Assessing the effect of monetary policy on economic growth in franc zone

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Abstract: This study aims at assessing the effect of monetary policy on economic growth for the fourteen countries of the Franc zone over the period 1985-2012 using a dynamic panel model. The system estimator of the generalized method of moments has allowed us to demonstrate a significant and negative effect of domestic credit provided by banking sector on economic growth. The analysis reveals that money supply has significant positive effect on economic growth, while total reserves and inflation have a negative effect. However the negative effect of domestic credit provided by banking sector can be reversed through allocation of funds to those projects for which the social returns are the highest and through allocation of funds to productive local industries.

Keywords: Domestic credit, real GDP, dynamic panel, GMM.

1- Introduction

The franc zone is an economic, monetary and cultural area that is equivalent to none other in the world. It is made up of very diverse states and territories and results from developments and changes in the former French colonial empire (bank of France report 2010). After attaining their independence, most of the newly-created African states decided to remain within a homogenous group characterized by a new institutional framework and a common exchange rate mechanism. The franc zone is made up of France and 15 African states: Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo in West Africa, Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon in Central Africa, and the Comoros. The Franc zone is made up of two monetary unions: the West African Economic and Monetary Union (WAEMU) and the Central African Economic and Monetary Community (CEMAC). The treaty instituting the Central African Economic and Monetary Community was signed on 16 March 1994 (by the presidents of Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon), resulting in the creation of two entities: an economic union and a monetary union. The Treaty on West African Economic and Monetary Union was signed by the Heads of State of Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo meeting in Dakar on 10 January 1994. This treaty has four main strands:

harmonization of the legal and regulatory framework, setting up of a common market, multilateral surveillance of macroeconomic policies and coordination of national sectorial policies in the major economic areas.

The central bank of West African states (BCEAO) is an international public institution with head office in Dakar (Senegal). It defines and implements monetary policies in WAEMU, ensures the banking system's stability, implements WAEMU's exchange rate policies under the terms set out by the council and manages the official exchange reserves of member countries. The Bank of Central African states (BEAC) with head office in Yaoundé (Cameroon) has the tasks of defining and setting the union's monetary policy and the official reserves of the member countries. Also to promote the smooth operation of payment and settlement systems. The primary objective of BEAC is to ensure the monetary stability. Monetary policy can be defined as the process by which the government, central bank, or monetary authority of a country or a group of countries control the supply of money, availability of money, and cost of money or rate of interest to attain a set of objectives oriented towards the growth and stability of the economy.

The 14 African countries in the franc zone account for nearly one third of all sub-Saharan African states. Yet in terms of population and output the zone is far smaller. However, during a June 2007 meeting in N'djamena (Chad), member heads of state agreed to institutional reforms in CEMAC to strengthen regional policy making. Overview to only 17% of the population of Sub Saharan Africa and is in fact less than the population of Africa's most populous country, Nigeria. The franc zone accounts for about 15% of Africa's GDP and produces 22% of its oil.

The economic landscape of the franc zone is heterogeneous not only between the two unions but even within each grouping. The production structures and structural indicators for WAEMU and CEMAC differ significantly. Though WAEMU has more than doubled the population of CEMAC, its average per capital income in 2006 was less than half the CEMAC level. Measured by the share of exports to crop, WAEMU is also less open. The monetary policy of CEMAC is affected by the economic performance of the region. The monetary authority of BEAC decided to devaluate CFA franc in 1994 in order enhance economic activity. In 2001 the aim of monetary policy of BEAC was price stability and the promotion of save economic growth in countries (BEAC report 2001), based on this, the monetary supply increased by 13.7% compared to 2000 and the credit to the economy increased by 12% in Cameroon. In Central African Republic, the money supply decreased by 1.1% and the credit to the economy increased by 9.2%, the net debt on state also increased by 38.3% due to difficulties of public

funds. In Congo, the money supply reduced by 22.8% due to the reduction of external assets by 82, 3% and the credit to the economy reduced by 33.5%. In Gabon the money supply increased by 8.5% and the credit to the economy increased by 17.5%. In Equatorial Guinea the money supply increased by 22.8% and the credit to the economy increased by 35.2%. In Chad, the money supply increased by 23.2% and the credit to economy increased by 35.2 %(BEAC report 2001).

