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An Economic Analysis of Current Account Sustainability in Selected ECOWAS Countries, 1980-2006.

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AN ECONOMIC ANALYSIS OF CURRENT ACCOUNT SUSTAINABILITY IN SELECTED ECOWAS COUNTRIES 1980-2006

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DEDICATION

This research work is dedicated to God Almighty who is the source of every good thing as well as the giver of life.

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ABSTRACT

The study analyzed the trend and pattern of selected ECOWAS countries' current account balances from 1980 to 2006, examined the sustainability of these balances and determined the direction of causality between the current account and net output changes for these countries. These were done with a view to ascertaining whether these countries would be able to overcome their huge external debt problem without any external crisis and thus be on the right path to establishing a monetary union in the region.

The study used annual secondary time series data from 1980 to 2006 on ten ECOWAS countries, collected from World Development Indicators (WDI) published by the World Bank, 2007 edition. The ten countries which were selected on the basis of data availability are Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea-Bissau, Mali, Niger, Nigeria, Senegal and Togo. The Vector-Auto Regression (VAR) technique was employed to analyze the intertemporal model in order to generate the optimal current account series. Descriptive statistics such as mean and range were used to capture the trend and pattern of these countries' current account balances, while visual inspection as well as correlation coefficient and the probability values of the equality of the standard deviations of the actual and optimal current account series were used to determine whether the actual series were sustainable or not. The bivariate granger causality test was specified and estimated to determine the direction of causality between current account and net output changes.

The results showed that the current account balances of the selected countries were in deficits for most of the period of the study and that Cote d'Ivoire had the highest per capital current account surplus (US 90.99 dollars) while Ghana had the lowest balance (-143.00 dollars). On the issue of sustainability, results revealed that the optimal and actual current account balances were equal in Burkina Faso ($r=0.89$, $p<0.05$), Ghana ($r=0.91$, $p<0.05$) and Nigeria ($r=0.97$, $p<0.05$). The results also showed that there was unidirectional causality from current account to changes in net output for Burkina Faso ($F=4.54$, $p<0.05$), Cote d'Ivoire ($F=4.82$, $p<0.05$) and Guinea-Bissau ($F=4.30$, $p<0.05$).

The conclusion that emerged from the results is that it would be difficult for ECOWAS to achieve its objective of establishing a monetary union in the region as many of the countries could not solve their external debt problem for the period 1980 to 2006.

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

The Economic Community of West African States (ECOWAS) is a regional group of 15 countries that was founded by treaty in May 1975. One of its major goals was to bring together the economies of the mostly small nations, hoping the combined economic power would allow the countries to compete better than any one state could do on its own. In actuality, ECOWAS was an attempt to overcome the isolation of most West African countries following the colonial period and the period of post-independence nationalism.

ECOWAS' primary objective remains to promote co-operation and integration in order to create an economic and monetary union for encouraging economic growth as well as development in West Africa. The group has taken several steps to combat some of the problems it has encountered in the process of regional integration. These steps include the following:

(i) Moving to eliminate custom duties and similar taxes, establishing a common external tariff and creating a uniform monetary unit. The establishment of a Free Trade Area (FTA) within ECOWAS began in 1979 when complete dismantling of tariff restrictions for local produce, for traditional handicraft and fully processed commodities was adopted (African Union, 2009).

(ii) An ECOWAS passport was introduced in 2000 and has been proposed as replacement for national passports (African Union, 2009). No visa is now required anywhere for nationals of Member States who travel across the ECOWAS region. Residents of West Africa now have the right to move freely, to get settled wherever they want within the community to carry out any activity. The introduction of the passport is a giant step towards eliminating barriers to the cross-border movement of citizens. Indeed, it is directed at promoting a common identity among ECOWAS citizens.

(iii) ECOWAS established the Economic Community Monitoring Group (ECOMOG) in 1990 which is a multilateral military peacekeeping force in order to address conflicts within member states. As a fallout of the establishment of ECOMOG, ECOWAS Heads of State signed a protocol establishing a Mechanism for Conflict Prevention, Management, Resolution, Peacekeeping and Security in December of 1999.

In addition to these, the Heads of States of ECOWAS adopted the ECOWAS Monetary Cooperation Programme (ECMP) in 1987 to accelerate the process of integration within the sub-region (Bawumia, 2002). This programme entailed the adoption of collective policy

measures designed to achieve a harmonized monetary system. A monetary zone was also established in the region under the programme (Ebi, 2003).

From the foregoing, ECOWAS no doubt is doing everything possible to make achieve its objective. However, there are still hurdles to cross and problems to solve. These problems which include huge external debt, escalating crime rate, high incidence of diseases such as HIV/AIDS epidemic and electoral malpractices are as important as, if not more important than, the ones already tackled.

This study looks at one of these other problems with a view to helping the region find a lasting solution to it.

1.2 Statement of Research Problem

Substantial external debt within individual member states is one of the greatest challenges that ECOWAS is still battling with (EIA, 2007). This problem raises concerns about the sustainability of these countries' current account positions. For every economy whether developed or developing, the current account position is very important.

The position of the current account is typically used as one of the main leading indicators for future behaviour of an economy and it is part of the everyday decision-making process of policy makers. As Okojie (2005) puts it, policy makers view the evolution of the current account balance as a key indicator of the health of a nation's economy. In separate studies, Baharumshah et al. (2003) and Goldberg et al. (1995) contended that the current account

for individual countries serve as a barometer for policy makers as well as investors as it is an indicator of the economic performance of those countries. Thus, stakeholders become concerned when the current account balances are in a very bad state. This is because the resultant build up of claims by foreigners in the country violates the solvency condition vis-a-vis the rest of the world (Dulger and Ozdemir, 2005).

Recent episodes of currency crisis have been associated with large, growing and finally unsustainable current account balances (Roubini and Wachtel, 1998). The Mexican peso crisis of 1994, and the 1997 currency turmoil in a number of Asian countries (Thailand, Malaysia and Philippines in particular) appear to have been partly triggered by unsustainable current account imbalances. Following the Mexican peso crisis of 1994, the IMF devised a warning mechanism aimed at an early recognition of potentially unsustainable current account imbalances. Identification of unsustainable balances is important in putting in place institutional arrangements that can help an economy avoid macroeconomic problems.

Given that current account sustainability is very fundamental to the growth of such economies as those of ECOWAS countries, the pertinent question one needs to ask is; "How do we determine if an observed path of current account imbalances is sustainable or not?" Convectional wisdom suggests that deficits above 4.0 to 5.0 percent of GDP are unsustainable (Hudson and Stennett, 2003). This 'benchmark' was initially mooted by Summers (1996), when he noted that "close attention should be paid to current account deficit in excess of 5.0 per cent of GDP, particularly if it is financed in a way that leads to

rapid reversals". However, we cannot adequately assess external sustainability by merely appealing to rudimentary benchmarks such as the one just mentioned. This is because, on the one hand, countries such as Australia, Israel and Ireland were able to sustain current account deficits above this threshold for several years. On the other hand, other countries such as Chile and Mexico have experienced several external crises in the context of an external position that is not severely deteriorated.

