International credit rationing is the cause of this pro-cyclical behaviour according to Aizenman, Gavin and Hausmann (1996) and Gavin and Perotti (1997a, 1997b); Catão and Sutton (2001) and Kaminsky, Reinhart and Vegh (2004). For these authors, in bad times (recession), either the developing countries cannot find funding, or they can borrow at very high ratesand that may increase their deficits. So they are forced to decrease their expenditures.

During the good times in contrary, they can easily borrow at a low rate that encourages the increase of public spending.

However, Talvi and Vegh (2005), Alesina and Tabellini (2005) to take the opposite view of this explanation, they suggest that if governments anticipate credit rationing during recession periods, so they could save in good times in order to smooth spending over time. Alesina and Tabellini (2005) add that some malicious governments usually want to capture the country's resources, and in this context, voters often require more public goods and lower taxes to prevent bad behaviour during periods of economic boom. The requirement of voters leads the governments to increase public spending during the good times that makes the pro-cyclical fiscal policy.

Talvi and Vegh (2005) show in also that developing countries have a pro-cyclical fiscal behaviour, and explain this by the fact that these governments are often subject to political pressures because of significant instability of the tax base. According to them, public expenditure would therefore be influenced by pressure groups (unions, associations, political parties, non-governmental organizations, local authorities ...) and generally accentuate these pressures during the expansion phases. Political pressures discussed by these authors tend to force countries to decrease their primary spending during recession and increase them during expansion.

Recently, Frankel, and Vuletin Vegh (2011), still felt that some emerging countries may have a "degree" in the application of pro-cyclical policies, so that they reinforce (much more than they stabilize) the volatility cycles but still remain a mainstream phenomenon in the developing world. Végh and Vuletin (2012) confirmed with a sample of 62 countries[9] that tax policies are strongly pro-cyclical in developing countries and countercyclical or acyclical in industrialised countries.

With these teachings, it appears necessary to go into in detailof the analysis through an econometric model to determine whether or not the fiscal policy is really pro-cyclical in CEMAC zone. It is also necessary to see if the multilateral supervisionaccentuates the pro-cyclical bias in order to conclude for a possible revision of the convergence criteria.

3. Empirical assessment of the pro-cyclicality of the fiscal policy in the CEMAC zone.
3.1. Econometric model

Among the different specifications used to analyze the cyclicality of fiscal policy, the most frequent used is the following one (see Wyplosz, 2002; Gali and Perotti, 2003; Cimadomo, 2005; Guillaumont Tapsoba, 2011):

$$PB_{it} = \alpha_0 + \alpha_1 PB_{it-1} + \alpha_2 EP_{it-1} + \alpha_3 X_{it} + \varepsilon_{it} \quad (1)$$

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[9] 20 industrialized countries and 42 developing countries.

Talvi et Vegh (2005), Alesina et Tabellini (2005), Vegh et Vuletin (2012) are made a theorical demonstration of this relation.

In this representation:

- PB_{it} is a fiscal policy variable of country i at time t that can be either the structural balance, i.e. public spending or revenue reported to GDP. Because of the preponderance of external debt within developing countries, Talvi and Vegh (2005) suggest to use primary expenditures which exclude the debt service that has no impact on aggregate demand. However, Cimadomo (2005) uses the structural primary balance. We use the structural balance and expenditure in our analysis.
- PB_{it-1} represents the level of the previous fiscal variable retained. It measures the degree of inertia of fiscal policy due to some delaying issues. Indeed, if α_1 is positive and close to 1 (too high), then the behavior of the fiscal authorities do not change much over time and the opposite phenomenon is observed if α_1 is small.
- EP_{it-1} is our variable of interest and represents the output gap of country i in period t-1. This difference is sometimes called "output GAP", that is the difference between the observed GDP and potential GDP. This variable measures the evolution of the cycle during time. Therefore negative values of this variable correspond to recession periods, while positive values correspond to expansion periods. Thus the coefficient α_2 allows us to analyze the cyclicality of fiscal policy. Then a positive value of α_2 corresponds to a counter-cyclical fiscal policy aggregate, while a negative coefficient implies a pro-cyclical fiscal policy. In other words, if α_2 is not significant the fiscal policy will be acyclic.