BEAC and BCEAO are trying to influence economic activity even if it is not their final objective; but there is not a consensus in the literature concerning the effect of monetary policy on real variables such as economic growth. For instance, we have The New Neoclassical Synthesis which suggest that monetary policy actions can have an important effect on real economic activity, persisting over several years, due to gradual adjustment of individual prices and that credibility plays an important role in understanding the effects of monetary policy (Goodfriend and al., 1997). Monetarists such as Friedman (1968), believed that the monetary authority should avoid major monetary shocks to the macro economy, suggesting a rule in which the quantity of money grew at a constant rate sufficient to accommodate trend productivity growth. Keynesian economists believed that a monetary expansion stimulates economic development and employment, even if it leads to a higher inflation. Thus, this study seeks therefore to analyze the effect of monetary policy on economic growth in the franc zone.

2- Brief literature review

Some studies have been carried out in developing countries to assess the effect of monetary policy on economic activity. Olaniyi (2013) empirically investigate the relationship between domestic credit and economic growth in Nigeria, using annual time series data from 1970 to 2012. In order to do this, the study employs KPSS unit root test, Johansen cointegration test, Vector Autoregressive (VAR) modeling, impulse response function, variance decomposition and granger causality. Firstly, the findings reveal that there is a bi-directional causality and positive relationship between domestic credit and the economic growth in Nigeria. That is, domestic credit does not only contribute positively to economic growth in Nigeria, but the impact is strong and statistically significant. The findings have a strong implication on monetary policy in Nigeria. The major implication is that an efficient financial system is one of the foundations for building sustained economic growth. Considering regulations, institutional constraints and other macro-economic factors militating against domestic credit in the economy, government should make the environment conducive and supportive so that performance is enhanced and good lending behavior guaranteed.

Akpansung and al; (2011) examines the relationship between banking sector credit and economic growth in Nigeria over the period 1970-2008. They established the causal links between the variable, using Granger causality test while using a Two-Stage Least Squares (TSLS) estimation technique for their regression models. The results of Granger causality test show evidence of unidirectional causal relationship from GDP to private sector credit (PSC) and from industrial production index (IND) to GDP. They found that private sector credit impacts economic growth positively while lending rate impedes economic growth.

Mohsin Khan (2010) provides an overview of the current monetary policy debate. He discusses the conventional objectives, targets, and instruments of monetary policy, including an analysis of the monetary transmission process, which looks at the traditional "money" view as well as the credit channel. Khan examines the problems of dynamic inconsistency and inflationary bias, where governments deviate from their stated or target inflation level in order to obtain short run output gains. The various solutions proposed to overcome the dynamic inconsistency problem lead to another debate on rules versus discretion in monetary policy. Most economists now agree that any rules-based regime permits a margin for discretion, and they reject the idea that rules and discretion are mutually exclusive. As policymakers in many countries throughout the world have gravitated toward an approach based more on rules than on full discretion, a key issue is choosing an appropriate policy target, or nominal anchor. Khan offers a detailed discussion on nominal anchors and current monetary frameworks before moving on to analyze the output effects of monetary policy. He looks at the relationship between the growth of GDP and different monetary aggregates in 20 sub-Saharan African economies and finds empirical support for the hypothesis that credit growth is more closely linked than is money growth to the growth of real GDP in these countries.

Harold Ngalawa and al; (2011) investigate the process through which monetary policy affects economic activity in Malawi. Using innovation accounting in a structural vector autoregressive model, it is established that monetary authorities in Malawi employ hybrid operating procedures and pursue both price stability and high growth and employment objectives. Two operating targets of monetary policy are identified, bank rate and reserve money, and they demonstrated that the former is a more effective measure of monetary policy than the latter. Their study also illustrates that bank lending, exchange rates and aggregate money supply contain important additional information in the transmission process of monetary policy shocks in Malawi. Furthermore, they have shown that the floatation of the Malawi Kwacha in February 1994 had considerable effects on the country's monetary transmission process. In the post-1994 period, the role of exchange rates became more conspicuous than

before although its impact was weakened; and the importance of aggregate money supply and bank lending in transmitting monetary policy impulses was enhanced. Overall, the monetary transmission process evolved from a weak, blurred process to a somewhat strong, less ambiguous mechanism.