The foregoing therefore support the suggestion that analysis of the sustainability of current account imbalances should take into consideration the question of whether particular imbalances are excessive relative to an optimal benchmark. Intertemporal Benchmark Models (IBMs) of the type suggested by Obstfeld and Rogoff (1995) yields prediction about the "equilibrium" or "optimal" path of external imbalances. Actual balances can then be compared to this benchmark to determine whether they have been excessive or not. An important implication of the Intertemporal current account model is that the current account must granger-cause changes in net output.

While studies have examined current account positions in some of these countries individually such as Opoku-Afari (2005) on Ghana; and Adedeji (2001) as well as Okojie (2005) both on Nigeria; systematic studies on ECOWAS as a group are yet to emerge particularly given that simultaneous achievement of domestic and external macroeconomic equilibrium in the region is considered to be a central goal of macroeconomic policies (Mancellari and Xhepa, 2003). Addressing this issue is also important if ECOWAS countries

are to generate sustainable growth and mobilize resources needed to tackle poverty and collectively meet the Millennium Development Goals (Kasekende, 2005).

This study was therefore proposed to answer the following research questions:

1. What have been the trend and pattern of total actual current account balances in selected ECOWAS countries from 1980 to 2006?

2. Have current account balances in these countries been sustainable over the period covered?

3. What is the direction of causality between the current account and net output changes?

1.3 Objectives of the Study

The broad objective of the study is to assess empirically the excessiveness or otherwise of current account balances of selected ECOWAS countries between 1980 and 2006.

The specific objectives are to

i. examine the trend and pattern of selected ECOWAS countries' total actual current account balances for the period 1980 to 2006;

ii. ascertain the sustainability or otherwise of these countries' current account balances; and

iii. determine the direction of causality between the current account and net output changes.

1.4 Justification

Africa is unarguably the poorest continent in the world (Meyer, 2006). The concern of policy makers and other stakeholders today is how to tackle the numerous problems facing the continent. Any meaningful research focusing on the continent in general, and the ECOWAS region in particular is therefore a step in the right direction.

Given the macroeconomic fragility of the developing world, especially African countries, assessing the sustainability or otherwise of the current account balance appears to be a sensible strategy for effective policymaking (Calderon, Chong and Zanforlin, 2001). The current account balance is an important indicator of a developing economy's performance and it plays several roles in policy makers' analysis of economic development (Aristovnic, 2006). One, its significance stems from the fact that the current account balance, reflecting the saving-investment ratio, is closely related to the status of the fiscal balance and private savings which are key factors of economic growth. Two, a country's balance on current account is the difference between exports and imports, reflecting the totality of domestic residents' transactions with foreigners in the markets for goods and services. Three, since the current account balance determines the evolution over time of a country's stock of net claims on (or liabilities to) the rest of the world, it reflects the intertemporal decisions of (domestic and foreign) residents. Consequently, policy makers should endeavour to explain current account balance movements, assess their sustainability (and/or excessiveness) levels,

and seek to induce changes to the balance through policy measures where the current account balances are not in line with fundamentals.

Furthermore, ECOWAS countries face similar challenges, which include huge external debt and the obligation of servicing such debt, which is crippling. Since sustainability requires that a country be able to achieve solvency (that is, the country satisfies its budget constraint) with unchanged policies or without very large and costly future adjustments, the results of this study will tell us whether with time ECOWAS countries will be able to pay back their huge external debt without any crisis and be on the right path towards sustainable development.

1.5 Scope of the Study

The study investigates current account sustainability in ten out of the fifteen countries that make up the ECOWAS region for the period 1980 to 2006, on the basis of the quality and availability of data. These countries are Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea - Bissau, Mali, Niger, Nigeria, Senegal, and Togo.

It should however be noted that the scope of most of the empirical studies in the literature on the intertemporal approach to current account today is limited to only the consumption-smoothing component of the current account, since its other component (i. e. consumption-tilting) has implications for the current account that are not of interest (Lau et al., 2007). This is the reason why the intertemporal model is sometimes referred to as

consumption smoothing model due to the motive of smoothing consumption in the face of shocks. Hence, the scope of this study is limited to only the consumption-smoothing component of the current account.

1.6 Conceptual Definition

1.6.1 Balance-of-Payments Accounting

A country's international transactions are recorded in the Balance-of-Payments accounts. A country's balance of payments has three components: the current account, the financial account and the capital account.

The current account, which is the focus of this research, records exports and imports of goods and services and international receipts or payments of income. Exports and income receipts enter with a plus while imports and income payments enter with a minus.

The financial account keeps record of sales of assets to foreigners and purchases of assets located abroad. Thus, the financial account measures changes in a country's net foreign asset position. Sales of assets to foreigners are given a positive sign and purchases of assets located abroad a negative sign.

The capital account records non-financial transactions in wealth.

1.6.2 Components of the Current Account

(a) Trade Balance (or Balance on Goods and Services): It represents the difference between exports and imports of goods and services.

i. Merchandise Trade Balance (or Balance on Goods): This is equal to exports minus imports of goods.

ii. Services Balance: This includes net receipts from items such as transportation, travel expenditures and legal assistance.

(b) Income Balance:

i. Net Investment Income: This is the difference between income receipts on the assets owned by a country abroad and income payments on foreign-owned assets in the country. It includes international interest and dividend payments and earnings of domestically-owned firms operating abroad.

ii. Net International compensation to employees.

(c) Net Unilateral Transfers: This is the difference between gifts (that is, payments that do not correspond to purchases of any good, service or asset) received from the rest of the world and gifts made to foreign countries.

1.6.3 Solvency Versus Sustainability

In order to evaluate the stable long-run trajectory of a country's current account balances, two inter-related questions need to be addressed (North, 1999). The first one concerns the solvency properties of the debtor country. Intertemporal solvency investigates the country's ability to repay its external debt. For a country to become intertemporally solvent, the present discounted value of future trade surpluses must be equal to the present value of its foreign debt (Milesi-Ferretti and Razin, 1996). This is the concept of intertemporal solvency implying that all debts will be repaid in the long run.

The second question concerns the sustainability properties of the current account deficits. Mann (1999) defines a current account deficit as being sustainable when it does not generate economic forces that will result in a change in its path. Put differently, a current account balance is sustainable when the continuation of the current policy stance will not require a "drastic" shift or a "sudden stop" (e.g. a sudden tightening of monetary and fiscal policies, causing a large recession), or lead to a "crisis" (e.g. sharp increases in interest rates, a sudden depletion of the reserves, or an exchange rate collapse). The intertemporal theory of the current account also stress the consumption-smoothing role that current account deficits and surpluses can play. An important implication of the theory is that the current account must granger-cause subsequent changes in net output.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on current account dynamics. Section 2.2 deals with the review of theoretical literature. In section 2.3, we review empirical literature.