However, to test the hypothesis of asymmetric fiscal policy according to the cycle phases, we introduce a dummy variable to split EP_{it-1} in two along the cycle phase. We then had two new variables:

- $EP_{it-1}^e = EP_{it-1} * I(EP > 0)$, where $I(EP < 0)$ is a dummy variable that takes the value 1 when the output gap is positive. EP_{it-1}^e represents the expansive phase of the cycle;
- $EP_{it-1}^r = EP_{it-1} * I(EP < 0)$, where $I(EP < 0)$ is a dummy variable that takes the value 1 when the output gap is negative. EP_{it-1}^r represents the recession phase of the cycle. Therefore the new representation could be presented as follows:

$$PB_{it} = \varphi_0 + \varphi_1 PB_{it-1} + \varphi_2 EP_{it-1}^e + \varphi_3 EP_{it-1}^r + \varphi_4 X_{it} + \varepsilon_{it} \quad (2)$$

Under this new representation, the cyclicality of fiscal policy is measured by φ_2 and φ_3 corresponding to the expansion and recession periods respectively. Since in our baseline estimates we use the structural balance as a fiscal policy variable, a significant and negative value of φ_2 implies a pro-cyclical fiscal policy in the expansion phase, and a similar interpretationcould be madeup for φ_3 in recession phase.

- X_{it} represents a set of control variables expected to have a link with the fiscal variables. For example: the debt ratio of the previous period (Wyplosz, 2002; Gali and Perotti, 2003;

Cimadomo, 2005, Williams and Adedeji , 2007), fluctuations in the terms of trade[10] (Garvin and Perotti, 1997; Doré and Mason, 2002; Williams and Adedeji, 2007) ; public aid[11] in percentage of GDP (Guillaumont and Tapsoba, 2011). However in some estimates, we control for the 1994 devaluation that had a significant impact on some macroeconomic balances.

- ε_{it} is the error term.

Indeed, to take account of multilateral supervision that took effect after 1994, we also introduce a dummy variable (SM95) among the key variables in order to deal with the effect of multilateral supervision on the cyclicality of the fiscal policy. This dummy variable takes the values 1 from 1995 and 0 before. Therefore we have the following representation:

$$PB_{it} = \gamma_0 + \gamma_1 PB_{it-1} + \gamma_2 EP_{it-1}^e + \gamma_3 EP_{it-1}^r + \gamma_4 EP_{it-1}^e * SM(95) + \gamma_5 EP_{it-1}^r * SM(95) + \gamma_6 X_{it} + \varepsilon_{it} \qquad (3)$$

From this new representation, we can compare the periods before and after the multilateral supervision to check whether or not the multilateral supervision has increased the occurrence of pro-cyclical policies in CEMAC.

3.2. Data and estimation methods

The estimates are based on a balanced panel model made by the six CEMAC countries over the period from 1987 to 2010. Almost all variables come from the World Bank WDI (World Development Indicator, 2011) database. However the structural balance used here comes from an estimate. Indeed, changes in the structural balance in general give us the direction and intensity of the pulses discretionary adopted by governments. And, statistically, the structural balance is determined by the difference between the actual balance and cyclical component:

$$SB_{structural} = SB_{observed} - SB_{conjonctural} \qquad (4)$$

Two remarks can be made as well: on the one hand, the structural balance, to the extent that it is not dependent on economic fluctuations, is often used as an indicator of the fiscal adjustment necessary because it is more important than the cyclical balance and better reflects the evolution of the actual balance as can be seen in the graph below. On the other hand, changes in the structural balance gives us the direction and intensity of the pulses discretionary adopted by the government.

And the structural budget balance is the residual of the estimation of equation (5) below:

$$SOB_{it} = \alpha GAP_{it} + \mu_{it} \qquad (5)$$

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[10] The terms of trade are the main source of exogenous shocks on income and expenditure and are represented here by the difference between the levels of terms of trade with their observed trend. This specification assumes that only unanticipated changes in terms of trade relative to its trend affect fiscal policy (Guillaumont and Tapsoba, 2011).

[11] The control quality for aid is explained by the fact that the basic balance which is one of the quantitative criteria for multilateral supervision in CEMAC is calculated without including expenditures in capital financed from the outside, thus aid is supposed to have a negative effect on the budget balance since government revenues are calculated excluding grants (Guillaumont and Tapsoba, 2009).