With the aid of the St. Louis equation, Sesan Adeniji and al; (2013) applies panel data technique on real variables of some selected African countries with extended data from 1970 – 2012. Their results support both Keynesian and monetarist positive policy assertions. The monetary base and government expenditure are viable instruments to stabilize output. Moreover, their study suggests that utilizing the monetary base as a policy tool is more powerful than using government expenditure.

There are also several studies that have been carried out in industrialized and emergent countries in order to assess the effect of monetary policy on economic activity such as:

Chung et al. (2011) then undertake a simulation exercise based on the historical relationships between interest rates and components of GDP. They find that the $600 billion in Treasury purchases recently undertaken by the Fed is likely to boost GDP by up to a full percentage point, which translates into roughly 1 million full-time equivalent jobs supported by these actions. It should again be noted that this is just the effect of the most recent Fed asset purchase – not the full range of effects spurred by their conventional easing in the early parts of the recession and the first round of quantitative easing. Chung et al. (2011) estimate that the full effect of all large-scale asset purchases undertaken by the Fed probably supported nearly 3 million jobs and will have lowered measured unemployment by 1.5 percentage points through the end of 2012.

La Porta et al. (1998), Levine et al. (2000), Leitão (2010), Hassan et al. (2011) defend this idea. There is no consensus in domestic credit that this proxy promotes economic growth. Leitão (2010) finds a positive correlation between domestic credit and growth. The author examines the link between financial development and economic growth for European Union Countries and BRIC (Brazil, Russia, India and China) for the period 1980 to 2006. As in Levine et al. (2000), the author applied a dynamic panel data. Hassan and al. (2011), Levine (1997) defend and find a negative impact of credit on economic growth. In fact domestic credit discourages the investment and saving. In this way we can consider a negative correlation within credit and growth.

Mishra et al (2009), using Vector Autoregressive model (VAR), investigates the direction of causality between India credit market development and the economic growth between 1980 and 2008. He finds that economic growth has a positive impact on credit market

development. As well, Granger Causality Tests indicate that credit market development spurs economic growth in India. Cappiello et al (2010) found, in their study of the European Area, that contrary to recent findings for the US, the supply of credit, both in terms of volumes and in terms of credit standards applied on loans to enterprises, have significant impacts on real economic activity. That is to say, a change in loans growth has a positive significant impact on GDP.

Ioannis Pragidis and al; (2013) in their paper tried to identify any asymmetric impact of unanticipated monetary policy shocks on the real economy, as the latter is being described by the industrial production index. In doing so, they tested for the true Taylor's rule model for each economy under question and they used a nonlinear forward looking Taylor's rule in order to forecast the movements of the FED for U.S and a backward looking linear Taylor's rule for Brazil. Any deviation from these forecasts is assumed to be an unanticipated monetary policy shock. According to them this is the first time that a nonlinear Taylor's rule is used in order to identify the monetary shocks. Next, using a well-documented methodology, they found a significant impact of these shocks on the real economy. In the case of U.S, only unanticipated monetary shocks appear to have statistically significant impact on the real economy confirming the expected results of the rational expectations theory. On the other hand, in the case of Brazil, they detected a significant impact of a positive monetary shock. Furthermore, the anticipated monetary policy has a much less significant impact than the impact of an unanticipated shock which is in line with the theory of rational expectations that only unanticipated monetary shocks can affect the real economy.

3- Theoretical framework

This study will be based on Neo-classical growth theory framework developed mainly by Solow (1956), and Barro and Sala-I-Martin (1992). Starting with General Cobb-Douglas production function model:

(1) $$\mathbf{Y_{i,t} = K_{i,t}^{\alpha} (A_{i,t}L_{i,t})^{1-\alpha}}$$

Where $Y_{i,t}$ was the total amount of production of the final good at time t in country i, $K_{i,t}$ was the capital stock at time t in country i, $A_{i,t}$ was technology at time t in country i, and $L_{i,t}$ was total employment in country i, at time t.