2.2 Review of Theoretical Literature

This section surveys the main theoretical approaches that have been developed to analyze movements in the current account of the balance of payments. It will endeavour to provide an overview of the economic thinking on the relevance of current account for economic policymaking from the essentially static Mundell-Flemming (M-F) paradigm developed in the 1960s to the latest intertemporal models, and to explain their implications for the behaviour of the current account.

2.2.1 The Canonical Mundell-Fleming Analysis

The Mundell-Fleming Model, in its various versions, has enjoyed wide popularity since the early 1960s and still plays a prominent role in shaping policy decisions (Knight and Scacciavillani, 1998). The M-F model reflects the *Zeitgeist* of the 1960s and early 1970s and the confidence that macroeconomic policies could simultaneously achieve both internal balance (high employment) and external balance (balance of payments equilibrium). M-F is basically an extension of classic IS-LM analysis to an open economy, assuming international capital mobility, imperfect substitutability between domestic and foreign goods, a fixed aggregate price level, and variable real output (or, in the "full employment" version, fixed real output and a variable price level).

The M-F model explicitly treats the markets for goods, money balances and foreign exchange. However, markets for domestic and foreign bonds lurk in the background as substitutes for domestic money, and the labour market enters through the assumption that output responds to changes in demand. Since the model concentrates on the 'short run', it describes simple adjustment mechanisms in a model of stationary flow equilibrium and static exchange rate expectations. Over the years, this model has proved very useful in drawing conclusions about the impact of policy actions on output, interest rate and the balance-of-payments adjustment process under alternative exchange rate regimes. In addition, since it distinguishes between current and capital transactions as contained in the balance

of payments, it also has something to say about the effects of policy shifts on a country's current account balance.

Analytically, the M-F model determines two variables - the real interest rate, r, and real output, Y–via the now-famous IS, LM, BOP loci, the combinations of r and Y at which the markets for goods, money and foreign exchange are, respectively, in equilibrium.

Assuming that both the LM and BOP curves are positively-sloped in the r-Y space and that the IS curve is negatively-sloped, the equilibrium levels of r and Y are determined by the intersection of the three curves. Given some degree of capital mobility, the economy can sustain an equilibrium at a combination of r and Y where the current account is either in deficit or surplus, depending on the values of some parameters, the levels of economic activity, the real exchange rate and the differential between foreign and domestic interest rates.

In fact in the M-F model, the BOP curve reflects not only current account equilibrium but overall equilibrium in the foreign exchange market, including supplies and demands resulting from capital transactions. At a given real exchange rate, an increase in domestic income will cause the current account to move into deficit, but equilibrium in the overall balance of payments - the sum of the current and capital accounts - can be restored by a rise in domestic interest rate relative to that prevailing in the rest of the world that induces a net capital inflow just equal to the current account deficit. Assuming that domestic and foreign bonds are close substitutes, so that capital is highly mobile internationally, the LM curve

is steeper than the BOP curve: if income rises, it takes a larger increase in the interest rate to eliminate the excess demand for money than it does to eliminate the excess demand for foreign exchange.

These relative slopes are important for assessing the impact of various policy actions on the current account balance. For example, under a fixed exchange rate and high capital mobility, the M-F model concludes that an expansionary fiscal policy will unambiguously push the current account into a deficit, financed by the higher capital inflows induced by the interest rate increase that results from the impact of fiscal expansion on income and money demand. Furthermore, the higher the degree of capital mobility, the larger the deterioration in the current account balance that results from a given fiscal expansion. Thus, with high capital mobility and a fixed exchange rate, changes in fiscal policy exert a substantial direct impact on the current account balance. Conversely for well-known reasons, the M-F model predicts that, with a fixed exchange rate, changes in domestic credit will have little impact on the current account balance.

The M-F model concludes that under a floating exchange rate, an expansionary monetary policy will also affect the current account balance, but the direction of the effect cannot be determined *a priori*. The monetary expansion induces a fall in domestic interest rate, a rise in income and a depreciation of the home country's real exchange rate. This can cause either an improvement or a deterioration in the current account balance, depending on the relative impacts of the exchange rate depreciation and the increase in income on

exports and imports. On the other hand, when the exchange rate is floating, the effect of a fiscal expansion on interest rates tends to cause the domestic currency to appreciate, thus unambiguously pushing the current account balance into deficit.

A major weakness, however, is that the M-F model is essentially static. Since it focuses on the short run, it neglects the impact of net investment on the stock of productive capital and of current account imbalances on net international indebtedness. Thus, it can only describe the short-term effects of economic policies on the current account balance and not the longer-run path that results from the interaction of stocks and flows. Take, for example, an expansionary fiscal policy. While this policy stance initially leads to an appreciation of the home country's real exchange rate, a current account deficit and a capital inflow, it also results in an increase in external indebtedness. But as the current account deficit persists and international liabilities increase, net external debt service payments will also rise. In order for a given current account balance to be maintained as debt service rises, the merchandise trade account must improve steadily. This implies that after its initial appreciation, the home country's real exchange rate will have to decline.

Thus the initial exchange rate appreciation resulting from an expansionary fiscal policy will gradually be reversed over time, as the country's international debt and debt-servicing obligations build up. Longer-term dynamic effects such as these, which are important in gauging the sustainability of a given current account position, are omitted from the M-F model by assumption. Thus despite its wide acceptance, the M-F paradigm is in many

respects, too crude an approximation of reality to explain the longer-term evolution of the current account and associated changes in stocks of international assets and liabilities (Knight and Scacciavillani, 1998).

2.2.2 The Consumption Smoothing Approach to the Current Account

The consumption smoothing approach focuses on the long-run saving and investment decisions of private agents. According to this approach, in symbols, it is given as:

$$CA_t \equiv Sp_t + Sg_t - Ig_t - Ip_t \tag{2.1}$$

This implies that

$$CA_t \equiv (Sp_t + Sg_t) - (Ig_t + Ip_t) \tag{2.2}$$

where CA is the current account balance (CA $>$ 0 indicates a surplus), S_p represents private savings, S_g government savings (i.e., the current fiscal position), I_p private investment, I_g public investment and the subscript, t, indicates a generic, discrete time period.

The interpretation that can be given to identity (2.2) is that economies can grow at full potential with or without showing current account deficits or surpluses. Instead, what determines the current account position of a particular country is the savings-investment *gap*, which depends on the willingness of foreigners to hold its liabilities. Countries with a higher savings ratio will tend to be net capital exporters and run sustained current account surpluses, while countries with a lower savings ratio will tend to import capital and therefore run current account deficits. Thus whereas the M-F model can only analyze short-

term changes in the current account position, the fundamental concern of the consumption smoothing approach is the intertemporal sustainability of the current account.

