United Nations University

WIDER

World Institute for Development Economics Research

Research Paper No. 2004/15

Monetary Policy in the CFA Zone

Country-level Credit Policy

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February 2004

Abstract

This paper examines whether the BCEAO has made use of the various policy instruments at its disposal for steering credit in the individual CFA zone member countries to complement interest rate policy at the zone level. We estimate whether private sector credit has responded systematically to different monetary policy variables using iterated 3-stage least squares regressions for Burkina Faso, Côte d'Ivoire, Mali, Senegal and Togo. If we constrain the coefficient estimates there is some support for the hypothesis that the BCEAO has contracted private sector credit in response to a higher inflation differential with France. However, there seems to be no policy rule to restrict private sector credit in response to increasing government borrowing from the central bank or increased foreign borrowing. If the coefficient estimates are unconstrained, there does not appear to be any systematic policy to control credit expansion at the domestic level.

Keywords: monetary policy, CFA zone, credit control

JEL classification: E31, E52, E58

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This study has been prepared within the UNU-WIDER project on 'Long-Term Development in the CFA-zone Countries of Sub-Saharan Africa', directed by David Fielding.

UNU-WIDER gratefully acknowledges the financial contribution to the project by the Finnish Ministry for Foreign Affairs.

UNU-WIDER also acknowledges the financial contributions to the research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Norway (Royal Ministry of Foreign Affairs), Sweden (Swedish International Development Cooperation Agency – Sida) and the United Kingdom (Department for International Development).

ISSN 1810-2611 ISBN 92-9190-594-1 (internet version)

Acknowledgements

We gratefully acknowledge helpful comments from Professor David Fielding, Dr Kalvinder Shields and seminar participants at the UNU-WIDER workshop on Long Term Development in the CFA-zone Countries of Sub-Saharan Africa, June 2003, Helsinki. Remaining errors are as always the responsibility of the authors.

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Camera-ready typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER
Printed at UNU-WIDER, Helsinki

1 Introduction

The goals of monetary policy in the CFA zone are to maintain price stability and maintain an appropriate level of foreign reserves, which are the pooled foreign exchange reserves of the member states.[1] At the zone level the BCEAO uses a mixture of indirect policy instruments (the discount rate mechanism, a repurchase agreement facility and a system of periodic auctions of central bank bills)[2] to pursue these goals. However, the monetary policy at the zone level will not necessarily suit all the member states in the zone. Table 1 shows the cross-country correlations between some of the macroeconomic variables that the BCEAO appears to react to at the zone level (Shortland and Stasavage 2003). It can be seen that output gaps and inflation rates are not strongly correlated within the zone.[3] There may therefore be a need to complement the interest rate setting at the zone level with further policies to suit the economic situation in individual CFA member countries.

Table 1
Correlations

Inflation	WAMU	Burkina	Mali	RCI	Senegal	Togo
WAMU	1.0000					
Burkina	0.7206	1.0000				
Mali	0.7213	0.4419	1.0000			
RCI	0.4883	0.2018	0.1224	1.0000		
Senegal	0.4159	0.0675	0.2626	-0.1744	1.0000	
Togo	0.2329	0.1202	-0.1568	0.2668	-0.2368	1.0000

Output gap[4]	Burkina	Mali	RCI	Senegal	Togo
Burkina	1.0000				
Mali	0.1185	1.0000			
RCI	-0.0153	0.0490	1.0000		
Senegal	0.4895	-0.0195	-0.0482	1.0000	
Togo	0.0871	0.0308	0.1423	-0.0682	1.0000

Credit to government	Burkina	Mali	RCI	Senegal	Togo
Burkina	1.0000				
Mali	0.8324	1.0000			
RCI	0.7988	0.8035	1.0000		
Senegal	0.5945	0.6091	0.5249	1.0000	
Togo	0.7653	0.7843	0.6219	0.5423	1.0000

1 IMF (2001: 17).

2 These are relatively infrequent. For example during 2000 there were no auctions of central bank bills.

3 This is also true for the pre 1994 period as shown by Bayoumi and Ostry (1997).

4 Based on Fielding *et al.* (2003) quarterly GDP data.

In the past country-level credit planning was the main monetary policy tool in the CFA zone.[5] The monetary programming exercise determined planned credit growth in each member country and the programme was implemented through credit ceilings on government borrowing and central bank refinancing of private sector credit. Credit growth in one country did not substantially spill over from one country to the other countries in the zone, as the capital markets were not well integrated.

