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Analysis of Current Account Deficit Determinants of Balance of Payments in Fixed and Flexible Exchange Rate Regimes: A Comparative Study in CFA Franc and Non-Franc Zones

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Abstract

This study compares the impact of certain economic and financial variables on the level of the deficit in the current account of the balance of payments of the countries of the Franc zone and certain countries of the non-Franc zone situated south of the Sahara. The empirical results of the study based on panel data models covering the period 1990-2015 indicate that none of the two zones behaves better against the current account deficit of the balance of payments and that no zone is more competitive than the other. Finally, it was clear from our analysis that the variables of gross domestic, saving and the change in the terms of trade better explain the change in the current account balance in the Franc zone, whereas the variables of net foreign transfers and gross domestic saving impact the most the current account deficit in non-CFA zone.

Keywords

current account deficit, balance of payments, fixed foreign exchange, flexible foreign exchange, Franc zone, non-Franc zone

1. Introduction

The balance of payments traces all the economic and financial transactions of the residents of a country with the rest of the world. According to the International Monetary Fund's Balance of Payments Manual, 5th edition (1993), all real and financial flows between residents and non-residents are divided into three accounts: the current account, the capital account and the financial account. The current account, records trade in goods, services and transfers with the outside world. Its balance reflects the capacity or the need for financing of an economy.

The current account balance of the balance of payments in various countries has often presented a

deficit situation reflecting many short-term and long-term macroeconomic imbalances, including the trade imbalance (between imports and exports), the financial imbalance (between Investments and savings) and the change in transfers (net transfers). Thus, the current account is a macroeconomic indicator that provides short-term information, both on domestic and international economic conditions, and in the long term reflects the country's competitiveness (Gnaro, 2004). Indeed, a one-time deficit in the current account can be attributed to an unpredictable shock, but when it persists, it leads to an increase in external debt (Ben Abdallah, 2000).

Financing of these official transactions takes place in different exchange rate regimes, namely fixed and flexible exchange rates. As a result, it can be speculated that the impact of the determinants of the current account deficit in the balance of payments is not the same for the various exchange rate regimes.

Traditionally, in the literature, the current account is examined through two approaches: a first approach is to use "Mundell-Fleming" models to estimate critical elasticities (Marshall-Lerner condition) or to determine the existence of the *J* curve (the evolution of the trade balance over time after devaluation). However, this approach does not take into account the inter-temporal aspect of the economy. The second approach uses inter-temporal current-balance models in which economies exchange the same good in order to test the inter-temporal behavior of agent consumption. In other words, the inter-temporal theories of the current account also emphasize the role of the improvement of consumption that current deficits or surpluses can play. For example, if a country experiences a shock, such as a natural disaster that temporarily jeopardizes its productive capacity, it can then, rather than immediately face all the consequences of the shock, spread the painful effects over time by displaying a current account deficit.

Indeed, the current account deficit corresponds to the current financing requirement of the economy. It is generally covered by external borrowing. The payment of the services of the debts thus contracted would be secured with the future commercial surpluses which the economy would generate. But the excess of the value of imports relative to exports does little to help the situation.

Hence, for several decades, whether in fixed or flexible exchange rates, the current account of most developing countries presents a structurally deficit, mainly due to the insufficiency of export earnings to ensure the coverage of imports of goods and services. In this case, the deterioration of the current account, coupled with a decline in net foreign financing flows, would lead to an accumulation of deficits in the overall balance of payments, which would result in foreign exchange reserves being drawn down. If this situation persists, it could lead to a balance of payments crisis that would require the implementation of drastic measures.

The objective of this study is to analyze the impact of certain economic and financial variables on the level of the deficit in the current account of the balance of payments of the countries of the Franc zone and certain countries of the non-franc zone located in South of the Sahara for the period 1990-2015. Specifically, it is a question of determining which of the two zones behaves better against the current

account deficit of the balance of payments or more simply which of the two zones is more competitive than the other.

The rest of the paper is organized as follows. Section 2, in a brief presentation, compares the economic performance of the two CFA and non-CFA zones. Section 3 discusses the literature review which presents the various works devoted to the subject. In the fourth section, we specify the models whose comparative analysis of the results is presented in Section 5. Finally the last section concludes the work.

2. Economic Performance in CFA Franc Zone and Non-Franc Zone

Recent studies have concluded that exchange rate regimes may not account for differences in economic performance or more explicitly they do not influence them (Ghosh et al., 1996; Klein & Shambaugh, 2010; Rose, 2011). However, for the African countries south of the Sahara (SSA) and especially those concerned with our work, several studies have been done to show the links between the exchange rate and certain macroeconomic variables.

Devarajan and Rodrik (1991) show that the countries of the CFA Franc area, because of the parity of their currency with the French Franc (now the EURO), suffer from the external shocks inherent in their terms of trade and whose costs are high. On the other hand, countries in the non-Franc zone can alleviate the costs associated with these external shocks. They find that countries in the CFA zone have tried to keep inflation rates low in contrast to non-CFA countries. According to the authors, the difference between the two rates is 14 points. However, they point out that the production costs to maintain a fixed exchange rate surpass the profit associated with a low inflation rate. Overall, the authors conclude that, in general, the fixed exchange rate was a poor arrangement for countries in the CFA zone. Based on a study of a sample of 35 SSA countries over the period 1985-2009, Coulibaly and Davis (2013) have almost reached the same conclusion that countries in the CFA zone benefited in terms of inflation without resulting in a significant effect on economic growth.

Elbadawi and Majd (1992) compare the economic performance of the two zones and find that, from a competition point of view, the performance of countries in the CFA zone is already weaker in the first half of the 1980s than in the second half and worst than that of non-CFA countries in terms of economic growth, exports, investment and savings. The only exception is domestic inflation. On the other hand, the long-term results remain mixed. Countries in the CFA zone perform better than others during the 1970s and 1980s in exports, domestic savings, domestic investment and inflation. But in terms of economic growth, performance is lower. Similarly, Ghura and Hadjimichael (1996), estimating the average economic growth of 29 SSA countries between 1981 and 1992, show that the average income of the CFA zone countries declined by 0.91 per cent, while they remained almost unchanged (+ 0.01%) for the other zone. They conclude that price stability in the CFA area has not generated high economic growth. Similarly, Coulibaly and Davis (2013), over the period 1985-1994, find that the countries of the CFA zone were in recession while the other SSA countries are stagnant. However, the CFA zone

performed well after the devaluation, with an average growth rate of 3.4 per cent compared with the previous period. Also, Hoffmaister et al. (1998) show that the economic performance of the CFA area was better during the period 1975-1985 due to the positive terms-of-trade shocks and that this trend reversed during the period 1985-1993.