In this specification, SOB_{it} is the actual balance; αGAP_{it} is the cyclical balance that represents a proportion α of the GAP output, and this residual estimate will represent the structural balance ($\hat{\mu}_{it}$). To determine the potential GDP so as to calculate the GAP output, we use the Hodrick-Prescott and they recommended values of 1600 for the smoothing parameter with respect to quarterly data and 100 for annual data. Bouthevillain (2002) suggests 30 per annual series while Baxter and King (1999) adopt values between 100 and 400. In our case, potential GDP is calculated using three values of the current HP filter: 30 (Bouthevillain, 2002), 100 (Backus and Kehoe, 1992), 400 (Correia et al 1992). However, we have chosen the final parameter 30 because it gives us more significant results as noticed in the graph below that the structural balance estimated and used follows the remarkable evolution of the actual balance.

Table 3: Estimated balance (which represents the residual estimates).

Estimations	Smoothing parameter	Dependent variable	Explanatory variable	Coefficient	p-value	Residual estimates
First estimation	30	SOB	GAP (30)	-0,0536487	0,001	SBS30
Second estimation	100	SOB	GAP (100)	0,007773	0,087	SBS100
Third estimation	400	SOB	GAP (400)	0,0215592	0,146	SBS400

Note: SOB = actual balance, GAP = Output gap, SBS = Structural budget balance

Figure 1: Evolution of balances in CEMAC
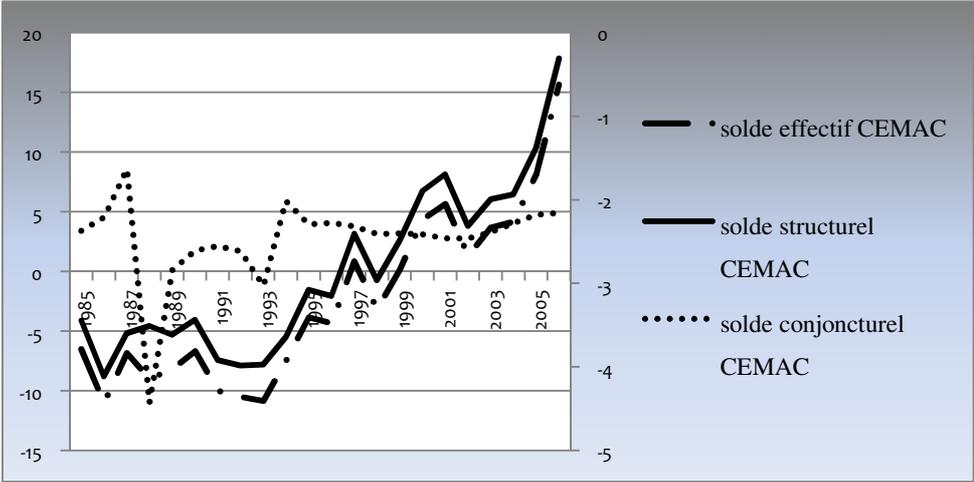
Source: Authors based on data from WDI 2011.

However, due to the simultaneity bias between fiscal policy and economic activity (measured by the output gap), the estimation of equation (3) which allows we to analyze the cyclicality of fiscal policy can't be done by ordinary least squares. Estimation by GMM is appropriate, but the small number of countries expose us to the Roodman critical (2009) that the number of individuals (i = 1 ... n) must be greater than the period of the study (t = 1 ... T). Gali and Perotti (2003), Alesina et al. (2007) use the method of instrumental variables to solve the simultaneity bias by using instruments such as the cycle period and delayed cycle ofthe most important trading partner. However, the fixed effects estimator (within estimator) can also be used.

3.3. Results

Our results confirm the pro-cyclical fiscal policy in the CEMAC zone. In fact, as it can be seen in Table 3 below, the structural balance reacts negatively to the changing economic situation. The negative effect is more pronounced and significant when using the method of instrumental variables that appear most appropriate here. In the period of expansion the structural fiscal balance decrease during the next period, and therefore increase public spending.