The consumption smoothing view hinges on a sort of Modigliani-Miller Irrelevance Theorem of international macroeconomics: in a country that has free access to international capital markets, the mix of domestic and external capital is largely irrelevant in the financing of a country's fixed capital formation because both must be remunerated at the risk-adjusted equilibrium rate of return prevailing on the world market. It is crucial, in other words, to ensure that the net present value of investment projects is positive; whereas the geographical source of financing is irrelevant.

2.3 Review of Empirical Literature

As stated earlier, many empirical studies have been carried out on the sustainability of current account in different parts of the world. A review of some of these past studies will unarguably provide a direction and framework for this study.

2.3.1 Studies on Developed Countries

Using quarterly data corresponding to the period beginning in the early 1970s and finishing in the early 1990s, Liu and Tanner (1996) tested the external solvency of France, Germany, Italy, Japan, Canada, the United Kingdom and the United States. By employing a Dickey-

Fuller test with a break in the intercept to account for shifts in the behavior of the series in the 1980s, the authors found that the intertemporal solvency condition was satisfied for the U.S., Germany and Japan. The weakness of this study is that its findings do not settle the issue of what explains the high correlation of savings and investment. It merely suggests an additional consideration not mentioned in previous literature.

Holme (2003) investigated the sustainability of OECD current account balances in the long run using Fully Modified Ordinary Least Squares (FMOLS) procedures as well as quarterly panel data for eleven OECD countries over the study period 1980Q1-2002Q4 inclusive. Given that low test power could be responsible for the acceptance of the nulls of non-stationarity and non-cointegration, the use of panel data unit root and cointegration tests enabled the author to investigate sustainability with increased test power. Unlike previous panel data studies of current account balances, the paper offered a new panel data evidence of sustainability where it is possible to identify members from within the panel which exhibit current account sustainability. He found that at most, six countries exhibit sustainability–Australia, Belgium, Canada, Japan, UK and US; while five countries–France, Germany, Italy, Norway and Spain–do not offer evidence in favour of sustainability.

While conducting an investigation into the extent and asymmetric adjustment of the US current account over the study period 1960Q4-2003Q2, Holmes and Panagiotidis (2004) employed a recursive trace test and were able to identify distinct periods where the US current account did not satisfy the necessary condition for sustainability (mid 1960s to mid

1970s and mid 1980s to the end of the 1990s)and distinct periods where the necessary condition is satisfied (mid 1970s to mid 1980s and late 1990s onwards).

Raybaudi et al. (2004) employed quarterly U.S. data over the period 1970-2002 as well as a Markov regime-switching ADF model in order to assess the potential problems of sustainability of a country's debt. Their results indicated that the U.S. current account was unsustainable during the periods 1983-87 and 1993-2002, and that the expected times the U.S. current account would remain in sustainable and unsustainable regimes are 21 and 29 respectively.

Employing fractional integration techniques, Dulger and Ozdemir, (2005) tested for the sustainability of current account deficits in seven developed countries for the 1974:1-2001:3 period. The traditional views of modelling current account series either as trend deterministic [I(0)] or as stochastic trend [I(1)] processes seem too restrictive compared to the wide scope of possibilities covered by the fractionally-integrated I(d) processes. These processes belong to a broader class called long memory, owing to their ability to display significant difference between distant observations in time (Gil-Alana, 2002a). The results of the study by Dulger and Ozdemir show that all countries' current account is non-stationary and three countries' (France, Italy and Canada) current accounts are mean reverting (i.e. shocks have no permanent effect on the values of the current account series), so that they are sustainable in the long run. The results also show that those of Germany, UK, US and Japan are not mean reverting and are unsustainable. These results however

contradict the findings of the study carried out by Wu (2000) which showed that the current account deficits among industrializes countries are sustainable.

Kalyoncu (2005) examined the sustainability of current account for Turkey during the period 1987:1-2002:4, using the intertemporal borrowing constraint. He tested for a long run relationship between two Turkey export measures and imports measures (measured real term and percentage to real GDP). His empirical results suggest that there existed a unique long run or equilibrium relationship among real exports and imports and their percentage to real GDP. Results also show that their estimated cointegration factor, β, was very close to 1. The findings suggest that the current account of Turkey was sustainable in the long run.

Karunaratne (2008) examined the polemics and empirics on the sustainability of the high current account deficits and foreign debt of Australia that prevailed during the period 1959q3 to 2007q1 using the intertemporal optimization model and VAR methodology. His results suggest that Australia appear to have satisfied the intertemporal budget constraint and remained solvent. On the issue of causality, results of the F-test of the null hypothesis of Granger non-causality of changes in national cash flow by the current account is rejected by VARs with lag lengths of k =1, 2 and 3 for the full sample period. Furthermore, there is evidence of reverse causality that changes in national cash flow affected the current account over the full sample period. His overall conclusion is that empirical test results indicate that changes in the current account imbalances were consistent with the predictions of consumption-smoothing by the intertemporal optimization model over the full sample

period.

2.3.2 Studies on Developing Countries

Using Vector Autoregression analysis, Ghosh and Ostry (1995) estimated the equilibrium or optimal consumption-smoothing current account of forty-five developing countries including Nigeria. Employing data ranging between 1950 and 1991, they found out that for a majority of these countries, the hypothesis of full consumption-smoothing could not be rejected, suggesting that capital mobility may after all be quite high in this group of countries. On the issue of causality, they used a standard t-test to gauge whether current account granger-caused subsequent movements in national cash flow in 13 African (including Nigeria), 11 Asian, 5 Middle East and 16 Latin American and the Caribbean countries. For Africa, the current account granger-caused the national cash flow in about half the countries: Kenya, Malawi, Mauritius, Senegal, Tunisia and Zambia. For Asia, the results suggest granger-causality in five cases: Hong Kong, India, Korea, Papua New Guinea and the Philippines. The results for the Middle East were also encouraging: three of the countries passed the test at standard significance levels. Finally, eleven of the sixteen countries from the Latin America and Caribbean region exhibited granger-causality from the current account to national cash flow. The causal relationship was unidirectional in all cases.

While examining current account sustainability in South Africa from 1970 to 1998, North (1999) argued that since 1970, movements in South Africa's current account have

tended to reflect changes in the domestic economic and political environment. External events, such as changes in the U.S dollar price of gold, terms of trade movements, changes in foreign economic growth rates and volatile swings in exchange rates have also impacted strongly on the current account. He asserted further that south Africa's historical dependence on imported goods, and its reliance on primary exports, especially gold as its main source of foreign exchange has positioned it with many other developing and emerging economies with regards to balance of payment constraints.