Other studies attempt to analyze the effects of real exchange rate volatility on economic growth. These studies have shown that the misalignment of the upward exchange rate associated with fixed exchange rate regimes leads to lower economic growth. For countries in the CFA zone, evidence is highlighted, among others, by the authors Dubas (2009), Coudert et al. (2011) and Holtemöller and Mallick (2012).

From the point of view of fiscal discipline, Tornell and Velasco (2000) indicate that the flexible exchange rate can lead to greater fiscal discipline. They also argue that a lax fiscal policy presents varying degrees of costs for both exchange rate regimes. But for the flexible exchange rate regime, the cost is immediate because of exchange rate fluctuations and price levels. On the other hand, Hounsou (2014) concludes that the fixed exchange rate regime presents more fiscal discipline than the other regime as stipulated by macroeconomic theory and in a democratic context.

3. Literature Review

The work of Marshall and Lerner (1946) made it possible to highlight the critical elasticity theorem also called the Marshall-Lerner condition. This approach explains the evolution of the balance of current transactions by that of the trade balance. Thus, for example, a decline in the exchange rate improves the balance of the current account balance if the sum of the absolute values of the price elasticities of imports and exports is greater than unity. The form of the equation gives: $|\varepsilon_X| + |\varepsilon_M| > 1$, with ε_M the price elasticity of imports and ε_X the price elasticity of exports**.**

Many empirical studies have focused on the estimation of foreign trade equations in order to evaluate the elasticities of exports and imports because of the implications of the resulting important economic policies. In the context of developing countries, economists have addressed the issue of whether a devaluation could improve the external position, particularly the trade and current account balances of these countries. Cooper (1971a), analyzing the consequences of devaluation in 21 developing countries over the period 1958-1969, finds that devaluations have generally helped to improve trade balances and the current account balances of these countries. Reinhart (1995) estimated the price elasticities of exports and imports for a number of individual developing countries. For Kenya, for example, the results indicate long-run price elasticities of exports and imports of 0.2 and -0.7, respectively, showing that the Marshall-Lerner condition is not met. On the other hand, for Colombia, the price elasticity of the demand for imports is -1.4 and that of exports is 0.5, indicating that a devaluation can improve the trade balance for this country. Senhadji (1999) analyzes the actual imports of goods and services from Nigeria and finds short-term and long-term price elasticities of -0.3 and -0.8, respectively. These results show that there is a delay in the reaction of volumes to changes in relative prices and activity.

In sum, the price elasticities approach focuses on price competitiveness and cyclical activity in

explaining the evolution of the trade balance and hence the current account balance. The implication of the resulting economic policies is that devaluation can improve the trade balance and current account, provided that the Marshall-Lerner theorem is satisfied.

However, this approach widely used in current account analyzes is considered static and does not take into account the inter-temporal budget constraint and the persistence of shocks and their impacts on foreign trade. In addition, the elasticities approach only takes into account the balance of goods and services and its effects on the current account balance. It thus neglects the influence of the balance of income and that of current transfers. The inter-temporal approach of the current account takes into account these different limits and complements that of the elasticities in the analyzes of the current balance of the balance of payments.

Economists often look at the relationship between the current account deficit and the fiscal deficit (twin deficits) using the accounting identity for the Gross Domestic Product (GDP) rated Y.

Given that $Y = C + I + G + X - M$, on the one hand, and $Y = C + S + T$, on the other hand, with

C = consumption; I = investment; G = government spending; X = exports; M = imports; S = saving and T = taxes, and by equalizing the two equations we have:

$(S - I) + (T - G) = (X - M)$ or private saving + public saving = current account balance.

Since the current account balance is equal to net exports, we can conclude that a current account deficit is the excess of investment over saving plus the excess of government spending over tax revenue. To reduce the current account deficit, many economists conclude that the surplus of investment must be reduced on savings or budget deficits.

If investment keeps a nation’s capital stock, the focus is on increasing savings and reducing the budget deficit.

To this end, Obstfeld and Rogoff (1995) consider that it is necessary to specify the determinants of private investment and saving behavior while emphasizing the intertemporal nature of these behaviors. For example, when consumers seek to improve their consumption, they prefer to go into debt. The result is a reduction in savings and, consequently, a deterioration in the current account balance. The temporary decline or the anticipated decline in income leads to a decrease in the surplus or an accumulation of the current account deficit (Rouabah, 2005).

Frankel and Razin (1987), using a general equilibrium model, analyze the effect of fiscal policies on current account behavior. The results show that, depending on whether a country has a current account deficit or surplus, the effects of fiscal policy will be different. Similarly, Blanchard (1983) develops a current account model that integrates the costs of investment facilities. The results show that an economy of the size of Brazil will need a steady 10% trade surplus to meet an external debt of about 300% of GDP. Also, Obstfeld and Rogoff (1996) show in a model adapted to a small open economy that for a debt-to-GDP ratio of 15, the trade surplus needed to repay debts is around 45% of GDP.

Cordoba and Kohoe (2000), on the basis of a calibration model of the Spanish economy, conclude that the optimal response to financial reform is to allow the current account deficit to rise, To 60% of GDP.

These figures are obviously very far from what is observed in reality. Thus, Edwards (1989) pointed out that the major limit of these different models comes from the unlikely values obtained in the estimates.

Insel and Kaykıç (2013) develop a model for Turkey to highlight the determinants of the current account of the balance of payments using an Auto Regressive Distributed Lag (ARDL) approach. The results show that inflation positively affects the current account deficit of the balance of payments, while the other variables of the model are the real GDP growth rate, the investment to GDP ratio, the saving to GDP ratio, the price of a barrel of oil in Europe and the real exchange rate which negatively impact the current account deficit.

Other studies have been devoted to the current accounts of developing countries since 1970, due to the difficulties of economic growth, the deterioration of the terms of trade and the problems of indebtedness to which the vast majority of these countries were confronted. One of the pioneering works on current account deficits in developing countries is that of Khan and Knight.