However, we can also observe that the delayed balance plays a very significant change in the structural balance in CEMAC zone and the size of its coefficient (0.8 or 0.6) reflects the inertia of fiscal policy. The inertia can be explained by the long policy delays on the one hand, or high expenditures which are made in several years. However, aid plays a significant and positive impact on the structural balance that is in accordance with our expectations.

Similarly, the devaluation has enabled CEMAC countries to revive economic growth and restore macroeconomic balances after the crisis of 1990s. It has also a positive impact on the structural balance. Only the delayed debt has not a significant impact at least at a 10% threshold. However, the coefficient associated with this variable has the expected sign, because too much debt accumulation compromises the health of public finances.

Table 3: Cyclical behaviour of discretionary fiscal policy in CEMAC

Variables	(1)	(2)	(3)	(4)
	Dependent variable : Structural budget balance (HP 30)			
Aid	0.0401	0.285***	0.0555	0.120**
	(0.0738)	(0.0749)	(0.0562)	(0.0541)
Delayed debt	-0.00564	-0.0761***	-0.00214	-0.0131
	(0.0167)	(0.0183)	(0.00911)	(0.00903)
Terms of trade	14.44***	17.72***	15.20***	17.47***
	(4.271)	(3.736)	(4.196)	(3.960)
Delayed balance	0.815***	0.434***	0.792***	0.600***
	(0.0791)	(0.0916)	(0.0759)	(0.0861)
Output gap	-2.410*	-0.638	-3.155**	-3.383***
	(1.250)	(1.119)	(1.338)	(1.252)
Devaluation		9.043***		5.319***
		(1.444)		(1.300)
Constante	1.327	-0.550	1.235	-1.923
	(1.397)	(1.247)	(1.010)	(1.200)
R^2	0,55	0,66	0,56	0,62

Standard deviations in parentheses
*** P <0.01, ** p <0.05, * p <0.1
(1) Estimated with fixed effects
(2) Estimation with fixed effects and control for devaluation
(3) Estimated by Instrumental Variables (delayed cycle, cycle of China)
(4) Estimated by Instrumental Variables (adding the EU cycle) and control for inflation

Fiscal policy and the cycle phases

It appears that during booms, the pro-cyclical bias of the fiscal policy is observed in CEMAC zone. Indeed, we observed most often in developing countries a significant increase in public spending during booms as shown many authors. This procyclicality can be explained by the instability of the tax base governments which are most of time subjected to political pressures by unions, associations, political groups, non-governmental organizations, local authorities, and these pressures increase generally in expansion phase, that is why government spending increase and degrades the structural balance.

However we observe during recession phases an acyclical fiscal policy unlike Guillaumont Tapsoba (2011).This behaviour is justified in CEMAC zone by the fact that oil is a real leverage for growth. So, during recessions usually due to decline in commodity prices and especially of oil, governments are sometimes forced to leave unchanged certain expenditures and revenues due to potential reaction of pressure groups. However, the inertia of fiscal policy remains pronounced.

Pro-cyclicality and multilateral supervision

Regarding multilateral supervision, we find that the pro-cyclical bias of fiscal policy is reinforced from the period of adoption of the multilateral supervision criteria. Thus, during the expansion phases over the period of analysis, the coefficient of the pro-cyclicality of fiscal policy is -2.690, and it is estimated at -10.85 after the adoption of multilateral supervision. This result confirms our previous analysis whereby multilateral supervision has helped to strengthen the pro-cyclical bias of fiscal policy in CEMAC.

However, when the terms of trade are improved, a positive and significant effect is felt on the structural balance and may result in increased revenue. According to our previous results, the phenomenon of inertia of fiscal policy remains robust and significant.

Tableau 4: Cyclicality of the fiscal policyand multilateral supervision in CEMAC

Variables	(1)	(2)
	Dependent variable : Structural balance	
EP>0 (Expansion)	-2.690*	
	(1.415)	
EP<0 (Recession)	-23.37	
	(16.85)	
Aid	0.118**	0.0348
	(0.0558)	(0.130)
Delayed debt	-0.0129	-0.00940
	(0.00930)	(0.0148)
Terms of trade	17.65***	17.10***
	(4.084)	(5.772)
Delayed balance	0.659***	0.596***
	(0.101)	(0.140)
Devaluation	3.956**	
	(1.762)	
EP>0 since MS		-10.85*
		(6.412)
EP<0 since MS		1.863
		(14.14)
Constant	-2.161*	4.686**
	(1.252)	(2.278)
R^2	0,5974	0,4653