Despite the recent efforts to move towards indirect tools of monetary policy and away from credit planning, the BCEAO retains a number of policy tools, which would enable it to continue to pursue independent credit policies for each member country. The previous tools of credit ceilings on governments and limits on the rediscounting of bank loans have been strengthened and a third potential policy tool has been introduced: reserve requirements on banks. Capital market integration also remains underdeveloped. A weak system of payments and delivery and a lack of confidence among banks about other banks' solvency prevent inter-bank lending, especially across national borders.[6] Country-level credit planning is therefore still a potential monetary policy mechanism.

The policy framework for the CFA zone is discussed in a number of recent publications (for example, Union Monetaire Ouest Africaine 1989, IMF 2001). There is also some empirical literature on monetary policy formation in the CFA zone (for example, Fielding 2002, Savvides 1998). However, there are no recent examinations of how monetary policy is conducted at the national level: the existing studies are based on data before the devaluation of the CFA franc in 1994. This paper is to address the question whether a systematic country-level credit policy has been implemented since 1995.

BCEAO policy tools

The first policy tool of the BCEAO that could be used to achieve balanced money growth is the enforcement of credit ceilings on government borrowing.[7] The BCEAO constitution limited central bank credit to each member government to 20 per cent of the previous year's fiscal receipts.[8] However, it is not clear to what extent the central bank could resist governments' credit demands in practice. In Côte d'Ivoire, for example, the monetary authority's credit to government fluctuated between 32.7 per cent and 49.3 per cent of government revenue and grants between 1994 and 1998 according to IMF data.[9] In fact, according to the International Financial Statistics, none of the countries' central bank advances was within the 20 per cent limit in the period of 1995-2000.[10]

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5 Honohan (1990: 3).

6 IMF (2001: 19).

7 IMF (2001: 18).

8 In September 1998 the council of ministers decided to phase out central bank financing of government budget deficits entirely by 2002, except for within-year advances to smooth cash-flows.

9 International Financial Statistics lines 66212A...ZF...and 66281Y...ZF...

10 The BCEAO may measure advances to government according to different accounting standards; however, it does not publish its own data of advances to government.

If the BCEAO's ability to resist government borrowing was limited, it may have restricted private sector borrowing in response to rising government borrowing, by imposing ceilings on central bank refinancing of private sector credit. The BCEAO's control over lending to the private sector has been strengthened considerably in recent years. Until 1989 the BCEAO had a constitutional obligation to refinance all short-term agricultural credit granted by commercial banks, as theoretically these would be 'self-liquidating' as the harvest was sold. This law was amended in 1989, because it was found that the system was abused and the short-term credits were not repaid as expected. Since then agricultural credits have been treated in the same way as ordinary credits and a single ceiling has been applied.[11]

The third policy tool at the disposal of the BCEAO is the use of reserve requirements. Liquidity ratio rules require banks to hold a certain fraction of their assets as reserve deposit and the system of setting reserve requirements has been in place since 1993.[12] According to the IMF Country Report in 2001 reserve requirements are used as a policy tool on a country-by-country basis 'taking into account the disparities in the progression of bank liquidity positions in each country'.[13] However, the policy has not been used actively during the 1990s. Reserve requirements were changed only infrequently (twice each in Mali and Burkina, three times in Togo and four times in Senegal and Côte d'Ivoire for 1995 to 2000). Moreover, actual reserves and required liquid reserves are only weakly correlated. An examination of banks' liquid reserves shows that actual reserves tended to exceed required reserves, sometimes by as much as a factor of ten, but during periods of hikes in the required reserve ratio, actual reserve ratios were lower than required reserve ratios in Burkina, Côte d'Ivoire, Senegal and Togo. It is possible though that the BCEAO used 'moral suasion' as a policy tool to influence banks' reserve levels, using the credible threat of imposing higher liquid reserve requirements.