In fact, Khan and Knight (1983) carry out a study on the evolution of the current account balance in 32 non-oil developing countries on data covering the period 1973-1980 using an estimate by the techniques of the Ordinary Least Squares (OLS). The results of their study confirm the view that external factors, namely the sharp rise in real foreign interest rates, the stagnation of industrial activities in the industrial countries, and the remarkable fall in the terms of trade, as well as the internal factors expressed the increase in budget deficits and the rise in real exchange rates which contributed significantly to the deterioration in the current account balance in the 1970s.

Another analysis of the current account deficit based on the overall macroeconomic balance was conducted for the case of New Zealand. Kim et al. (2001) focused on this study, following a persistence of the current account deficit since the 1970s. Quarterly data, covering the period 1982: 2 to 1999: 3 and including private final consumption expenditure, Gross Fixed Capital Formation (GFCF) and changes in inventories, government final consumption expenditure, GDP and the current account balance were used. The results of the study show that, despite the country's current account deficit during the 1990s, its movements were in line with its inter-temporal budget constraint and thus the satisfaction of its formal solvency condition.

In addition, Hassan (2006) conducted a study on the determinants of the current account of Bangladesh. The variables used as determinants of the external trade deficit, used as a proxy for the current account deficit, include the fiscal balance, domestic savings, domestic income growth, foreign income growth, external interest rate, Terms of trade, exports and the real exchange rate. The period covered by this study is 1976-2003 and the methodology used is an Error Correction Model (ERM). The main findings revealed that the important explanatory variables in the determination of the current account deficit are the external interest rate, the terms of trade and the exports relative to GDP. The external interest rate and exports relative to GDP have a negative impact whereas the terms of trade are positively correlated with the current account balance. However, the most remarkable result is that no internal economic

indicator has a significant impact on the current account deficit and that all explanatory factors are related to external economic variables.

Chinn and Ito (2008) have also sought to explain the current account reversals in emerging Asian countries since 1997. They used the model of Chinn and Prasad (2003) and introduced the variables of financial development and legal environment that affect savings, investment and growth. The results have resulted in the fact that financial development and the legal environment have a significant role in explaining Asia's capital flows. Their results also show that the investment opportunity gap explains better the improvements noted in the current accounts of the emerging Asian countries rather than the excess of savings.

Duasa (2007) sought to explain the determinants of Malaysia's trade balance. He used a cointegration approach of Pesaran et al. (2001) with the ARDL model. Then, he performed a decomposition of the variance and simulated the functions of impulse responses. With this approach, he highlighted a long-term relationship between income, money supply and the trade balance. However, he found no long-term relationship between the balance of trade and the exchange rate.

Waliulah et al. (2010), in the wake of Duasa, examine the determinants of the trade balance in Pakistan using the same methodology in the case of Malaysia. Their conclusion shows that the income and the supply of money exert a strong influence on the balance of the trade balance in the long term. The exchange rate can help improve the balance of the trade balance and hence the current account balance, but its effect is weaker than the effects of income and currency.

Debelle and Faruqee (1996) use a panel of 21 industrialized countries over the period 1971-1993 and an additional cross-sectional data set comprising 34 both industrialized and developing countries including 10 sub-Saharan African countries to examine the determinants of current account. Based on the cross-sectional estimates, they conclude that the fiscal surplus, terms of trade and capital stock do not play a significant role in the long-term current account change, while relative income, debt and demographic factors have a significant impact on the current account. In addition, the results indicate that changes in fiscal policy, changes in the terms of trade, the economic cycle and the real effective exchange rate affect the short-term current account balance. Calderon, Chong and Loayza (2002), completing the study by Debelle and Faruqee (1996) use a panel of 44 countries, including 11 countries in sub-Saharan Africa over the period 1966-1994. From the Methods of Generalized Moments (GMM), they lead to the results that an improvement in the rate of growth of the GDP leads to an increase in the deficit of the current account. However, countries with higher growth rates do not have a significant deficit. Moreover, the increase in the growth rate of the industrialized countries induces a moderate decrease in the current account deficit. The reduction in real foreign interest rates generates an increase in the deficit. Similarly, the appreciation of public savings rates leads to a reduction in the current account deficit. However, an increase in the private saving rate does not alter the current account deficit. The improvement in the real exchange rate and a fall in the terms of trade widen the current account deficit.

Chinn and Prasad (2003), using an approach that highlights the macroeconomic factors of the saving-investment balance, examine the determinants of the current account on a sample of both industrialized and developing countries. Results based on cross-sectional and panel-based estimation techniques show that the government budget balance and the initial net stocks of foreign assets are positively correlated with the current account. Another important result of their study indicates for developing countries that the financial indicators and the terms of trade are positively associated with current surpluses (or small deficits), while the measures of opening to international trade are Linked to larger current account deficits. Chinn and Ito (2008) have also sought to explain the current account reversals in emerging Asian countries since 1997. They used the model of Chinn and Prasad (2003) and introduced the variables of financial development and legal environment that affect savings, investment and growth. The results indicate that that financial development and legal environment have a significant role in explaining Asia's capital flows. Their results also show that the investment opportunity gap explains better the improvements noted in the current accounts of the emerging Asian countries rather than the excess of savings.

Kwalingana and Nkouna (2009) conducted a study on the determinants of the current account imbalance in Malawi covering the period 1980-2006. They show, using the cointegration method of Engle and Granger (1987), that the external factors of trade openness, terms of trade, external debt accumulation and current account liberalization mainly determine the behavior of the current account. The analysis of impulse responses indicates that exogenous shocks to the exchange rate amplify the persistence of the current account deficit. Moreover, the decomposition of the variance of innovations shows that the exchange rate can explain significantly the current account balance even after a 3-year horizon, and that its explanatory power increases with time. According to these authors, the government can fully control the current account through exchange rate policies.

Uz (2010) conducts a study on the determinants of the current account in Turkey. It examines the long-term and short-term impact of the exchange rate, private and public saving on the current account balance for the period from the first quarter of 1987 to the second quarter of 2008. Based on the cointegration approach of Pesaran et al. (2001) with the ARDL model, it shows the existence of a cointegration relation between the current balance and the selected explanatory variables. Moreover, the exchange rate has a positive effect on the current account balance in both short and long-term dynamics. Thus, it shows that an appreciation of the currency improves the current account balance in the short term while a depreciation of the long-term currency improves it. The result also shows a positive relationship between the current account balance and private saving. On the other hand, public saving is not statistically significant in both the short and the long term.