Defining $k_{i,t} = K_{i,t} / A_{i,t}L_{i,t}$ as the stock of physical capital per unit of effective labor, and $y_{i,t} = Y_{i,t} / A_{i,t}L_{i,t}$ as output per unit of effective labor in country i at time t. They derived the following equation:

(2) $dk_{i,t}/d_t = s_i y_{it} - (g + n + \delta)k_{i,t}$

When g was technological progress of A, n was the growth rate of the labor force and δ was depreciation of K. The production function in the intensive form could be written as $y_{i,t} = k_{i,t}^{\alpha}$. Then intensive form of steady state of capital was:

(3) $\ln k_i^* = \frac{1}{1-\alpha} \ln s_i - \frac{1}{1-\alpha} \ln(g_i + n_i + \delta)$

Substituting the steady state k^* we obtained

(4) $\ln y^* = \ln(A_{i,0}) + g_{i,t} + \frac{\alpha}{1-\alpha} \ln s_i - \frac{\alpha}{1-\alpha} \ln(g_i + n_i + \delta)$

Following Barro and martin (1992) for unconditional convergent equation will be:

(5) $\ln y_{i,t} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \upsilon_{i,t}$

Since determinants of economic growth differ across countries, Barro (1990), Barro and Sala-i-Martin (1992) favor the notion of conditional convergence:

(6) $\ln y_{i,t} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \gamma X_{i,t} + \upsilon_{i,t}$

Where t indicates the time interval, (t-1) is the initial of the time interval, $\mathbf{X_{i,t}}$ is the matrix of other variables that can affect economic growth, $\upsilon_{i,t}$ is error term, and y is real GDP per people.

4- Data source and methodology

In this study, we are interested in testing the effect of monetary policy on economic growth in Franc zone from 1985 to 2012. The secondary data used cover the period of 1985 to 2012 for the fourteen countries of the Franc zone. Data was collected from the World Development Indicators CD-ROM 2013 (WDI) and the IMF (2013). Data concerning inflation was extracted from the IMF data base.

4.1- **Model specification**

This study will be based on Neo-classical growth theoretical framework developed mainly by Solow (1956), and Barro and Sala-i-Martin (1992). This specification was also used by Asongu (2012), Soukiazis and Vitor Castro (2003) and Fung (2009). That is:

(7) $\ln y_{i,t} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \gamma X_{i,t} + \upsilon_{i,t}$

Where t indicates the time interval, (t-1) is the initial of the time interval, $X_{i,t}$ is the matrix of other variables that can affect economic growth, $\upsilon_{i,t}$ is error term, and y is real GDP per people.

7) Is equivalent to:

(8) $\ln y_{i,t} = \alpha + \ln y_{i,t-1} + \beta \ln y_{i,t-1} + \gamma X_{i,t} + \upsilon_{i,t}$

(9) $\ln y_{i,t} = \alpha + (1 + \beta) \ln y_{i,t-1} + \gamma X_{i,t} + \upsilon_{i,t}$

(10) $\ln y_{i,t} = \alpha + \beta^* \ln y_{i,t-1} + \gamma X_{i,t} + \upsilon_{i,t}$ With $\beta^* = 1 + \beta$

In order to take into account the effect of monetary policy, we should add other variables and the equation that will be estimated is:

$$\ln GDP_{i,t} = \alpha + \beta^* \ln GDP_{i,t-1} + \beta_{1i,t} M2_{i,t} + \beta_{2i,t} RESERV_{i,t} + \beta_{3i,t} CREDIT_{i,t} + \beta_{4i,t} TRADE_{i,t} + \beta_{5i,t} INVEST_{i,t} + \beta_{6i,t} INFLA_{i,t} + \upsilon_{i,t}$$

$GDP_{i,t}$: Is the real GDP of country *i* in year t;

$GDP_{i,t-1}$: Is the real GDP per of country i in year t-1

$M2_{i,t}$: Is the annual growth rate of money supply of country i in year ;

$RESERV_{i,t}$: Is the total reserves of country i in year t;

$CREDIT_{i,t}$: Is the domestic credit of country i in year t;

$TRADE_{i,t}$: Is the total trade of country i in year t;

$INVEST_{i,t}$: Is the gross fixed capital formation of country i in year t;

$INFLA_{i,t}$: Is the inflation rate of country i in year t;

$\upsilon_{i,t}$: is the error terms;

ln : is neperian logarithm.

4.2- Definition of variables

- Dependent variable

The dependent variable in this equation is the real GDP. This variable is used to capture the economic growth. This variable was also used by Jeevan Kumar (2013) in order to capture economic growth.

- Independent variables

The money supply (M_2)

This is the annual growth rate of monetary mass. This variable takes into account the effect of monetary policy through money supply on economic growth.