Given that the BCEAO has a number of policy tools, which may have been used in different combinations, looking at the use of the policy tools individually may give misleading results. We therefore examine to what extent the BCEAO controls domestic and private sector credit in the CFA member countries, without focusing on a particular policy tool. Did the BCEAO reduce total credit in response to emerging inflationary pressure in individual economies? Did the BCEAO sterilize foreign capital inflows and foreign borrowing? And did the BCEAO react to increased government borrowing by restricting private sector credit?

We use data on Burkina Faso, Côte d'Ivoire, Mali, Senegal and Togo, which represent the bulk of output of the West African monetary union and for which quarterly data (especially on GDP) are available. The analyses are based on monthly or quarterly data from 1995 to 2000, that is, since the devaluation of the CFA franc. We exclude observations before 1995 because in the run-up to the devaluation of the CFA franc monetary policy was dominated by the concern over peg stability. Moreover, most of the time series only become stationary after the devaluation. The end date of 2000 is used because the GDP data from Fielding *et al.* (2003) are only available until the end of 2000.

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11 Union Monetaire Ouest Africaine (1989).

12 IMF (2001).

13 IMF (2001: 17).

The paper is structured as follows. The following section discusses two previous studies of monetary policy in developing countries, which employ a similar methodology to the one used in this paper. Section three discusses the data and methodology. Section four examines whether the BCEAO has systematically influenced domestic credit and credit to the private sector in response to monetary policy target variables. Section five concludes.

2 Previous studies of monetary policy in developing countries

There are a number of previous studies of monetary policy making in developing countries, for example, Connolly and Taylor (1979), Fry (1993 and 1995), Kamas (1985 and 1986), Savvides' (1998), Fielding (2002). The following discussion focuses on the 1995 study by Fry and the 1998 study by Savvides. Savvides (1998) examines monetary policy making in sub-Saharan Africa and includes a number of CFA zone countries in his sample. His methodology is based on the 1993 and 1995 studies by Fry, which examined the monetary policy in six pacific Basin developing countries with a control group of 21 other developing countries using annual data from 1960 to 1988. Fry's monetary policy reaction function was specified as:

$$\Delta\mathbf{DC/Y} = \beta_0 + \beta_1 \Delta\mathbf{NFAY/Y_{it}} + \beta_2 \Delta\mathbf{NFAY/Y_{it-1}} + \beta_3 \mathbf{(\pi-\pi^*)_{it}} + \beta_4 \mathbf{(\pi-\pi^*)_{it-1}} + \beta_5 \mathbf{oilinf_t} + \beta_6 \mathbf{oilinf_{t-1}} + \beta_7 \Delta\mathbf{CGY_{it}} + \beta_8 \Delta\mathbf{CGY_{it-1}} + \beta_{10} \mathbf{REXCHL} + u_{it}$$

The dependent variable is the change in domestic credit scaled by GDP to account for size effects (**ΔDC/Y**). The dependent variables are all potential objectives of monetary policy or economic variables the central bank needs to take into account when determining domestic credit. $\Delta\mathbf{NFAY/Y_{it}}$ is the change in net foreign assets of the banking system. The variable is included to examine whether central bank sterilizes the effects of the accumulation of foreign assets. **(π-π*)** is the differential between domestic and foreign inflation as inflation rates have to converge for long run currency stability. The Central bank may either accommodate or resist the effect of foreign price shocks, which are proxied by oil-price inflation (**oilinf**). The central bank may also react to increases in government borrowing (**ΔCGY**) by cutting back lending to the private sector. If the central bank completely neutralized the public sector borrowing then the coefficient on this variable would be zero, partial neutralization would result in a coefficient less than one. A further variable that the central bank may react to is the lagged real exchange rate (**REXCHL**). The impact of the variable is ambiguous. Depreciations are inflationary and therefore may necessitate a restrictive credit policy. However, real depreciations raise the cost of servicing foreign debts and may therefore increase public sector borrowing.

The estimation method is iterated 3-stage least squares (I3SLS). The I3SLS method estimates a system of structural equations where some equations contain endogenous variables. In the first stage instrumented values of the endogenous variables are developed. The second stage obtains a consistent estimate of the covariance matrix of the equation disturbances. In the third stage a generalized least squares type estimation is performed using the covariance matrix estimated in the second stage and the instrumented values in place of the endogenous variables. Cross equation restrictions were imposed on all coefficients except the intercepts. The endogenous variables are $\Delta NFAY/Y_{it}$ and $(\pi-\pi^*)_{it}$. The instruments for $\Delta NFAY/Y_{it}$ and $(\pi-\pi^*)_{it}$ are all exogenous

variables as well as lagged values of the endogenous variables, as well as US inflation, the world interest rate, world economic growth, lagged values of real GNP growth and money (M2) growth.