Note: Standard deviations in parentheses. *** p<0.01, ** p<0.05, * p<0.1; (1) and (2) are Instrumental Variables estimations

To test the robustness of our results, we changed the dependent variable by replacing public spending, and we find that our primary results are the same. Indeed, it can be seen in the table below that spending respond positively to changing economic situations during an expansion, which confirms the nature of pro-cyclical fiscal policy. We also observe that this effect is more pronounced after the implementation of multilateral supervision (MS).

Table 5: Robustness of the cyclicality of fiscal policy and multilateral supervision

Variables	(1)	(2)
	Dependent variable : Public spending reported to GDP	
EP>0 (Expansion)	0.0236*	
	(0.0132)	
EP<0 (Recession)	0.0728	
	(0.167)	
Aid	0.000275	0.000739
	(0.000519)	(0.00122)
Delayed debt	-3.41e-05	-0.000215
	(8.25e-05)	(0.000134)
Terms of trade	-0.136***	-0.192***
	(0.0381)	(0.0550)
Delayed Public spending	-0.460***	-0.284**
	(0.0854)	(0.119)
Devaluation	-0.0104	
	(0.0128)	
EP>0 since MS		0.147**
		(0.0578)
EP<0 sinceMS		0.261
		(0.134)
Constante	0.00612	0.0304*
	(0.0118)	(0.0178)
R²	0,3	0,3

Note: Standard deviations in parentheses. *** p<0.01, ** p<0.05, * p<0.1; (1) and (2) are Instrumental Variables estimations

Thus, the CEMAC fiscal policy appears to be pro-cyclical and can greatly affect the stability of the States of this zone. This behaviour can also result from weak institutions and a poor governance system (Tapsoba et al., 2011). Indeed, it would be more appropriate to use counter-cyclical fiscal policy given the structure of exports (dominated by raw materials) of CEMAC countries.

However, as mentioned above, several reasons can explain the application of pro-cyclical fiscal policies, and in addition to the pressure made by certain groups, we can also meet political and institutional reasons. According to Alesina and Tabellini (2005), Thornton (2008), most countries implementing this kind of fiscal policy, institutional quality are those which have deplorable spread of corruption, we find also by Diallo (2008) poorly defined property rights, and a near absence of control system and constraints on the executive power.

Thornton (2008) gives four reasons why fiscal policy should be counter-cyclical:

• It allows a smoothing of government spending (down during expansion and an increase in a recession, as in the Chilean case mentioned above);

• It allows a smoothing of production to offset demand shocks or prevent the overheating of the economy;

• There is a prudential measure that allows covering different shocks (permanent or temporary) that are sometimes difficult to distinguish;

• Automatic stabilizers exert a natural counter-cyclicality of fiscal policy and thus allow stabilizing the economy. The implementation of counter-cyclical policies will reinforce the effect of the automatic stabilizers.

It should nonetheless be noted that the implementation of counter-cyclical policies in CEMAC implies that deficits may play a positive impact on economic activity so that the fiscal stimulus will be a source of growth in a recession phase, and that the rigors can not only avoid overheating expansion, but also smooth production over time. This approach imposes a revision of prudential rules established within the framework of multilateral supervision. For example, the states could replace de basic fiscal balance by the primary structural balance.

In addition, States would also benefit to operate a dual diversification: their productive structures and their tax base to not just be dependent on oil revenues. This last recommendation is based on the fact that the non-oil tax revenues in CEMAC are less than 20% contrary to others countries[12] which have more than 50%.

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[12] Industrialised countries

Conclusion

This paper tented to analyze the cyclicality of fiscal policy in CEMAC zone. It appears that fiscal policies in CEMAC countries are strongly pro-cyclical. This procyclicality is accentuated by the multilateral supervision.

Thus, countercyclical fiscal policies appear as an alternative to the countries of the sub-region in order to smooth out fluctuations in their cycles. This kind of policy can also decrease the probability of asymmetric shocks that seem harmful to monetary policy.