Ahmad and Pentecost (2012) study the dynamics between the real exchange rate and current account variables in 11 African countries over the period 1980-2008 using a stochastic model of an open economy. The result indicates that permanent exogenous shocks have positive and permanent effects on these variables, while temporary shocks have no effect on the exchange rates of these countries and

different effects on their current accounts.

Sy, D. and Sy, H. (2013) using a cointegration approach of Pesaran et al. (2001) examined the causes of the Senegal current account structural deficit. The results of their investigation reveal the existence of a cointegration relationship between the current account balance, the exchange rate, the import rate, the investment gap and the budgetary balance. The study shows that, over the long term, the exchange rate, the import rate and the lagged current account are the variables that explain the deficits, while in the short term, the variables exchange rate, import rate and also the investment gap are the main causes.

Economists agree that the exchange rate is the best instrument for restoring macroeconomic equilibrium, but the choice of the exchange rate regime is nevertheless the subject of constant debate. The question is what is the most appropriate and effective exchange rate regime to restore balance and macroeconomic stability. Thus, our comparative analysis allows us to determine which of the CFA franc zone and the non-franc zone better controls the variation of the current account.

4. Methodology

In order to test the hypothesis that the two zones behave differently to the current account deficit, the equation representing the evolution of the current balance is presented in the form:

$$\boldsymbol{CAB_{i,t} = \alpha_0 + \alpha_1 BTB_{i,t} + \alpha_2 FNT_{i,t} + \alpha_3 GFCF_{i,t} + \alpha_4 GDS_{i,t} + \alpha_5 CTT_{i,t} + \alpha_6 CPI_{i,t} + \alpha_7 DM_{i,t} + \varepsilon_{i,t}} \quad (1)$$

In this equation, CAB is the dependent variable that controls the change in the current account balance. The variable BTB measures the balance of the trade balance; FNT measures foreign net transfers; GFCF is gross fixed capital formation; GDS is gross domestic saving; CTT measures the change in the terms of trade; CPI is the consumer price index (2005 base). Finally, the dummy variable (DM) equals one (1) for countries with fixed exchange rates and zero (0) for countries with flexible exchange rates. It compares the behavior of countries in the Franc and non-Franc zones with the change in the current account balance. The choice of these explanatory variables is linked to the composition of the current account of the balance of payments. The parameters $\alpha_0, \alpha_1, \alpha_{2,,}\alpha_3, \alpha_4, \alpha_5, \alpha_6$ and α_7 represent the coefficients to be estimated and are uniform for both groups. From the point of view of economic theory the coefficients are all signed positive. Finally, the error term is denoted by ε. The indices *i* and *t* represent respectively the individual dimension (country index) and the temporal dimension.

The countries of the CFA franc zone are: Benin, Burkina Faso, Ivory Coast, Mali, Senegal and Togo in the UEMOA zone, and Cameroon, Congo, Gabon and Chad for the CEMAC zone. Data are not available for Guinea Bissau and Niger for WAEMU, Central African Republic and Equatorial Guinea for the CEMAC zone. The non-Franc countries involved in the study are Botswana, Gambia, Ghana, Kenya, Nigeria, Uganda, Malawi, Sierra Leone, Tanzania and Zambia. The choice of these countries in the non-Franc zone is explained by the fact that they are all located in the South of the Sahara and for which we have data.

The beginning of the period (1990) caught our attention because it marks a new macroeconomic context based on democratic experience. The end of the study period (2015), on the other hand, is

justified by the availability of recent data. Data on the trade balance, net foreign transfers, gross domestic saving, gross fixed capital formation and changes in the terms of trade are derived from the World Development Indicators of the World Bank .The current account balance and the Consumer Price Index (CPI, 2005 base) are provided by the International Monetary Fund. They have an annual dimension.

Our study uses regression in panel data. This choice is justified by the fact that we have data for 20 countries. It is also guided by the concern consider account the specific effect associated with each country and to have more data, more variability and less collinearity among the variables.

4.1 Estimation Procedure

The estimation procedure will be carried out in three stages. First, we check the stationarity of the series, then we make the Hsiao (1986) homogeneity tests for the choice of specification (homogeneity, heterogeneity) and Hausman (1978). Finally, the estimation of the model that is adopted comes after the implementation of these tests without forgetting the verification of the assumptions that underlie them.

4.1.1 Study of Stationarity

We follow Banerjee and Zanghieri (2003), Araujo et al. (2004) and Hurlin and Mignon (2005) to briefly present the unit root tests. In our study, we propose first generation tests. Unit panel root tests are based on ADF tests in time series.

The null hypothesis of the first generation tests is based on the notion of independence between the individuals of the panel. We present the tests of Harris and Tzavalis (1999), Levin, Lin and Chu (2002) and Im-Pesaran-Shin (2003).

The appropriate choice of each model depends on the information available on the panels of the series to be tested. In fact, under the null hypothesis, each series of deviations follows a “random walk” with the tendency. Under the alternative hypothesis, each series is stationary around a deterministic trend.

4.1.2 Test of Hsiao and Hausman

The choice of specification (homogeneity, heterogeneity) is therefore very important. In order to determine the structure of the panel, Hsiao (1986) proposes a sequential test procedure. In addition, the Hausman (1978) is a specification test to determine whether the coefficients of the estimates (fixed and random) are statistically different. These two tests will be used in our study as part of the choice of the appropriate model.

4.2 Descriptive Analysis

This section presents the evolution of choice variables for the two zones over the period of our study. An analysis of Tables 1 and 2 shows that the current account was -4.9 over the period 1990-2002 in countries with fixed exchange rates. This indicator rose to -7.2 over the period 2003-2015, a decrease of 45.9%, while countries with flexible exchange rates have an increase of 33.7% (from -5.1 to -3.4). This indicates that the current account is better appreciated in countries with flexible exchange rates than in countries with fixed exchange rates. Another highlight in Tables 1 and 2 is that only Gabon has a current account surplus during both periods of analysis among countries with fixed exchange rates,