Hudson and Stennett, (2003) evaluated the sustainability of Jamaica's current account positions over the period 1962 to 2002 and over the medium term, using an intertemporal model of sustainability for the historical data while the traditional accounting and present value approaches were employed to evaluate the prospect for the current account. The historical current account balances were in general, above optimal and as such they did not breach the solvency condition for sustainability. Notwithstanding, there were periods of chronic imbalances that precipitated dramatic reversal in policy and investor sentiment. The outlook, therefore, suggests that the economy's net external liabilities will grow, with the risk of investors perceiving the trend as unsustainable.

Lau, Baharumshah and Habibullah (2007) investigated the anatomy of the dynamic current account behavior for the ASEAN -5 countries (Indonesia, Malaysia, the Philippines, Singapore, and Thailand) over the 1961 to 2002 period using present value model. Despite the simplicity, the statistical computations suggest that the agents behave as the forward-

looking rational agents in the face of the shocks in the three out of five economies. The implication is that the current account acts as a buffer to smooth consumption in the presence of shocks and optimally smoothing its consumption path for these countries.

Using a simple consumption-smoothing model and cointegration tests with a structural break, Goh (2007) examined the impact of changes in capital mobility and the current account's capacity to predict external performance in Malaysia over the period 1960 to 2000. His results suggest that Malaysia's current account balance was sustainable prior to the 1997 crisis. However, it has been found out that the Malaysian data fail to pass a battery of stringent tests of the consumption-smoothing model. On the issue of causality, revealed that the current account granger caused national cash flow at 1 percent level of significance.

2.3.3 Empirical Evidence on ECOWAS

Adedeji (2001) employed an intertemporal model of the current account and macroeconomic indicators such as capital flight, size of external debt, economic growth, openess etc. to examine the size and sustainability of Nigeria's current account deficits over the 1960 to 1997 period. The standard Lagrange Multiplier (LM) test for no serial correlation under the null and the LM test for the maintained hypothesis of no first order conditional heteroscedasticity were used. By sequentially applying the Fully Modified (FM) method of analysis, he concluded that the Nigerian economy appeared to satisfy its intertemporal budget constraint during the period. His results also showed that over the entire sample

size, the estimate of the long-run relationship between real net output adjusted for interest payments and real private consumption (θ) is 0.85. The result also supports the view that current account deficits accompanied by macroeconomic instability and structural weakness can degenerate into an external crisis. He however pointed out that one of the approaches he used in testing for the presence of unit roots i.e. Phillips-Perron test has low power against trend stationary alternatives and that this weakness be kept in mind when interpreting the results obtained from their application. On the issue of causality, his results showed that the current account granger caused changes in net output at 3 percent level of significance.

Okojie (2005) analysed Nigeria's current account balances as well as her capital and financial account balances using annual data for the period 1975 to 2001. This study differs from the one carried out by Adedeji (2001) in that the author didn't dwell so much on the sustainability or otherwise of Nigeria's current account. Rather she focused on the various determinants of these balances and argued that Nigeria's current account balances fluctuated between deficits and surpluses, depending on the price of crude oil her major export product. The results of her OLS regression analysis of current account balances showed that the key determinants of whether Nigeria registers a deficit or surplus on her current account are the exchange rate, the domestic interest rate, as well as the trade balance to GDP ratio. Overall, the analysis does not suggest that current account deficits were protracted or unsustainable in Nigeria, as they usually swing back to a surplus after a short interval (three years). However, she used dummies and not actual current account balances

in her estimation.

Using various criteria which included public sector savings, capital inflow and level of international reserves, Opoku-Afari (2005) measured the sustainability of Ghana's current account deficits between 1975 and 2004. His findings show that Ghanaian current account deficit has been excessively high over the past decade, peaking around the 1999/200 period. Beside been excessively high, it has been driven mainly by trade deficit emanating from falling exports, underscoring the structural problems in the Ghanaian economy. However, the result he got for the long-run coefficient between net cash flow and private consumption (i.e. 1.92) is quite counter-intuitive to what the general low savings rate in Ghana predicts. In effect, it implies that Ghanaians tend to smoothen their consumptions to reflect long-term trends. On the issue of causality, his results show that there existed no causality between current account and net cash flow at 5 percent significance level.

2.3.4 Summary of Major Gap

This study stands out from previous studies in the same area by been the first study to look at current account sustainability in the context of ECOWAS. Previous studies in this region were just country-specific studies which gave no consideration for a comparative analysis of ECOWAS countries as carried out in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology to be employed in achieving the objectives of the study. Section 3.2 discusses the theoretical framework for the study. In section 3.3 the model is specified while in section 3.4 data measurement, which comprises definitions of variables as well as sources of data, is presented. Section 3.5 examines the methods of estimation.

3.2 Theoretical Model

This study adapts the intertemporal model of the current account which is derived from the permanent income theory of consumption and saving. The simple intertemporal model implies that a country's current account surplus (deficit) should be equal to the present value of expected future declines (rise) in output, net of investment and government purchases. A Vector Autoregression involving the current account and net output can be used to compute

a forecast of this present value, conditional on economic agents' information. According to the theory, the VAR forecast of this present value should be equal to the current account (Bergin and Sheffrin, 2000).

It has, however, been pointed out (Sachs, 1982) that movements in the current account can be decomposed into two components. First, the consumption-tilting motive, whereby a country tilts its consumption towards the present or future (driven by differences between the subjective discount rate and the world interest rate). Second, the consumption-smoothing motive, which smooths consumption in the presence of shocks to output, investment or government spending. The focus of this study is, however, limited to the consumption-smoothing component of the current account. The consumption-smoothing component is stationary, which has a number of econometric advantages that can be exploited (Hudson and Stennett, 2003).

We present here a review of the intertemporal model of the current account as put together by Adedeji (2001), whose work is fundamental to this intended study. This model yields the optimal current account balance, which will be used to determine the excessiveness or otherwise of the current account when compared with the actual balance.

Assuming we have a small open economy, with the ability to lend and borrow at a constant real world interest rate, r, and produces a single tradable good. The representative agent is assumed to have rational expectations. The infinitely lived household has the

expected intertemporal utility function given by:

$$\sum_{t=\tau}^{\infty} \beta^{t-\tau} E_t \left[U(C_t) \right]; \quad 0 < \beta < 1 \tag{3.1}$$

where β is the discount factor, $U(C)$ is the utility function and is strictly increasing in consumption and concave (that is $U'(C) > 0$ and $U''(C) < 0$), C_t denotes consumption and E_t is the conditional expectation operator based on the information set of representative agent at time t.

The relationship between the net foreign asset and the current account balance is stated as:

$$CA \equiv B_{t-1} - B_t = rB_t + Y_t - C_t - I_t - G_t \tag{3.2}$$

where Y denotes the country's GDP, B is the economy's net foreign assets (debts if negative), I is the level of investment, G is the level of government expenditure and CA is the current account balance.