Domestic Credit (CREDIT)

This is domestic credit provided by banking sector in percentage of GDP. This variable was used by Leitão (2012) and Olaniyi Evans (2013) to assess the effect of monetary policy on economic growth.

Total Reserves (RESERV)

Here it is the annual growth rate of total reserves. This variable captures the effect of external assets on economic growth. Reserves is also a guarantee of external stability of money.

Gross fixed capital formation (INVEST)

Here it is expressed as a ratio of total investment in current local currency and GDP in current local currency. Investment or gross capital formation is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector.

Inflation (INFLA)

A low inflation rate is indispensable to ensure the credibility of monetary policy. This will be captured by the inflation, consumption price (annual growth) in order to take into account the final objective of BEAC which is internal and external stability of money. The studies of Gillman and Kejak (2005), and Fountas et al. (2006) found a negative effect on growth.

Trade

Many authors like Grossman and Helpman (1991), Youth (1995), show the importance of commercial openness. They concluded their work by saying that trade can enhance economic growth. Here it is in percentage of GDP.

Lag of GDP annual growth rate

This variable permits us to test the convergence hypothesis. Neoclassical growth models postulate that, a country's per capita growth rate tends to be inversely related to its starting level of income per person. In particular, if countries are similar with respect to structural parameters

for preferences and technology, then poor countries tend to grow faster than rich countries (Barro, 1992). Thus, there is a force that promotes convergence in levels of per capita product, so we expect a negative sign.

4.3- Estimation technique

In our models, the presence of the lag value of the dependent variable makes us to have a dynamic panel. The estimation of dynamic panels shows the problem of autocorrelation of individual specific effect and independent variables, but also the problem of endogeneity of some explanatory variables. To solve these problems, Anderson and Hsiao (1982) transform the model in first difference in order to eliminate the individual effect. The problem of correlation between the dependent variable and the error term is still persistent. The use of ordinary least square (OLS) will give biased parameters and non-convergent. Consequently, we used the Generalized Method of Moment (GMM), which is an instrumental method to make our estimation (as use by Zulkey and al; 2010, Patrick lünnemann and Thomas mathä 2001, Moses M. Sichei 2005). The Generalized Method of Moments (GMM) introduced by Hansen (1982) has had a significant impact in econometrics since the Lucas critique; modellers have tried to estimate the structural parameters remaining invariant to changes in economic policy (Féve and Langot, 1995). GMM has allowed the estimation of such parameters, particularly in the context of nonlinear models with rational expectations.

On a statistical point of view, this method has provided a unified treatment of many classes of estimators. It includes, among other OLS, instrumental variables methods or maximum likelihood as special cases. Arellano and Bond were the first in 1991, in an article in the Review of Economic Studies, to propose an extension of the Generalized Method of Moments (GMM), in the case of panel data.

The method presents many advantages among which:

- This method permits to solve the problem of simultaneity bias and the inverse causality and eventually omitted variables. In addition, it permits to control specific individual and time effect; and allow solving the endogeneity problem not only at the level of dependent variable but also for other independent variable by the generation of lag value for variables.
- In addition, this method permits to generate instrument using explanatory variable, and this is not the case of other traditional instrumental methods (2SLS and 3SLS), that requires the choice of theoretical instrumental variable correlated with the explanatory variables but un-correlated with the residual, which is not easy.

There are two types of estimators: the estimator of Arellano and Bond (1991) or differences GMM and system GMM estimator. The Arellano and Bond estimator suffer from weak instruments, which lead to substantial biases in finite samples, and its accuracy is asymptotically small (Blundell and Bond, 1998). Specifically, the lagged values of the explanatory variables are weak instruments for the first differences equation. Moreover, the differentiation of the level equation eliminates inter-country variations and takes into account only the intra-country variations.

Blundell and Bond (1998) found that the system GMM estimator is more efficient than the differences GMM estimator, it produces biased coefficients for small samples. The system estimator can raise the limits of the difference estimator. This method allows estimating simultaneously the difference equation and the level equation. We retain this estimator to test our hypotheses.

All the regression and econometric tests are made using STATA 11.0; since it gives an easy way of estimating dynamic panel model using the Xtabond2 command. All the tests performed before the regression are also available in this software.