while Nigeria and Botswana also have an excess current balance during these two periods among the countries of the second zone. Current account growth rates over the two periods were respectively 432.4%, 794.5% and 148.0% for Gabon, Nigeria and Botswana respectively. The other countries in our study recorded a current account deficit in both periods, with the exception of Ivory Coast, whose specificity is based on a current account surplus for the period 2003-2015 Moreover, countries with a surplus current account among the two groups of countries are those with real potential in the export of raw materials (oil, manganese, copper, nickel, etc.). In regards to the trade balance as a percentage of the Gross Domestic Product (GDP), it rose from -4.5% over the period 1990-2002 to -4.3% for the period 2003-2015 in the CFA countries and -6.0 % To -8.6% in non-CFA countries. We note that all countries with a surplus current account also have an external balance of the surplus trade balance. This could be explained by the fact that the trade balance is an important determinant in the current account. In addition, among countries with a fixed exchange rate, Cameroon, Congo and Ivory Coast are added to the ranks of countries with a surplus trade balance over the period 1990-2002, while only Zambia has a surplus for its trade balance among countries with flexible exchange rates. Gross fixed capital formation as a percentage of GDP showed an upward trend in both periods and in both groups of countries, a 20.3% increase over both periods for countries with fixed exchange rates. This indicator has increased to 39.2% in countries with flexible exchange rates. Thus, investments are greater in non-CFA countries than in CFA countries. In addition, gross domestic savings grew by 37.4% over the two periods in the CFA countries, while the increase was about 38.5% in the second zone. Thus, the difference in the volume of savings is not significant in the two zones. Second, we note an increase in net foreign transfers, changes in the terms of trade and in the consumer price index in both groups. This increase in the variations in terms of Exchange is more important in countries with fixed exchange rates than in countries with flexible exchange rates. On the other hand, growth in the consumer price index and net transfers is more significant in these latter than in the CFA franc countries.

Table 1. Average of Variables in the CFA Zone

	CAB		BTB		GFCF		GDS		CTT		CPI		FNT	
	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015
Benin	-4.7	-5.3	-9.7	-11.1	18.1	22.3	9.5	11.5	94.5	110.8	58.3	95.5	5.3	2.9
Burkina Faso	-3.2	-8.2	-13.6	-12.6	20.4	23.9	7.7	13.3	113.4	107.0	65.7	95.9	8.4	5.7
Cameroun	-3.1	-1.9	3.0	-4.0	15.5	18.5	18.7	14.8	86.4	140.5	65.5	96.4	0.8	1.5
Congo	-13.6	-40.7	0.9	-5.8	8.7	15.7	9.1	9.5	84.1	125.1	55.2	92.2	0.7	4.7
Ivory Coast	-3.5	0.1	7.3	7.5	11.2	11.2	18.3	19.7	123.6	142.2	62.3	96.9	-3.4	-1.9
Gabon	5.9	31.2	19.9	28.8	24.9	25.7	45.2	54.1	122.6	187.2	72.9	96.1	-1.7	-4.4
Mali	-8.8	-6.8	-12.1	-3.9	19.6	19.2	7.4	18.4	109.4	134.9	68.1	95.7	6.7	5.2

Senegal	-5.7	-13.3	-7.7	-17.7	20.7	24.3	6.2	7.8	139.0	102.0	72.1	97.1	3.3	11.2
Tchad	-4.0	-3.8	-22.3	-4.1	17.5	28.4	-2.7	25.1	94.9	178.0	62.7	95.7	4.0	4.4
Togo	-8.6	-23.1	-10.5	-20.4	15.3	17.7	5.6	-2.3	96.9	27.2	61.1	94.7	5.7	9.5
Panel	-4.9	-7.2	-4.5	-4.3	17.2	20.7	12.5	17.2	106.5	125.5	64.4	95.6	3.0	3.9

Source: WDI (2015), author's calculation.

Table 2. Average of Variables in the Non-CFA Zone

	CAB		**BTB**		**GFCF**		**GDS**		**CTT**		**CPI**		**FNT**	
	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015	1990-2002	2003-2015
Bostwana	7.1	17.7	8.7	1.6	27.3	30.3	38.2	35.0	94.4	87.4	32.6	90.4	3.0	8.8
Gambie	-2.0	-8.5	-6.2	-19.8	9.9	24.5	3.7	5.0	100.9	99.6	46.1	94.5	2.5	7.4
Ghana	-5.7	-12.5	-13.4	-15.9	20.5	24.8	7.3	9.4	106.9	157.1	12.2	86.9	3.8	3.3
Kenya	-7.9	-4.9	-4.8	-11.7	17.6	19.4	13.2	7.8	96.4	90.3	26.7	90.0	4.2	6.3
Malawi	-7.8	-14.3	-13.6	-16.3	14.7	18.7	3.4	4.6	113.5	91.5	16.1	101.0	4.0	16.7
Nigeria	2.3	19.5	11.2	9.6	9.6	11.3	20.9	21.2	72.1	183.0	19.0	90.1	2.8	5.7
Ouganda	-5.1	-7.6	-11.9	-11.5	16.7	24.0	5.0	12.8	131.1	104.3	67.4	96.8	3.0	4.3
Sierra Leone	-10.1	-15.7	-7.6	-13.8	7.1	16.0	-0.5	2.9	99.6	69.4	40.8	92.7	6.3	7.1
Tanzanie	-10.1	-7.5	-15.6	-9.9	20.4	28.6	5.1	17.6	100.9	123.0	33.3	95.8	6.5	2.9
Zambie	-12.2	-0.3	-7.0	1.4	13.7	21.7	8.0	28.3	133.0	165.9	12.3	86.4	-0.4	2.0
Panel	-5.1	-3.4	-6.0	-8.6	15.8	21.9	10.4	14.5	104.9	117.2	30.7	92.5	3.6	6.5

Source: WDI (2015), author's calculation.

5. Empirical Results and Discussions

This section analyzes the relationship between the current account, the external balance of the trade balance, gross fixed capital formation, gross domestic saving, changes in the terms of trade, the consumer price index and Foreign net transfers.

First, we question the existence of a unit root between the different data series. Next, we examine the Hsiao (1986) homogeneity test and the Hausman (1978) test of the choice of the model with individual effects.

5.1 Unit Root Test Results

The study of the stationarity of time series is paramount in current econometric practice because most analyzes carried out on long series undergo various disturbances which tend to modify the variance of the data, which sometimes biases the results of the estimates. To begin, our empirical analysis focuses on the unit root test of Harris and Tzavalis (1999), Hadri (2000) and Im-Pesaran-Shin (2003) applied to the variables introduced in equation (1), with the exception of the indicator variable (DM). Thus, the

results of our tests show that in both groups of countries, the unit root hypothesis can't be accepted in level for all variables at the 5% threshold. Consequently, a risk of cointegration of series can't be considered in our study. In other words, our model will be estimated later on the variables in level.