Fry's results showed that developing country central banks react systematically to a number of economic variables. In the full sample the countries sterilized a small fraction (17 per cent) of foreign capital inflows and tended to accommodate domestic inflation and increases in oil prices. Central banks also accommodated most of the governments' credit requirement, contracting credit to the private sector by only 12 per cent of the increase in the governments' credit requirements. The Pacific basin countries on the other hand sterilized 41 per cent of foreign capital inflows, were less accommodating regarding oil price inflation and neutralized two thirds of government borrowing.

A highly relevant recent application of Fry's methodology is Savvides' (1998) study of the development of domestic credit in five sub-Saharan African countries including three countries in the CFA zone.[14] Savvides (1998) estimated the following regression, also using iterated 3-stage least squares (3SLS) with annual data from 1968–1991 for Côte d'Ivoire and Gabon and 1975–1988 for Cameroon.

$$\Delta \mathbf{DC/Y} = \beta_0 + \beta_1 \Delta \mathbf{NFAY/Y_{it}} + \beta_2 \Delta \mathbf{NFAY/Y_{it-1}} + \beta_3 \mathbf{(\pi-\pi^*)_{it}} + \beta_4 \mathbf{(\pi-\pi^*)_{it-1}} + \beta_5 \mathbf{oilinf_t} + \beta_6 \mathbf{oilinf_{t-1}} + \beta_7 \Delta \mathbf{CGY_{it}} + \beta_8 \Delta \mathbf{CGY_{it-1}} + \beta_{10} \mathbf{REXCHL} + \beta_{11} \mathbf{DET/Y_{t-1}} + u_{it}$$

The Savvides regression therefore uses all the explanatory variables of the Fry regressions, and also tests whether the central bank reacts to growing external indebtedness (**DET/Y**) by restricting the growth of domestic credit. Cross-country equality restrictions were imposed on all coefficients except the intercept. $\Delta NFAY/Y_{it}$ and $(\pi-\pi^*)_{it}$ were treated as endogenous variables and all the exogenous variables as well as lagged values of the endogenous variables were used as instruments. Savvides results show that there was no systematic sterilization of reserve accumulations in the CFA-zone member countries and that the (lagged) inflation differential and oil price inflation were accommodated. However private sector credit was restricted to some extent as public sector credit was expanded. With respect to rising external indebtedness the central bank action was stabilising. Finally the BCEAO responded to a real depreciation of the CFA franc by increasing domestic credit.

3 Data and methodology

We use the I3SLS methodology and most of the explanatory variables suggested by Fry (1995) and Savvides (1998). However, there are a number of important differences in our regressions.

(1) We use monthly data as the BCEAO makes policy decisions on a monthly basis. Therefore an analysis based on monthly data is consistent with the time horizon of the BCEAO.

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14 The countries in the Savvides paper are Cameroon, Côte d'Ivoire, Gabon, Ghana and Nigeria, but a separate regression is performed for the CFA zone countries.

(2) Our data are from 1995 to 2000. The starting point of January 1995 was chosen to examine monetary policy after the devaluation of the CFA franc. Moreover, several of the time series only become stationary in 1995 or have large structural breaks in the months following the devaluation. The end point of 2000 was dictated by the availability of the quarterly output gap data, taken from Fielding *et al.* (2003), as the IFS only records annual GDP data.[15] All variables other than the output data are taken from the International Financial Statistics database.

(3) We do not use domestic credit scaled by GDP (**PSC/Y**) as the dependent variable, but private sector credit. The total credit series (***32...ZF…) is calculated by the IFS as the sum of claims government, claims on the private sector and claims on other financial institutions. In the CFA zone central bank credit to the government is a very large part of total credit to government (for example, in Côte d'Ivoire in 2000 the government borrowing from the central bank ranged between 90 and 98 per cent of total claims on government).[16] The variable **CGY** is therefore a component of total credit and should not be used as an explanatory variable in the domestic credit regression. We circumvent this problem by using credit to the private sector / GDP (**PSC/Y**) as the dependent variable.[17] This still allows us to examine whether the government offsets government borrowing, which would be indicated by a negative coefficient for the **CGY** variable.