A review of the convergence criteria is necessary because those used do not reflect the intrinsic characteristics of the CEMAC[13] countries. However, for future studies it would be interesting to determine the optimal deficit in the sub-region that may promote the implementation of countercyclical policies.

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[13] Based on example, Tanimoune et al (2005) show that to a debt threshold of 83% of GDP, deficits have expansive effects on activity in West African Economic and Monetary Union (WAEMU). This rate is estimated at 79% for the Central African Economic and Monetary Community (CAEMC) according to Bikai (2010).

References

Adedeji, O. and Williams O. H. (2007) : « Fiscal Reaction Functions in the CFA Zone: An Analytical Perspective », *IMF Working Papers* 07/232, International Monetary Fund.

Aghion, P. and Marinescu I., (2007) : « Cyclical Budgetary Policy and Economic Growth : What Do We Learn from OECD Panel Data? », *NBER Macroeconomic Annual*, 22, pp. 251-93.

Aizenman J., M. Gavin and R. Haussmann (2000) : « Optimal Tax and Debt Policy with Endogenously Imperfect Creditworthiness », *Journal of International Trade and Economic Development*, Vol. 9, No. 4, pp. 367–95.

Akitoby B., B. Clements, S. Gupta and G. Inchauste (2006) : « Public Spending, Voracity and Wagner's Law in Developing Countries », *European Journal of Political Economy*, Vol. 2, pp. 908–24.

Alesina A. and R. Perotti, (1995): « Fiscal expansions and adjustments in OECD countries », *Economic Policy*, octobre, pp. 207-248.

Alesina, A., F. Campante and G. Tabellini (2008) : « Why Is Fiscal Policy often Procyclical? », *Journal of the European Economic Association*, Vol. 6, No. 5, pp. 1006–36.

Ary Tanimoune and Plane (2004) : « La convergence nominale dans le cadre du Pacte de Solidarité and de Croissance de l'Uemoa » : le défi de 2005 », *Document de rechercheCERDI*.

Ary Tanimoune, Plane and Combes (2005) : « Les effets non linéaires de la politique budgétaire: le cas de l'Union Economique and Monétaire Ouest Africaine »*Communication aux journées de l'AFSE,* Clermont-Ferrand, 19 and 20 mai 2005.

Avom D. (2007) : « La coordination des politiques budgétaires dans une union monétaire : l'expérience récente des pays de la Cemac », *Revue Tiers Monde*, 2007/4 n° 192, p. 871-893.

Avom D., and Gbandnkom D. (2003) : « La surveillance multilatérale des politiques budgétaires dans la zone Cemac: bilan and perpectives », *Mondes en developpement,* nᵒ 123 2003/3, p. 107 à 125.

Barro Robert J. (1974): « Are Government Bonds Nand Wealth », *Journal of Political Economy*, Vol. 82, nov-dec, pp. 1095-1117.

Barro Robert J. (1989):« The Ricardian approach to budget deficits »,*Journal of Economic Perspectives*, vol.3.

Barro, R. (1979):« On the Determination of the Public Debt », *Journal of Political Economy*, Vol. 87, No. 5, pp. 940–71.

Bikai J.L. and Kamgna S.Y. (2012) : « Effets de seuils de l'inflation sur l'activité économique en CEMAC : analyse par un modèle de panel à seuil non dynamique », *In Economies and Sociétés*, HS, n°45, 5/2012, p. 1017-1038.

Bikai J.L. (2010) : « Les effets non linéaires des déficits budgétaires sur l'activité économique en zone CEMAC », *MPRA paper*, n°24524.

Blanchard O. J. (1990b): « Suggestions for a New Sand of Fiscal indicator », *OECD Department* of *Economics and Statistics Working Papers,* no *79.*

Blanchard O., Dell'Ariccia G. and Mauro P., (2010) : « Rethinking Macroeconomic Policy»,*Journal of Money, Credit and Banking, Blackwell Publishing*, vol. 42(s1), pages 199-215, 09.

Bouthevillain C., (2002) : « Filtre de Hodrick-Prescott and choix de la valeur du paramètre », *Note d'Études and de Recherche* 89, Banque de France, pp. 1-21.

Brunila A., M. Buti and J. In't Veld (2002): « Fiscal policy in Europe: how effective are the automatic stabilisers? », *European EconomyEconomic Papers*, no 177.