5- Presentation of results

5.1- Pre-estimation tests

- Pair-wise correlation matrix (to test multicolinearity)

	loggdpD	m2	reserv	creditD	trade	invest	infla
loggdpD	1.0000						
m2	0.1663 0.0012	1.0000					
reserv	0.1211 0.0185	0.0147 0.7725	1.0000				
creditD	-0.1493 0.0036	0.3598 0.0000	-0.0694 0.1781	1.0000			
trade	0.3739 0.0000	0.1155 0.0225	0.2514 0.0000	-0.0451 0.3823	1.0000		
invest	0.2865 0.0000	0.2087 0.0000	0.0298 0.5557	-0.0311 0.5470	0.2346 0.0000	1.0000	
infla	0.0754 0.1435	0.3881 0.0000	-0.0372 0.4627	-0.1792 0.0005	0.0032 0.9500	0.2307 0.0000	1.0000

From the matrix above, we noticed that there is no problem of multicolinearity, since none of the correlation coefficients is greater than 0.8. We also noticed that the correlation between gdp, m2, creditD, trade and invest is statistically significant at 5%.

- Stationarity test

Before regression, stationarity of the variables is analysed. For the unit root test in panel data, two generations of tests have been developed: the first generation tests and second-generation tests. We retain in this study the Im-Pesaran-Shin test for unit root. The table below is a summary of the stationary test.

TABLE I

Series	Dickey-fuller statistic	Critical values			P-value	Decision
		1%	5%	10%		
LoggdpD	-9.4016	-2.050	-1.900	-1.820	0.0000	I(1)
M2	-9.8320	-2.050	-1.900	-1.820	0.0000	I(0)
Reserve	-9.9958	-2.050	-1.900	-1.820	0.0000	I(0)
creditD	-9.9861	-2.050	-1.900	-1.820	0.0000	I(1)
Trade	-1.9668	-2.050	-1.900	-1.820	0.0246	I(0)
Invest	-3.7060	-2.050	-1.900	-1.820	0.0001	I(0)
Infla	-9.3417	-2.050	-1.900	-1.820	0.0000	I(0)

SOURCE: author

From the tableI above we noticed that all the variables are stationary at 5%, but credit and loggdp are stationary after first difference, they are integrated with order one.

5.2- Estimation results

TABLE II

	Coef.	Corrected Std. Err.	Z	p>|Z|	[95% Conf. Interval]
loggdpLD	-.191222***	.036274	-5.27	0.000	-.2623176 -.1201263
M2	.0003589**	.0001428	2.51	0.012	.000079 .0006388
reserv	-2.60e-06	.0000129	-0.20	0.841	-.0000279 .0000228
Infla	-.000426	.0003191	-1.34	0.182	-.0010514 .0001994
creditD	-.0024352***	.000661	-3.68	0.000	-.0037308 -.0011396
Trade	.0006531**	.0002756	2.37	0.018	.000113 .0011932
invest	.0004171	.0003565	1.17	0.242	-.0002817 .0011159
Cons	-.0133907	.0163172	-0.82	0.412	-.0453718 .0185905
Arellano-Bond test for AR(1) in first differences: z = -1.87 pr > z = 0.062					
Sargan test of overid. Restrictions: chi2(5) = 8.67 prob > chi2 = 0.123 Hansen test of overid. Restrictions: chi2(5) = 7.07 prob > chi2 = 0.215					
Number of instrument = 13 number of observation = 364 Wald Chi2(7) = 112.80 number of groups = 14 Prob > chi2= 0.000 **5% significance and *** 1% significance					

Source: Author

In the results above (TABLE2), the test of instruments validity of Sargan and Hansen confirms the validity of the instruments, and the autocorrelation test of Arrellano-Bond

accepted like expected the presence of an AR(1). The likelihood chi-square indicates that the overall explanatory variables are significant at 1%.

Concerning the coefficient of the delay of real GDP, the coefficient is negative (-.191222) and significant at 1%. Since $\beta^* = 1 + \beta$, $\beta = -1.191222$. This coefficient with negative sign means that there is a conditional convergence in Franc zone countries concerning the economic growth during the period 1985-2012. This result is different to that of Latif A.G. Dramani (2010) who found that there were no real convergence in Franc zone countries as a whole during the period 1970-2000. Our results is the representation of efforts made by CEMAC and CDEAO countries concerning the respect of convergence criteria.