(4) Both the Fry (1995) and Savvides (1998) regressions include a variable tracking the changes in the real exchange rate. We exclude this variable in our regressions, as the variable is not relevant for the CFA zone countries after the devaluation of 1994. Any movement in the real exchange rate would be captured by the interest differential variable.

(5) We replace the variable of the level of foreign debt / GDP (**DET/Y**) with the change in the level of foreign debt / GDP (Δ**DET/Y**), because the DETY series is not stationary in Senegal and Togo unless it is differenced once. All other variables suggested by Fry (1995) and Savvides (1998) are already in differences and are stationary.[18]

(6) As we cannot reject the null hypothesis of no residual auto-correlation in the regression for Togo and only marginally reject it for Côte d'Ivoire we also include a lagged dependent variable in the regressions. This corrects the problem of residual auto-correlation in all country regressions.[19]

(7) Lastly we test whether the cross-equation restrictions are valid and as some of the constraints can be rejected we re-estimate the equations without the constraints on the coefficients.

There are two further variables, which are potential target variables for the BCEAO. First the BCEAO may respond to a contraction in economic activity by expanding

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15 To get a monthly dataset we used the quarterly figure for the three months in the quarter.

16 This is partially a reflection of the underdeveloped capital market in the zone and partially reflects the fact that IMF credits are channelled through the central bank.

17 IFS line ***32D…ZF… claims on private sector from 'Monetary Survey'.

18 According to both the augmented Dickey Fuller and the Phillips Perron Test.

19 Using the Lagrange Multiplier test (Greene 2003: 271).

domestic credit and vice versa. However, the only proxy for GDP data is the quarterly series constructed by Fielding *et al.* (2003). A monthly interpolation of any output gap measure based on these quarterly data is unlikely to be a good proxy of the data on economic activity available to the BCEAO at its monthly meetings.[20] Unfortunately data on unemployment and industrial production, which could serve as an alternative proxy for information available to the BCEAO are only published quarterly or annually, if at all.[21]

Second, given the constraints of the peg the BCEAO may also be sensitive to a loss of its centrally held foreign exchange reserves. BCEAO policy rules require credit restrictions whenever gross foreign assets fall below 20 per cent of sight liabilities. As we do not have access to the ratio between foreign exchange reserves and sight deposits, we did include a variable measuring the foreign assets of the BCEAO as a share of WAEMU GDP (Δ**FXY**). However, the variable was not significant in any specification of the regressions or in any individual country in regressions with unconstrained coefficients. Including it in the regressions did not change the signs or significance levels of the other explanatory variables and only had a very marginal impact on the R-squared statistics. We therefore do not include it in the regressions reported below.

The subsequent regression therefore tests whether the BCEAO reacts to the following monetary policy target variables: the change in banks' foreign exchange reserves / GDP, the change in the level of foreign debt / GDP, the countries' inflation differentials with France, the change in credit to the central government / GDP[22] and oil price inflation.

$$\Delta\mathbf{PSC/Y} = \beta_0 + \beta_1 \Delta\mathbf{PSC/Y}_{\mathbf{it-1}} + \beta_2 \Delta\mathbf{NFAY/Y}_{\mathbf{it}} + \beta_3 \Delta\mathbf{NFAY/Y}_{\mathbf{it-1}} + \beta_4 \Delta\mathbf{DET/Y}_{\mathbf{t-1}} + \beta_5 (\pi-\pi^*)_{\mathbf{it}} + \beta_6 (\pi-\pi^*)_{\mathbf{it-1}} + \beta_7 \Delta\mathbf{CGY}_{\mathbf{it}} + \beta_8 \Delta\mathbf{CGY}_{\mathbf{it-1}} + \beta_9 \mathbf{oilinf} + u_{it}$$

Current net foreign assets and the current inflation gap are treated as endogenous variables as they are linked to domestic credit through the banks' balance sheets. All the exogenous variables as well as lagged values of the endogenous variables (lag length t-2) are used as instruments. The methodology used is I3SLS.[23] The regressions are initially performed with cross-country equality restrictions on the coefficients (other than the intercepts) following Savvides and Fry. We then test the validity of the constraints on the coefficients. Given that most constraints can be rejected at the 5 per cent level we re-estimate the equations without the cross-country equality restrictions. The results show that there was no systematic response to target variables across the five countries.