We can derive the intertemporal (dynamic) budget constraint facing the representative agent by iterating the dynamic budget constraint in Eq.(3.2) and taking its expectation before imposing a 'solvency or transversality condition' (No Ponzi Game condition) in which external debt repayments are sustainable, or the current debt must be equal to the expected present value of future current account surpluses (ruling out the possibility of bubbles)[1].

[1] See Appendix A for details of the derivation

The intertemporal (dynamic) budget constraint is therefore given as:

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}Y_t+(1+r)B_t\right]=E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(C_t+I_t+G_t)\right] \tag{3.3}$$

The agent maximizes Eq.(3.1) subject to the constraint in Eq.(3.3). We use the Hamiltonian approach to derive the optimal path of consumption which is expressed as follows:[2]

$$C_t^*=\left[rB_t+(\frac{r}{1+r})\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}E_t(Y_t-I_t-G_t)\right] \tag{3.4}$$

Simplifying Eq.(3.4), we have:

$$C_t^*=r\left[B_t+(\frac{1}{1+r})\sum_{t=\tau}^{\infty}(\frac{1}{1+r})^{t-\tau}E_t(Y_t-I_t-G_t)\right] \tag{3.5}$$

Eq.(3.5) gives the open economy rational expectations consumption function. As in Hall (1988), planned consumption is constant but actual consumption will change as the stochastic processes in the economy evolve.

Substituting Eq.(3.5) into Eq.(3.2) yields the optimal current account balance:

$$CA_t^*=Y_t+rB_t-(\frac{r}{1+r})\left[(1+r)B_t+\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}E_t\left(Y_t-I_t-G_t\right)\right]-I_t-G_t \tag{3.6}$$

Simplifying Eq.(3.6), we have:

$$CA_t^*=Y_t+rB_t-rB_t-\left[(\frac{r}{1+r})\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}E_t\left(Y_t-I_t-G_t\right)\right]-I_t-G_t$$

This implies that

$$CA_t^*=Y_t-\left[(\frac{r}{1+r})\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}E_t\left(Y_t-I_t-G_t\right)\right]-I_t-G_t \tag{3.7}$$

[2]See Appendix B for details.

We can derive the optimal current account in the current period by carrying out some manipulations on Eq.(3.7).[3]

The optimal current account in the current period thus becomes:

$$CA_{\tau}^{*} = -\sum_{t=\tau+1}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_{\tau}\left(\Delta Q_{t}\right) \tag{3.8}$$

where $Q_t = Y_t - I_t - G_t$ and is known as the net output. In per capita terms, it is written as $q_t = y_t - i_t - g_t$.

Eq.(3.8) states that the current account is determined by future expectations of changes in net output (ΔQ_t), and the extent of the movement in the current account is a decreasing function of the persistence of the temporary shock. This implies that a country will run current account surplus only if it expects its net output to fall temporarily in the future. Conversely, the current account will be in deficit when future changes in net output are expected to be positive so that future output is transferred to the present (by external borrowing) to smooth the consumption. The analogy to house saving is quite revealing. As Campbell (1987) has shown, an implication of the rational expectations permanent income model is that households save when they expect their future labour income to decline. This implies that people save for the rainy day. In this model, net output plays the role of labour income while the current account plays the role of savings. Thus the current account acts as a buffer to smooth consumption in the presence of temporary disturbances or shocks.

[3] See Appendix C for the other manipulations.

3.3 Model Specification

To obtain the estimating model for the proposed study, we solve Eq.(3.8). Eq.(3.8) tells us that creating the optimal series requires estimating the present value of expected changes in net output, where the expectation depends on the information set used by economic agents.

This is challenging because it involves forecasting all the variables in the equation into infinity. In general, the information set used by agents to forecast future values of these variables is not known. However, that precise knowledge of what information is employed by the agent is not needed. This is because it has been shown, (Campbell and Shiller, 1987), that the current account itself reflects all the information available to agents for the purpose of forecasting these variables. Therefore by including the current account in the conditioning information set, it is possible to fully capture agents' expectations of shocks to net output.

Following Campbell and Shiller (1987) as well as Ghosh and Ostry (1995), we estimate an unrestricted VAR in $[\Delta Q_t, CA_t]$, where CA_t stands for the total actual current account balance. The VAR may then be written as:

$$\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix} \begin{bmatrix} \Delta Q_{t-1} \\ CA_{t-1} \end{bmatrix} + \begin{bmatrix} v_{1t} \\ v_{2t} \end{bmatrix} \tag{3.9}$$

where V_{1t} and V_{2t} are errors with a conditional mean of zero. The VAR can be more

compactly written as:

$$X_t = \psi X_{t-1} + \varepsilon_t \tag{3.9a}$$

Eq.(3.9) is used to forecast the expected value of ΔQ_t in Eq.(3.8). Taking the expectation of Eq.(3.8) yields:

$$E_t \begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix} \begin{bmatrix} \Delta Q_{t-1} \\ CA_{t-1} \end{bmatrix} + E_t \begin{bmatrix} v_{1t} \\ v_{2t} \end{bmatrix} \tag{3.9b}$$

For any matrix, X_t, the VAR (1) is:

$$X_t = AX_{t-1} + \varepsilon_t \tag{3.9c}$$

where A is conformably defined. Note that Eqs.(3.9a) and (3.9c) are the same.

Iterating Eq.(3.9c) forward, we have:

$$X_{t+1} = AX_t + \varepsilon_{t+1} \tag{3.9d}$$

Iterating Eq.(3.9d) forward, we have:

$$X_{t+2} = AX_{t+1} + \varepsilon_{t+2} \tag{3.9e}$$

Substituting Eq.(3.9d) into (3.9e), we have:

$$X_{t+2} = A\left(AX_t + \varepsilon_{t+1}\right) + \varepsilon_{t+2} \tag{3.9f}$$

This implies that:

$$X_{t+2} = A^2 X_t + A\varepsilon_{t+1} + \varepsilon_{t+2} \tag{3.9g}$$

Iterating to time j, we have:

$$X_{t+j} = A^j X_t + \sum_{k=0}^{j-1} A^k \varepsilon_{t-k+2} \tag{3.9h}$$

Taking the expectation of Eq.(3.9h), we have:

$$E_t\left(X_{t+j}\right) = A^j X_t + E_t\left[\sum_{k=0}^{j-1} A^k \varepsilon_{t-k+2}\right] \tag{3.9i}$$

We assume a standard normal distribution for the errors, that is, ε_{it} is normally distributed with mean zero and variance one. This implies that:

$$E_t(\varepsilon_t) = E_t(\varepsilon_{t+1}) = ... = E_t(\varepsilon_{t+j}) = 0 \tag{3.9j}$$

By applying Eq.(3.9j) to (3.9i), the second term on the right hand side of Eq.(3.9i) reduces to zero. Hence, Eq.(3.9i) becomes:

$$E_t\left(X_{t+j}\right) = A^j X_t \tag{3.9k}$$

By applying this idea to Eq.(3.9), Eq.(3.9) becomes:

$$E_\tau \begin{bmatrix} \Delta Q_\tau \\ CA_\tau \end{bmatrix} = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}^{t-\tau} \begin{bmatrix} \Delta Q_\tau \\ CA_\tau \end{bmatrix} \tag{3.10}$$

where

$$A = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}$$

and $j = t - \tau$.