The coefficient of money supply is positive, meaning that an increase in money supply will lead to an increase in economic growth. Since we are dealing with a semi-logarithmic function, we need to apply the anti-log in order to analyse the marginal effect, but due to the fact that the value of the coefficient is small, we should not apply the anti-log. More precisely, a unitary increase in the growth rate of money supply will lead to an increase in the economic growth by 0.036%. This coefficient is statistically significant at 5%. This result is similar to that of Tobin, (1965) who argued that money is not super-neutral because an increase in the anticipated growth of the nominal money supply reduces the real interest rate and increases the long-run capital-output ratio.

The coefficient of total reserve is negative, meaning that, a unitary increase in total reserves growth rate will lead to a decrease in economic growth. But this coefficient is not statistically significant at 5 and 10%. The coefficient of inflation is negative as expected, meaning that a unitary increase in the inflation rate will lead to a reduction in economic growth. But this coefficient is not statistically significant at 5 and 10%.

The coefficient of domestic credit provided by banking sector is negative and statistically significant at 1%, showing that an increase in domestic credit leads to a reduction in economic growth. More precisely, $e^{-.0024352} = 0.997567763$, tells us that an increase in the proportion of the domestic credit in the GDP by one unit leads to a reduction of economic growth by 0.24%. This result is explained by the use of a great proportion of domestic credit to finance fiscal deficit. This result goes into the same direction with Demetriades and Luintel (2001) who maintain that, the link between economic growth and financial development depends on the in-country institutional factors. There are wide institutional differences so financial development may derive growth in one country, but not in another. For instance, in

India, financial repression has not hindered growth, and has not undermined the expansion of finance, for the period between 1970-1971 and 1998-1999 (Bhattacharya and Sivasubramanian, 2003).

Trade has a positive significant effect on economic growth (significant at 5%). More precisely, an increase in the proportion of trade in the GDP by one unit, will lead to an increase in the economic growth by 0.065%. This small effect of trade can be explained by the fact that most of the export is oil and raw material and, in most of these countries, most of the oil income is spent on consumer imported goods which could not promote high economic growth. Gross fixed capital formation has a positive effect on economic growth (the coefficient is not significant). The coefficient of this variable tells us that a unitary increase in the proportion of gross fixed capital formation in the GDP will lead to 0.042% increase in the real GDP. This result goes in the line with that of Aschauer (1989a) in a study carried out in USA, Carrol and Weil (1994) in a study carried out in 64 countries.

6-Conclusion and recommendations

6.1-Conclusion

This study attempted to answer the central question: to what extend has the monetary policy impact on the economic growth of the Franc zone countries? To answer this question, we used a sample constituted by the fourteen countries of the Franc zone over the period of 1985-2012. Next to Asungu (2012), Soukiazis and Vitor Castro (2003) and Fung (2009) Baliamoune and Ndikumana (2008), we used the general method of moments. However, our development goes further than those of previous authors to take into account the limits of the difference estimator, we used the system estimator. In agreement with the empirical results, our study shows that money supply has a positive significant effect on economic growth, while domestic credit provided by banking sector has a negative significant effect. The study reveals also that, increased total reserves reduces the economic growth rate. However, this inverse relationship is not proven significantly within the period of study. This result underlines that total reserve is not the most important channel through which monetary policy affects economic growth. The study also reveals that, inflation has a negative effect on economic growth. We find that trade is a positive stimulus for economic growth in the Franc zone. Moreover, the reason why trade has a small positive effect on economic growth may be due to the extraversion of the Franc zone countries. In addition, we note that gross fixed capital positively affects

economic growth. Reflecting the central role that public investment occupies in the Franc zone economies.

6.2-Recommendations

This study found that, commercial banks credit is a channel through which monetary policy affect economic growth in CEMAC. In order to reverse the negative effect of credit, we advocate that banks allocate funds to those projects for which the social returns are the highest. We also preconize like Kruk and al; (2013) that banks should allocate more funds to productive local industries. We also tested the hypothesis of convergence in the Franc zone. It would be wise to strengthen the rules of convergence, and the respect of these standards by all countries. We finally suggested the use of a coordinated optimal mix of policy instruments since to achieve a particular macro-economic objective might not be realistically attainable.

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