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20 When a measure of the output gap based on the Fielding data is included its coefficient is never significant.

21 Industrial production is available quarterly for Côte d'Ivoire and Senegal only and unemployment is available annually for Côte d'Ivoire only (IFS).

22 Using the IFS data rather than BCEAO data, which may differ from IFS definitions.

23 Qualitatively similar results are obtained if OLS is used instead of I3SLS. We report the I3SLS results because it is the more efficient estimation method and to make the results comparable to the Savvides results.

4.1 Regressions with constrained coefficients

In the regression of the determinants of private sector credit, where the coefficients (other than on the intercepts) are constrained it appears that the BCEAO is sensitive to some monetary policy variables.

$$\begin{aligned}\Delta\mathbf{PSC/Y} = \beta_0 &- 0.145^{***}\ \Delta\mathbf{PSC/Y}_{\mathbf{it-1}} + 0.0382^{***}\ \Delta\mathbf{NFAY/Y}_{\mathbf{it}} \\ &- 0.029^{***}\ \Delta\mathbf{NFAY/Y}_{\mathbf{it-1}} - 0.086\ \Delta\mathbf{DETY}_{\mathbf{t-1}} - 0.068^{***}\ (\pi\text{-}\pi^*)_{\mathbf{it}} \\ &+ 0.002\ (\pi\text{-}\pi^*)_{\mathbf{it-1}} + 1.596^{***}\ \Delta\mathbf{CGY}_{\mathbf{it}} + 0.334^{***}\ \Delta\mathbf{CGY}_{\mathbf{it-1}} \\ &- 0.001^{**}\ \mathbf{oilinf} + u_{it}\ [24]\end{aligned}$$

Only a very small fraction of increases in current foreign capital inflows are lent on to the private sector and there appears to be an attempt to sterilize lagged foreign capital inflows. Both coefficients on the foreign assets variables (current and lagged) are significant at the 1 per cent level. There appears to be no statistically significant relationship between the increase in long-term foreign debt and domestic credit. There is evidence of a contraction in private sector credit to in response to a higher current inflation differential: the coefficient on the current inflation differential is negative and the relationship is statistically significant at the 1 per cent level. However, the BCEAO does not seem to offset government borrowing by reducing private sector credit. The coefficient on this variable is positive and larger than one.[25]

These results are in contrast with those of Savvides for the period before the devaluation of 1994. There is no longer evidence of a policy to restrict private sector credit in response to government borrowing from the central bank and no stabilising response to rising external indebtedness. On the other hand credit does not rise to accommodate inflation or oil price shocks, but credit policy appears to be restrictive in response to these target variables.

4.2 Regressions with unconstrained coefficients

When we test whether we can accept the constraints placed on the coefficients in the estimation, we find that we have to reject the constraints on the lagged dependent variable, the current and lagged government borrowing from the central bank and the current inflation differential. The tests are inconclusive for the lagged net foreign assets variable. We therefore repeat the I3SLS regression without constraining the coefficient estimates. The results presented in Table 3 show first that eliminating the constraints on the coefficients results in an improved fit for the country regressions of Côte d'Ivoire, Mali and especially for Senegal and Togo.[26] Second it appears that the five countries

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24 See Table 1 for details.

25 It is unfortunately not possible to test the hypothesis that the BCEAO reduces domestic credit when the governments exceed their borrowing limits of 20 per cent of revenues. According to IFS data all of the countries exceeded their borrowing limit throughout the entire period under examination. It is, however, possible that the countries complied with the limits set by the BCEAO under BCEAO accounting procedures at least some of the time.