By premultiplying Eq.(3.10) by a 1×2 selection vector, $\begin{bmatrix} 1 & 0 \end{bmatrix}$, we have:

$$E_\tau \Delta Q_t = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}^{t-\tau} \begin{bmatrix} \Delta Q_\tau \\ CA_\tau \end{bmatrix} \tag{3.11}$$

Substituting Eq.(3.11) into Eq.(3.8) yields:

$$CA_{\tau}^{*} = -\sum_{t=\tau+1}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}\begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}^{t-\tau}\begin{bmatrix}\Delta Q_{\tau}\\ CA_{\tau}\end{bmatrix} \tag{3.11a}$$

Re-arranging Eq.(3.11a), we have:

$$CA_{\tau}^{*} = -\begin{bmatrix}1 & 0\end{bmatrix}\sum_{t=\tau+1}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}\begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}^{t-\tau}\begin{bmatrix}\Delta Q_{\tau}\\ CA_{\tau}\end{bmatrix} \tag{3.11b}$$

Using matrix approach, Eq.(3.11b) can be written as:

$$CA_{\tau}^{*} = -\begin{bmatrix}1 & 0\end{bmatrix}\sum_{t=\tau+1}^{\infty}\left(\frac{\Psi}{1+r}\right)^{t-\tau}\begin{bmatrix}\Delta Q_{\tau}\\ CA_{\tau}\end{bmatrix} \tag{3.11c}$$

where

$$\Psi = \begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}$$

The expression

$$\sum_{t=\tau+1}^{\infty}\left(\frac{\Psi}{1+r}\right)^{t-\tau}$$

in Eq.(3.11c) can be simplified as follows:

$$\sum_{t=\tau+1}^{\infty}\left(\frac{\Psi}{1+r}\right)^{t-\tau} = \left(\frac{\Psi}{1+r}\right) + \left(\frac{\Psi}{1+r}\right)^{2} + \left(\frac{\Psi}{1+r}\right)^{3} + \ldots$$

This implies that:

$$\sum_{t=\tau+1}^{\infty}\left(\frac{\Psi}{1+r}\right)^{t-\tau} = \frac{\left(\frac{\Psi}{1+r}\right)}{I + \left(\frac{\Psi}{1+r}\right)}$$

where I is a 2×2 identity matrix. Therefore,

$$\sum_{t=\tau+1}^{\infty}\left(\frac{\Psi}{1+r}\right)^{t-\tau} = \left((1+r)^{-1}\Psi\right)\left(I - (1+r)^{-1}\Psi\right)^{-1} \tag{3.11d}$$

Substituting Eq.(3.11d) into (3.11c), (3.11c) becomes:

$$CA_{\tau}^{*} = -\begin{bmatrix} 1 & 0 \end{bmatrix}\left((1+r)^{-1}\psi\right)\left(I-(1+r)^{-1}\psi\right)^{-1}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} \tag{3.12}$$

Substituting the value of Ψ back into Eq.(3.12), the equation becomes:

$$CA_{\tau}^{*} = -\begin{bmatrix} 1 & 0 \end{bmatrix}\left(\frac{1}{1+r}\right)\begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}\left[\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - \left(\frac{1}{1+r}\right)\begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}\right]^{-1}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix}$$

This implies that:

$$CA_{\tau}^{*} = -\begin{bmatrix} 1 & 0 \end{bmatrix}\left(\frac{1}{1+r}\right)\begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}\begin{bmatrix} 1-\frac{\psi_{11}}{1+r} & -\frac{\psi_{12}}{1+r} \\ -\frac{\psi_{21}}{1+r} & 1-\frac{\psi_{22}}{1+r} \end{bmatrix}^{-1}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} \tag{3.12a}$$

Let

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1-\frac{\psi_{11}}{1+r} & -\frac{\psi_{12}}{1+r} \\ -\frac{\psi_{21}}{1+r} & 1-\frac{\psi_{22}}{1+r} \end{bmatrix}$$

Therefore, Eq.(3.12a) becomes:

$$CA_{\tau}^{*} = -\begin{bmatrix} 1 & 0 \end{bmatrix}\left(\frac{1}{1+r}\right)\begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} \tag{3.12b}$$

But

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad-bc}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Eq.(3.12b) then becomes:

$$CA_{\tau}^{*} = -\begin{bmatrix} 1 & 0 \end{bmatrix}\left(\frac{1}{1+r}\right)\left(\frac{1}{ad-bc}\right)\begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} \tag{3.12c}$$

$$= -\begin{bmatrix} 1 & 0 \end{bmatrix}\left(\frac{1}{1+r}\right)\left(\frac{1}{ad-bc}\right)\begin{bmatrix} \psi_{11}d-\psi_{12}c & -\psi_{11}b+\psi_{12}a \\ \psi_{21}d-\psi_{22}c & -\psi_{21}b+\psi_{22}a \end{bmatrix}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix}$$

$$= -\left(\frac{1}{1+r}\right)\left(\frac{1}{ad-bc}\right)\begin{bmatrix} \psi_{11}d-\psi_{12}c & -\psi_{11}b+\psi_{12}a \end{bmatrix}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix}$$

$$= \begin{bmatrix} \frac{\psi_{11}d-\psi_{12}c}{(1+r)(ad-bc)} & \frac{\psi_{12}a-\psi_{11}b}{(1+r)(ad-bc)} \end{bmatrix}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix}$$

Therefore,

$$CA_t^* = \begin{bmatrix} \phi_{\Delta Q} & \phi_{CA} \end{bmatrix}\begin{bmatrix} \Delta Q_t \\ CA_t \end{bmatrix} \tag{3.13}$$

where

$$\phi_{\Delta Q} = -\left(\frac{\psi_{11}d-\psi_{12}c}{(1+r)(ad-bc)}\right)$$

$$\phi_{CA} = -\left(\frac{\psi_{12}a-\psi_{11}b}{(1+r)(ad-bc)}\right)$$

$$a = 1-\frac{\psi_{11}}{1+r}$$

$$b = -\frac{\psi_{12}}{1+r}$$

$$c = -\frac{\psi_{21}}{1+r}$$

and

$$d = 1-\frac{\psi_{22}}{1+r}$$

Eq. (3.13) yields the optimal balance which is compared with the actual current account balance[4]. Note that the total actual current account balance, (CA_t), comprises both the consumption-smoothing and consumption-tilting components. Since the scope of this study