Calderon, C., R. Duncan and K. Schmidt-Hebbel (2004):« Institutions and Cyclical Properties of Macroeconomic Policies », *Central Bank of Chile Working Paper* No. 285.

Carmignani, F. (2010):« Cyclical Fiscal Policy in Africa », *Journal of Policy Modelling*, Vol. 32, pp. 254–67.

Cimadomo, J. (2005) : « Le pacte de stabilité a-t-il renforce la pro cyclicité de la politique budgétaire », *La landtre du CEPII* (Centre d'Etudes Prospectives and d'Informations Internationales) No. 247.

Creel J. and al (1992) : « DOIT-ON OUBLIER LA POLITIQUE BUDGÉTAIRE? Une analyse critique de la nouvelle théorie anti-keynésienne des finances publiques » *Revue del'OFCE 92*

Creel J., Latreille T. and J. Le Cacheux, (2002) : « Le Pacte de stabilité and les politiques budgétaires dans l'Union européenne », *Revue del'OFCE, Hors-série « La mondialisation and l'Europe »*, pp. 245-297.

Darvas, Z., A. K. Rose and G. Szapáry (2005): « Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic », NBER Working Papers 11580, National Bureau of Economic Research.

Diallo O. (2009) : « Tortuous Road Toward Countercyclical Fiscal Policy: Lessons from Democratized Sub-Saharan Africa », *Journal of Policy Modeling*, Vol. 31, No. 1, p. 36–50.

Doré, O. and P. Masson (2002):« Fiscal Experience with Budgetary Convergence in the WAEMU », International Monetary Fund Working Papers 02/108.

Easterly, W. and S. Rebelo (1993):« Fiscal Policy and Economic Growth: an Empirical Investigation », *Journal of Monetary Economics*, Vol. 32, pp. 417–58.

Fiorito R. (1997): « Stylized facts of government finance in the G7 », *IMF Working Paper* 97/42.

Fiorito R. and Kollintzas T. (1994) : « Stylized facts of business cycles in the G7 from a real business cycles perspective»,*European Economic Review* 38, 235– 269.

Frankel J.A., Végh C. A. and Vulletin G. (2011): « On Graduation from Fiscal Procyclicality», *NBER Working Papers* 17619, National Bureau of Economic Research, Inc.

Gali, J. and R. Perotti (2003) : « Fiscal Policy and Monetary Integration in Europe », *Economic Policy*, Vol. 18, No. 37, pp. 533–72.

Gavin, M. and R. Perotti (1997) : « Fiscal Policy in Latin America », *NBER Macroeconomics Annual*, 12, pp. 11–71, MIT Press, Cambridge.

Giudice G. and al (2003) : « Can fiscal consolidations be expansionary in the EU? Ex-post evidence and ex-ante analysis », *European Commission, Economic Papers*, n° 195, décembre.

Guillaumont S. J. and Tapsoba S. J. (2011) : « Pro cyclicité de la politique budgétaire et surveillance multilatérale dans les unions monétaires africaines », *Working Papers* halshs-00554337, HAL.

Guzman M. (2009) : « On the behavior of fiscal policy with costly expectations », *Economica*, Departement of Economics, University of Plata, vol. 0, pages 29-44, January-D.

Hakkio C.S., Rush M. (1991) : « Is the Deficit Too Large », *Economic Inquiry*, 29, P.429-445.

Hamilton J. D. and Flavin M. A. (1986) : « On the limitations of government Borrowing: A framework for empirical Testing ». *American economic review* 76 p. 808-19

Hénin P.Y. (1997) : « Soutenabilité des déficits and ajustements budgétaires », *Revue Economique* 48 (3), mai, pp.371-395.

Kacou K., (2005) : « Effets de la politique fiscale de l'Andat sur l'épargne en Côte d'ivoire ».*CAPEC, Landtre de politique économique, N°98, Juilland 2005.*

Kennedy S. and Robins J. (2001) : « The Role of Fiscal Discipline in Dandermining Fiscal Performance », *Department of Finance Working Paper*, 2001-16, Canada

Lane, P. (2003b) : « The Cyclical Behavior of Fiscal Policy: Evidence from the OECD », *Journal of Public Economies*, Vol. 87, pp. 2661–75.