26 See R-squared statistics reported in Tables 2 and 3.

respond differently to the independent variables and that there is no clear pattern of a BCEAO credit policy at the country level.[27]

Table 2
Private sector credit regressions I3SLS estimates with constrained coefficients

	Burkina Faso	Côte d'Ivoire	Mali	Senegal	Togo
Lagged dependent variable	-0.149*** (.0525)	-0.149*** (.0525)	-0.149*** (.0525)	-0.149*** (.0525)	-0.149*** (.0525)
(Change in banks' net foreign assets)$_t$	0.038*** (0.0103)	0.038*** (0.0103)	0.038*** (0.0103)	0.038*** (0.0103)	0.038*** (0.0103)
(Change in banks' net foreign assets)$_{t-1}$	-0.029*** (0.0090)	-0.029*** (0.0090)	-0.029*** (0.0090)	-0.029*** (0.0090)	-0.029*** (0.0090)
(Change in foreign liabilities)$_{t-1}$	-0.0864 (0.5472)	-0.0864 (0.5472)	-0.0864 (0.5472)	-0.0864 (0.5472)	-0.0864 (0.5472)
$(\pi-\pi^*)_t$	-0.068*** (0.0185)	-0.068*** (0.0185)	-0.068*** (0.0185)	-0.068*** (0.0185)	-0.068*** (0.0185)
$(\pi-\pi^*)_{t-1}$	0.002 (0.0152)	0.002 (0.0152)	0.002 (0.0152)	0.002 (0.0152)	0.002 (0.0152)
(Change in CB lending to government)$_t$	1.596*** (0.0501)	1.596*** (0.0501)	1.596*** (0.0501)	1.596*** (0.0501)	1.596*** (0.0501)
(Change in CB lending to government)$_{t-1}$	0.333*** (0.0990)	0.333*** (0.0990)	0.333*** (0.0990)	0.333*** (0.0990)	0.333*** (0.0990)
Oil price inflation $_t$	-0.001** (0.0004)	-0.001** (0.0004)	-0.001** (0.0004)	-0.001** (0.0004)	-0.001** (0.0004)
Constant	-0.005 (0.0051)	-0.005 (0.0080)	-0.001 (0.0072)	-0.004 (0.0072)	0.003 (0.0186)
R-Squared	0.905	0.7785	0.5513	0.3499	0.4964

[27] Table 2 reports results of a regression excluding oil price inflation as an explanatory variable, as it is not significant in any country regression and only has a minimal impact on the R-squared statistics. The coefficients of other variables are only marginally affected. Oil price inflation is, however, still included in the instruments for current inflation.

Table 3
Private sector credit regressions I3SLS estimates with unconstrained coefficients

	Burkina Faso	Côte d'Ivoire	Mali	Senegal	Togo
Lagged dependent variable	-0.262** (.1152)	0.261** (0.1099)	-0.040 (0.1213)	-0.297*** (0.1165)	-0.474*** (0.0997)
(Change in banks' net foreign assets)$_t$	0.149 (0.1121)	0.018* (0.0096)	0.240** (0.1186)	0.255 (0.1723)	-0.005 (0.1111)
(Change in banks' net foreign assets)$_{t-1}$	0.040 (0.0982)	-0.026*** (0.0079)	0.0038 (0.1040)	0.042 (0.1483)	-0.284*** (0.0885)
(Change in foreign liabilities)$_{t-1}$	-1.214 (0.8202)	-0.992 (1.0826)	1.573 (1.4823)	1.289 (1.1286)	-0.448 (1.7289)
$(\pi-\pi^*)_t$	-0.045* (0.02575)	0.106*** (0.0378)	-0.080** (0.0413)	-0.092*** (0.0319)	0.098 (0.0903)
$(\pi-\pi^*)_{t-1}$	-0.020 (0.0225)	0.029 (0.3259)	0.017 (0.0331)	0.041 (0.0281)	-0.049 (0.0782)
(Change in CB lending to government)$_t$	1.453*** (0.2579)	1.666*** (0.0869)	1.344*** (0.3397)	0.808*** (0.1091)	1.504*** (0.1953)
(Change in CB lending to government)$_{t-1}$	0.482* (0.2841)	-0.509** (0.2146)	0.181 (0.3690)	0.130 (0.1395)	0.895*** (0.2344)
Constant	-0.005 (0.0057)	0.0156* (0.0085)	-0.004 (0.0085)	-0.006 (0.0067)	0.012 (0.0241)
R-Squared	0.9124	0.8492	0.6157	0.6255	0.6415

Burkina Faso

In Burkina Faso there are only two potential BCEAO target variables, which are statistically significant. The coefficient on the inflation differential is negative as expected and significant at the 5 per cent level, rather than at the 1 per cent level as in the regression with the constrained coefficients. The coefficient on government borrowing is positive and highly significant, showing no attempt by the BCEAO to offset the effect of increased government borrowing on total credit in the economy.