5.2 Test of specification of Hsiao and Hausman

After examining the stationarity of the series, we carry out econometric analyzes to justify the use of our empirical model. Thus, the first thing to check when facing a sample of panel data is the homogeneous or heterogeneous specification of the data generating process. From an econometric point of view, it is a matter of testing the equality of the coefficients of the model studied in the individual dimension. From an economic standpoint, it is possible to verify whether the theoretical model studied is perfectly identical for all individuals or whether there are country-specific specificities. The Hsiao test (1986) shows the rejection of the hypothesis of total homogeneity of the model variables at the 5% threshold. On the other hand, the hypothesis of a model with individual effects cannot be rejected. Thus, the Hausman test will allow us to discriminate between models with random effects and fixed effect. In addition, the Hausman (1978) specification test is a general test that can be applied to many specification problems in econometrics. But its most widespread application is the tests of specification of the individual effects in panel. It thus serves to discriminate fixed and random effects. The comparative analysis of the two zones leads us to know which of the fixed effects and random effects models is appropriate for our study. Hence, the results of the Hausman test (p-value = 0.0025 < 5%) lead to the retention of the fixed-effect specification. In other words, the null hypothesis based on the random effects model (the composite error model estimators being effective) is rejected at the 5% threshold.

5.3 Estimation Results for the Fixed Effects Model in the Two Zones

In this section, model (1) can be rewritten in each of the zones as follows:

$$\boldsymbol{CAB_{i,t} = \alpha_0 + \alpha_1 BTB_{i,t} + \alpha_2 FNT_{i,t} + \alpha_3 GFCF_{i,t} + \alpha_4 GDS_{i,t} + \alpha_5 CTT_{i,t} + \alpha_6 CPI_{i,t} + \varepsilon_{i,t}}$$

With

$$\boldsymbol{\varepsilon_{i,t} = \tau_i + \omega_t + \xi_{i,t}} \quad (2)$$

The taking into account of individual and temporal specificities is done here by the introduction specific effects to individuals and periods, which constitute many coefficients (called fixed effects) that can be estimated. The term $\boldsymbol{\tau_i}$ represents the fixed effect or the factor of heterogeneity of the countries (it takes into account all the factors not observed, which are constant over time and which have an impact on the current account balance). The term $\boldsymbol{\omega_t}$ is the temporal specific effect, and $\boldsymbol{\xi_{i,t}}$ the error term that takes into account unobserved factors that vary over time. One of the essential features of this model lies in the possibility that it offers to measure the effect of unobservable quantities on the variable that we seek to model when these unobservable quantities are stable over time or common to all the individuals. It thus allows attempts to interpret the fixed (individual and temporal) effects, an interpretation which can be quite interesting or even at the center of the analysis (Hultberg, Nadiri, & Sickles, 1999).

Table 3. Estimates Results for the Two Zones (*CAB is the Dependent Variable*)

	CFA countries	**Non CFA countries**
BTB	-0.2231064	-0.031085
	(-0.56)	(-0.14)
GFCF	-0.4902508	-0.436038***
	(-1.20)	(-1.94)
GDS	0.4421407	0.2521804
	(1.13)	(1.19)
CTT	0.0606472**	0.0824373*
	(2.16)	(4.85)
CPI	-0.1116098**	-0.0098201
	(-2.36)	(-0.68)
FNT	-0.5866988***	0.352251**
	(-1.95)	(2.25)
Constant	-0.4066965	-9.772914
	(-0.10)	(-4.08)
R ²Within	0.1143	0.2052
R ²Between	0.4168	0.3037
R ²overall	0.2421	0.2404
F(6,234)	5.03	10.07
F(9,234) u_i	8.26	12.18
Observations	250	250

Source: WDI (2015), author's calculation.

Note. The asterisks *, ** and *** denote respectively the significance at the threshold of 1%, 5% and 10%. Values in parentheses indicate Student's t-statistics.

The results in Table 3 show that the coefficients of change in terms of trade and net transfers are significantly non-zero in both zones. Indeed, changes in the terms of trade have a positive influence on the current account balance in the two groups of countries. The impact is greater in non-CFA countries (0.0824373) than in the CFA zone (0.0606472). On the other hand, transfers positively influence the current account balance in non-CFA countries against a negative effect in the CFA countries. Secondly, the consumer price index has a positive impact on the current account balance in the CFA countries, while gross fixed capital formation has a negative impact on this balance in the second zone. The other explanatory variables do not influence the evolution of the current account balance in these two groups of countries. Before examining the economic interpretations of our results, it is important to verify the assumptions underlying the fixed effects model (homoscedasticity and autocorrelation of errors are the

two most important) and also to examine the significance of the effects fixed. The Fischer [F (9,234)] statistic of fixed effect significance indicates that its effects are globally significant in both zones. Similarly, Fischer's overall significance test [F (6,234)] reveals the overall significance of the model at the 1% threshold in both groups of countries. The low value of R^2 (in particular the R^2within) may be linked to the non-verification of one or more validation hypotheses. Moreover, the homoscedasticity test of the errors of Breush-Pagan (1980) indicates a homoscedasticity of the errors in the two zones. On the other hand, the autocorrelation tests of Baltagi and Wu (1999), Wooldridge (2002) and Drukker (2003) indicate that the null hypothesis of no autocorrelation is rejected at the 5% threshold. Thus, we must integrate the correction of this autocorrelation of errors before any economic interpretation of our results. The application of the Quasi-Generalized Least Squares (MCQG) on a transformation of the model (2) makes it possible to integrate the correction of the autocorrelation (Sevestre, 2002).

Thus, the results of model (2) after this correction of the autocorrelation are presented in Table 4.

Table 4. Estimates Results for the Two Zones (*CAB is the Dependent Variable*)

	CFA countries	**Non CFA countries**
BTB	-0.2300148*	0.2945494**
	(-3.44)	(2.55)
GFCF	0.0426651	-0.1239893
	(-0.64)	(-1.18)
GDS	0.614604*	0.3473491*
	(-9.18)	(3.21)
CTT	0.0457583*	0.0324859*
	(-6.77)	(4.39)
CPI	-0.1537885*	-0.0171964*
	(-8.39)	(-2.7)
FNT	-0.3996154*	0.4029205*
	(-6.79)	(6.5)
Constant	-8.104253*	-8.628799*
	(-5.73)	(-8.3)
Wald Chi2	468.8	534.7
Observations	250	250

Source: WDI (2015), author's calculation.