Llau P., (1999) : « Les contractions budgétaires en Europe. Les enseignements des ajustements danois, irlandais and suédois », *Revue Française de Finances Publiques*, 68, 17-31.

Minea A. and Villieu P., (2007) : « Investissement public etEffets non linéaires des déficits budgétaires ». *LEO, Université d'Orléans*

Ondo Ossa (2005) : « Effets anti-keynésiens et ajustements : le cas de la zone CEMAC » *Revue du L.E.A, , vol. 6, numéro spécial,*janv-juin, 3-26

Ott D.J. and Ott A.F., (1965) : « Budget balance and equilibrium income », *Journal of Finance*, n° 20, p.71-77.

Perotti R. (2007) : « Fiscal Policy in Developing Countries: A Framework and Some Questions », *World Bank Policy Research Working Paper* Series N.4365, World Bank Group.

Perotti R., (1996) : « Fiscal consolidation in Europe: Composition matters », *The American Economic Review*, vol. 86, n° 2

Rand, J. and F. Tarp (2002) : « Business Cycles in Developing Countries: Are They Different?», *World Development*, Vol. 30, No. 12, pp. 2071–88.

Ravn, M. O. and H. Uhlig (2002) : « On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations », *The Review of Economics and Statistics*, Vol. 84, No. 2, pp. 371–75.

Rzonca A. and Cizkowicz P. (2005) : « Non-keynesian Effects of Fiscal contraction in New Members States », *European Central Bank Working Paper*, No. 519, September.

Schlarek A. (2003) : « Fiscal policy and private consumption in industrial and developed countries », Lund University, *Working Paper 2003, No. 20*, December.

Solow, R., (2002) : « Peut-on recourir à la politique budgétaire? Est-ce souhaitable? », *Revue de l'OFCE*, n° 83, octobre, pp. 7-24.

Strazicich M. (1997) : « Does tax smoothing differ by the level of government? Time series evidence from Canada and the United States. *Journal of Macroeconomics* 19, 305– 326.

Sutherland A., (1997) : « Fiscal crises and aggregate demand: Can high public debt reverse the effects of fiscal policy? », *Journal of Public Economics*, 65, 147-162.

Talvi, E. and C. Végh (2005) : « Tax Base Variability and Procyclical Fiscal Policy in Developing Countries », *Journal of Development Economics*, Vol. 78, No. 1, pp. 156–90.

Tapsoba S.J., Mpatswe G. K. and York R. (2011) : « The cyclicality of Fiscal Policies in the Cemac Region » (August). *IMF working Papers*, Vol., pp. 1-21, 2011.

Thornton, J. (2008) : « Explaining Procyclical Fiscal Policy in African Countries », *Journal of African Economies*, Vol. 17, No. 3, pp. 451–64.

Trehan B. and Walsh C.E. (1991) : « Testing Intertemporel Budget Constraints : Theory and Applications to US Federal Budget and Current Account Deficits », *Journal of Money, Credit and Banking*, 23, p.206-223.

Trehan, B. and Walsh C.E. (1988) : « Common trends, the government's Budget constraint, and revenue smoothing", *Journal of Economic Dynamics and Control*, n° 12 (1-2), p. 111-127

Tsangarides, C. G. and P. van den Boogaerde (2005) : « Ten Years After the CFA Franc Devaluation: Progress Toward Regional Integration in the WAEMU »,*IMF Working Paper* 05/145, International Monetary Fund.

Van den noord, P. (2000) : « The size and role of automatic fiscal stabilisers in the 1999s and beyond », *OECD Economics Department Working Paper*.

Vegh C. A. and Vulletin G. (2012) : « How is Taxe Conducted over the Business Cycle », *NBER Working Paper series* 17753.

Vincent J-P and Lamotte H. (1993) : La nouvelle macroéconomie classique, *Paris, PUF*

Wilcox, D.W. (1989) : « The sustainability of governments deficits : Implications of the present-value Budget constraint », *Journal of Money, Credit, and Banking*, n° 21 (3), (291-306).

Wyplosz, C. (2002) : « Fiscal Policy: Institutions versus Rules », *CEPR Discussion Paper* No. 3238.