Côte d'Ivoire

In Côte d'Ivoire current capital inflows feed into private sector credit to some extent, but there appears to be some attempt to sterilize lagged foreign capital inflows. However, the coefficient on the inflation variable is now positive (as well as significant at the 1 per cent level) suggesting that inflation is accommodated, rather than contained.

Again, there appears to be no pattern of restricting private sector credit in response to current government borrowing, though the coefficient on lagged government borrowing is negative and significant at the 5 per cent level. The lagged dependent variable in Côte d'Ivoire is positive, so there may be some inertia in the policy-making process.

Mali

In Mali increases in banks' net foreign assets are partially recycled into private sector credit. The coefficient on the inflation differential is negative as expected. Private sector credit increases as a multiple of government borrowing.

Senegal

In Senegal foreign capital inflows are partially reflected in increasing private sector credit. There appears to be a restrictive credit policy in response to rising inflation, and again private sector credit rise in line with government borrowing from the central bank. The coefficient here is; however, lower than in any of the other countries in the zone.

Togo

In Togo there is evidence for a policy of sterilizing lagged foreign capital inflows, but apparently there is no policy response regarding the inflation differential. Private sector credit rises as a multiple of current government borrowing and there also is a positive coefficient on the lagged government borrowing variable.

The estimation results based on the unconstrained coefficients therefore cast doubt on the results obtained in section 4.1. There does not appear to be a systematic policy to restrict credit in response to emerging inflationary pressures. While the regressions for Burkina Faso, Mali and Senegal show the expected negative coefficient on the inflation differential, the coefficient is positive and highly significant in Côte d'Ivoire and positive and insignificant in Togo. Similarly there is no systematic attempt to sterilize foreign capital inflows or foreign borrowing. Increases in long-term foreign liabilities are never significant in the regressions.[28] The only variable that is highly significant in all the regressions is the public sector borrowing from the central bank. But when the BCEAO is lending to the member governments it does nothing to offset its effect on domestic credit: domestic credit increases as a multiple of government borrowing. This result is in contrast to the Savvides results for the period before the devaluation, where the BCEAO kept a tighter control on domestic credit and restricted credit to the private sector to offset advances made to governments.

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28 The same is true for the BCEAO's centrally held foreign exchange reserves, which are therefore omitted from the regressions.

5 Conclusions

Our results suggest that the BCEAO did not take a particularly active role in steering domestic credit in the CFA member countries, although in theory it has several policy instruments at its disposal. While the first set of regression with constrained coefficients supported a hypothesis of restrictive credit policy in response to emerging inflationary pressures, the second set of regressions showed that across countries there is no evidence for a systematic policy. Not only do the significance levels and the magnitude of the coefficients vary widely, but in some cases the signs on the coefficients are reversed, showing accommodating monetary policy in Côte d'Ivoire and Togo. The only result that is consistent across all the countries is that there is no policy to restrict private credit if governments increase their borrowing from the BCEAO.

It appears therefore that the BCEAO operates interest rate policy at the zone-level, but does little to steer credit policy at the country level on a monthly basis.[29] This does raise the question of why the *de jure* powers of the BCEAO to restrict domestic credit growth have been strengthened in recent years, with the restrictions imposed on the refinancing of agricultural credits, the introduction of reserve requirements and the phasing out of central bank financing of government deficits. However, the first two of the measures predate the devaluation of the CFA franc in 1994 and may have been attempts to salvage the peg rather than being intended to strengthen BCEAO monetary control during periods of peg stability. It is therefore possible that BCEAO credit policy would become more pro-active if pressures on the currency re-emerged in the future.

[29] Another interpretation of the results would be that credit planning takes place on an annual basis (which would, however, be in contrast with the monthly setting of interest rates). In this case we would not necessarily observe credit responding to monthly variations in monetary policy target variables. However, we cannot test the response of the BCEAO to the monetary policy target variables discussed above on an annual basis with data from 1995 to 2002.

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