Note. The asterisks *, and ** denote respectively the significance at the threshold of 1% and 5%. The values in parentheses indicate Student's t-statistics.

Table 4 presents the results of the model specification (2) for both zones after the autocorrelation of errors. The Wald statistic indicates an overall significance of the coefficients of the model. The coefficients of the external balance of the trade balance, gross domestic saving, changes in the terms of trade, the consumer price index, net foreign transfers are significantly non-zero in the two groups of countries. For countries with fixed exchange rates, the variables that best explain the change in the current account balance are in order of importance: gross domestic saving, terms of trade changes, price index The external balance of the trade balance and net foreign transfers, while for countries with flexible exchange rates, net foreign transfers, gross domestic saving, trade balance, changes in the terms of trade and the consumer price index explain better in this order the balance of the current account. Moreover, most of these coefficients are robust, that is significant at the 1% threshold. This reflects a good accuracy of the estimators in the two zones. Gross domestic savings and terms-of-trade changes positively affect the current account balance in the two groups of countries, but this impact is higher in the CFA than in the non-CFA countries as indicated in the descriptive analysis. In other words, gross domestic savings and changes in the terms of trade increase the current account balance in the CFA countries more than in non-CFA countries. This difference in the terms of trade could give the countries of the CFA franc zone greater competitiveness. This result corroborates that obtained by Hassan (2006) in his study on the determinants of the current account of Bangladesh. The study covered the period 1976-2003 and the methodology used is an error-correction model. One of the most striking findings in our study is that changes in the terms of trade have a positive influence on the current account balance. In addition, we note a negative influence of the CPI on the current account balance in both zones. In other words, the increase in consumer prices deteriorates the current account balance in both zones. This deterioration is less important in countries with flexible exchange rates than in those at fixed exchange rates. However, this observation does not corroborate the results of the descriptive analysis. Second, net foreign transfers positively impact the current account balance in countries with flexible exchange rates, while this impact is negative in countries with fixed exchange rates. This indicates that transfers increase the current account better in these countries with flexible exchange rates while they deteriorate this account in countries with fixed exchange rates as shown by the descriptive analysis. This result can be attributed to the large volume of transfers in these non-CFA countries, unlike the CFA countries. The sign of the variable BTB (Trade Balance) is positive in the non-Franc zone as indicated by the economic theory. Thus, a high balance of trade balance will increase the current account balance. This result is not observed in countries with fixed exchange rates where the trade balance coefficient is negatively signed. Unlike the countries of the Franc zone, the positive effect of the trade balance on the current account balance in the non-CFA zone could be explained, perhaps and in part, by the fact that those countries export more than they import because of the abundance of their natural resources (oil, gas, precious metals, etc.) and also because of their potential to produce value-added goods. Moreover, the influence of GFCF is not observed in our analysis.

Finally, the comparative analysis of the two zones will focus on the estimated coefficients of the explanatory variables. The observation of these coefficients does not present large disparities which may lead us to conclude, solely on the basis of these parameters, that a regime is preferable to the other to control the balance of the current account of the balance of payments. However, each variable has its advantages and weaknesses for one or other of the zones. As a result, we cannot conclude that one zone is more competitive than the other, as indicated in Hounsou (2014) study.

6. Conclusion

This study compares the fixed and flexible exchange rate regimes in the CFA and non-Franc zones of certain countries south of the Sahara for the period 1990-2015 through the current account balance. The model used, which is based on the model developed by the empirical studies, in particular the contributions of Insel and Kayk ̧i (2013), considers that the exchange rate regime does not affect the current account through independent variables such as trade balance, net foreign transfers, gross fixed capital formation, gross domestic saving, terms of trade adjustments and the consumer price index (2005 base). The main findings of the comparative study are summarized as follows:

The results of our study show that the exchange rate regime affects the current account. Thus, contrary to the macroeconomic theory that seems to favor the flexible exchange rate regime to the fixed exchange rate regime, the results of our study do not confirm this assertion, at least for the two zones studied over the period concerned and given the variables of choice, nor do they show that one zone is more competitive than the other. On the other hand, the study reveals that for the CFA Franc zone, the variables that account for the current account balance in order of importance are: gross domestic saving, terms of trade changes, the consumer price index, the external balance of the trade balance and net foreign transfers. At the level of the non-Franc zone, this order of importance is: net foreign transfers, gross domestic saving, trade balance, changes in the terms of trade and the consumer price index. The strong significance of the gross domestic savings variable and the magnitude of its coefficient for the CFA Franc zone show how often these countries could reduce the deficit on their trade balances while reducing the investment surplus on savings from the production of value-added goods and services and not to import them.

The terms of trade impact significantly and positively the current account of countries with fixed exchange rates more than that of countries with flexible exchange rates. This result could be explained in part by the small fallout from the devaluation experienced by these CFA franc countries in January 1994. Theoretically, devaluation increases the competitiveness of a country by making its products cheaper abroad. In reality, it can only be beneficial to a State if it has industries capable of substituting domestic production for foreign imports. Otherwise, it would create inflation by making higher the price in national currency of imported products.

This article has the advantage that no other study to the best of our knowledge has been devoted to a comparative analysis of the two CFA and non-CFA zones and dealing with the change in the current

account of the balance of payments. However, the difficulty of this study lies in the unavailability of data on certain countries south of the Sahara. This forced us to exclude from our study certain WAEMU and CEMAC countries. This caveat, however, does not affect the quality of the econometric analysis. Finally, an extension of this study to the two zones would be to consider other variables, such as, for example, services for which data are not available for this work.

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Appendix A

Unit Root Tests on Variables in Both Zones and Their Residues

Table 1. Unit Root Tests on Variables in the CFA Zone

	Levin Lin Chu test		**Harris-Tzavalis test**		**Im-Pesaran-Shin test**	
	Level		**Level**		**Level**	
Variables	T-statistics	P-Value	T-statistics	P-Value	T-statistics	P-Value
CAB	-1.4607	0.0021	0.5016	0.0000	-2.8949	0.0001
BTB	-2.0766	0.0229	0.4188	0.0000	-2.9527	0.0000
GFCF	-1.9974	0.0229	0.5470	0.0008	-2.7718	0.0001
GDS	-1.6798	0.0465	0.2602	0.0000	-2.5798	0.0003
CTT	-2.8896	0.0019	0.6445	0.0802	-2.5096	0.0009
CPI	-3.3186	0.0005	0.5737	0.0036	-2.4052	0.0023
FNT	-2.2871	0.0111	0.5019	0.0000	-2.8002	0.0000

Source: WDI (2015), author's calculation.

Table 2. Unit Root Tests on Variables in the Non CFA Zone

	Levin Lin Chu test		**Harris-Tzavalis test**		**Im-Pesaran-Shin test**	
	Level		**Level**		**Level**	
Variables	T-statistics	P-Value	T-statistics	P-Value	T-statistics	P-Value
CAB	-1.3779	0.0041	0.4491	0.0000	-2.6763	0.0001
BTB	-2.5746	0.0050	0.4803	0.0000	-2.7786	0.0000
GFCF	-2.3915	0.0084	0.5852	0.0067	-2.5707	0.0003
GDS	-3.4120	0.0003	0.4681	0.0000	-2.7638	0.0000
CTT	-3.6051	0.0002	0.6320	0.0516	-2.5448	0.0005
CPI	1.4717	0.0294	0.9086	0.9996	0.2631	1.0000
FNT	-1.1799	0.0190	0.4827	0.0000	-2.6574	0.0001

Source: WDI (2015), author's calculation.

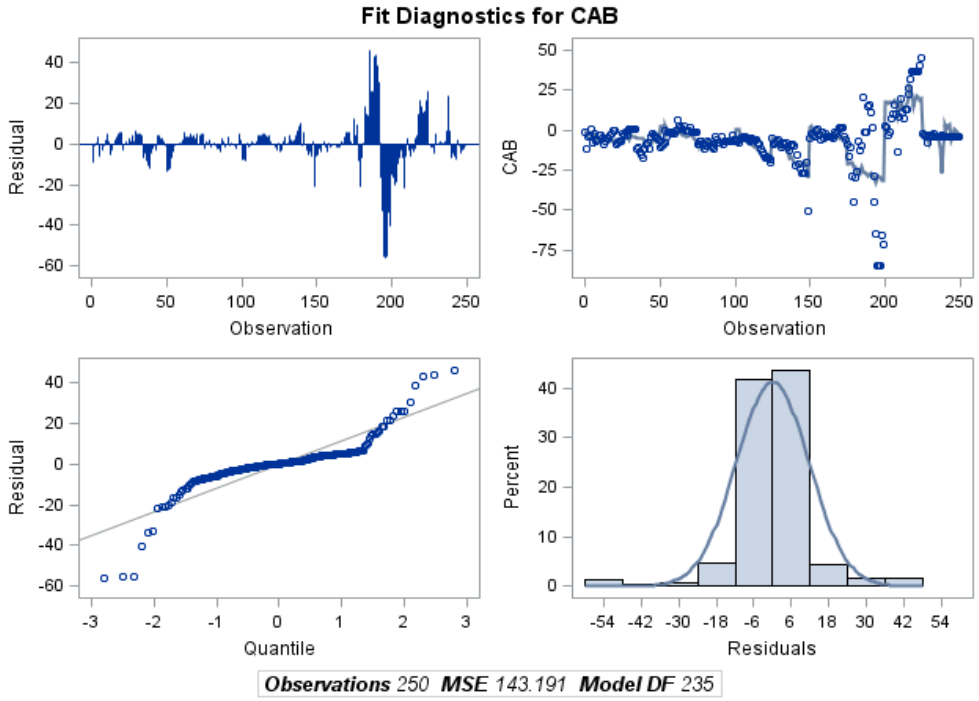

Figure 1. Residual Pattern of the Fixed-Effects Model of the CFA Zone

Source: WDI (2015), author's calculation (SAS 9.4).

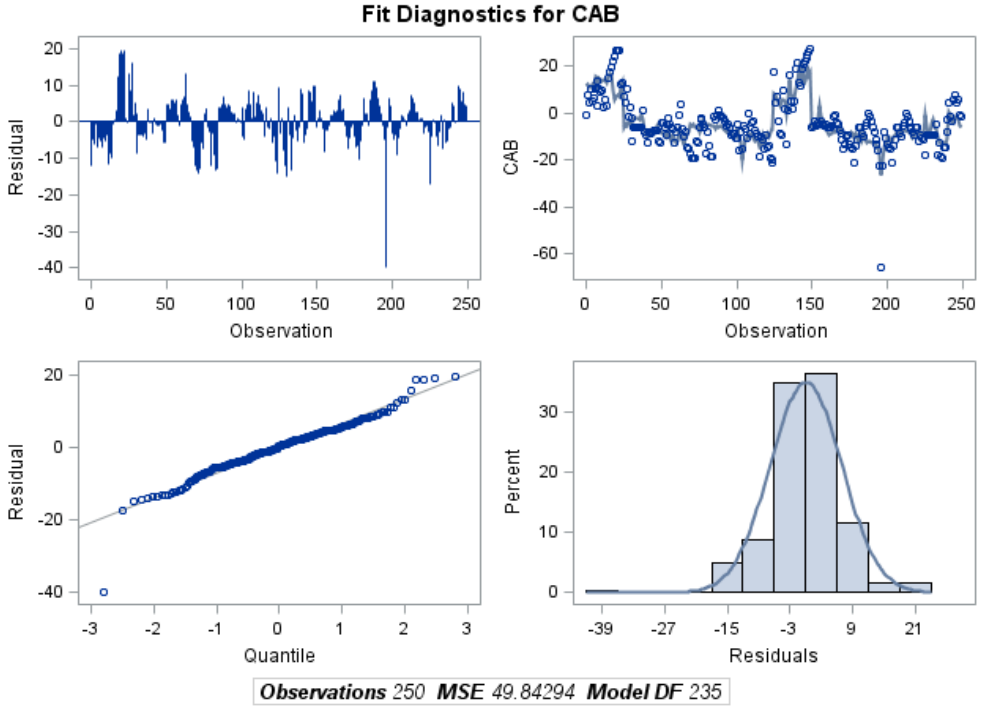

Figure 2. Residual Pattern of the Fixed-Effects Model of the Non CFA Zone

Source: WDI (2015), author's calculation (SAS 9.4).