[4]The expression in (3.13) is valid as long as the infinite sum in (3.8) converges, which it will if the variables in the VAR are stationary.

is limited to the consumption-smoothing component, we purge total actual current account balances of its consumption-tilting component. Consumption-tilting has implications for the current account that are entirely distinct from consumption-smoothing and so, it is important to ensure that the optimal consumption-smoothing component of the current account derived from Eq.(3.13) is only compared to that component of the current account that relates to consumption-smoothing, and not to the total actual current account (which potentially includes both consumption-smoothing and consumption-tilting components). Following existing studies like Adedeji (2001), Opoku-Afari (2005) and Lau et al. (2007), we define this actual consumption-smoothing balance ($casm_t$) as the residual series from the cointegration regression of net output adjusted for net factor payment, qr_t on per capita private consumption expenditure, c_t.

Mathematically, it is given by:

$$casm_t = qr_t - \theta c_t \tag{3.14}$$

where qr_t = net output adjusted for net factor payment; c_t = per capita private consumption expenditure; and θ = consumption-tilting parameter.

3.4 Methods of Estimation

This study employs both descriptive and econometric techniques of data analysis. Objective one will be achieved with the use of mean, median, standard deviation etc. while for

objective two, we evaluate the VAR model in Eq.(3.13) to generate the optimal current account series, CA_t^*. It should however be noted that it is only the actual consumption-smoothing current account, $casm_t$ and not the total actual current account that will be included in Eq.(3.13). As stated earlier, this consumption-smoothing current account is defined as the residual series from the cointegrating regression of net output adjusted for net factor payment, qr_t on per capita private consumption expenditure, c_t. According to the underlying theory, both qr_t and c_t must be stationary in first differences (i.e. I(1)). Hence, we test for the presence of unit roots and the degrees of integration of these variables using the Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979). The unit roots test is based on the null hypothesis that a unit root exists. To test for the optimal lag length in the VAR framework, we employ both the Akaike Information Criterion (AIC) and the Schwarz Information criterion (SIC). If the unit root test results accord with a priori expectation, we will go ahead with the cointegrating regression using the Johansen-Juselius cointegration test (Johansen and Juselius, 1990) to obtain the actual consumption-smoothing current account series $casm_t$. The test is based on the null hypothesis of no cointegration. We will also subject this series as well as change in net output to the unit root test to ascertain whether they are stationary at level, which is necessary for the expression in (3.13) to be valid (Adedeji, 2001). If the theory is supported, the VAR model in Eq.(3.13) will be estimated to generate the optimal current account series.

Once the optimal current account series (CA_t^*) have been computed, the test of whether

the current account balances of the selected ECOWAS countries were sustainable or not between 1980 and 2006 will be carried out using two criteria. The first criterion is by visual inspection after plotting the actual current account for each country against the optimal current account from the intertemporal model (Adedeji, 2001; Opoku-Afari, 2005; and Lau et al., 2007). The second criterion will compare the optimal series with the actual or observed series in terms of their correlation coefficient (Adedeji, 2001) and the probability of the equality of their standard deviation (an idea borrowed from Matrix Laboratory or MATLAB). The closer the correlation is to one and the closer the probability is to zero, the closer the actual balances are to been sustainable.

Finally, we determine the direction of causality between the current account, ($casm_t$) and net output changes, (Δq_t). This causal issue contained in objective three will be addressed by employing VAR-type of Granger-Causality tests. However, the causality may be bi-directional in nature. In this regard, the bivariate causality testing is applied.

The VAR models used for testing this causality are as follows:

$$\Delta q_t = \sum_{j=1}^{n} \alpha_j \Delta q_{t-j} + \sum_{j=1}^{n} \beta_j casm_{t-j} + e_{1t} \tag{3.15}$$

$$casm_t = \sum_{i=1}^{n} \gamma_i casm_{t-i} + \sum_{i=1}^{n} \phi_i \Delta q_{t-i} + e_{2t} \tag{3.16}$$

For there to be unidirectional causality from current account (casm) to net output changes (Δq), the estimated coefficients on lagged casm in Eq.(3.15) should be significantly different from zero (that is, $\sum \beta_j \neq 0$) as a group and the set of estimated coefficients on lagged Δq

in Eq.(3.16) should not be significantly different from zero (that is, $\sum \phi_i = 0$). For there to be unidirectional causality from net output changes to current account, the estimated coefficients on lagged Δq in Eq.(3.16) should be significantly different from zero (that is, $\sum \phi_i \neq 0$) as a group and the set of estimated coefficients on lagged casm in Eq.(3.15) should not be significantly different from zero (that is, $\sum \beta_j = 0$). Bidirectional causality is suggested when both $\sum \beta_j$ in Eq.(3.15) and $\sum \phi_i$ in Eq.(3.16) are significantly different from zero.

3.5 Data Measurement

3.5.1 Definitions of Variables

Annual data on private consumption expenditure, government consumption expenditure, investment, Gross Domestic Product (GDP), Gross National Product (GNP) and level of population in each of the selected countries were collected from the 2007 version of World Development Indicators (WDI) of the World Bank. All variables are cast in per capita terms by dividing them by the level of population in each country.

The variables for this study are measured as follows:

1. c_t: per capita private consumption expenditure.

2. q_t: net output, which is the difference between per capita GDP, and the sum of per capita investment and per capita government consumption expenditure.

3. qr_t: net output adjusted for factor payments, which is the difference between per capita GNP, and the sum of per capita investment and per capita government consumption expenditure.

4. Δq_t: the differenced form of net output, q_t.

5. CA_t: total actual current account balance, which is the difference between net output adjusted for factor payments and per capita consumption.

6. $casm_t$: actual consumption-smoothing balance, which is the difference between net output adjusted for factor payments and per capita consumption (adjusted for the tilting component).

7. CA_t^*: optimal current account series to be generated from the VAR framework.

3.5.2 Source of Data

Analysis of this study is conducted using annual time-series data for the period 1980 to 2006, making twenty-seven years in all. A total of ten ECOWAS countries are included in the study, namely, Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea-Bissau, Mali, Niger, Nigeria, Senegal and Togo. All the data, which include Gross Domestic Product (GDP), Gross National Product (GNP), private or household consumption expenditure, government consumption expenditure, investment and total population, will be obtained mainly from the World Development Indicators (WDI) (WDI Data CD-ROM, 2007).

CHAPTER 4

EMPIRICAL RESULTS

4.1 Introduction

This chapter is dedicated to achieving the three objectives of the study. The trend and pattern of the total actual current account balances of the ten ECOWAS countries purposely selected for this study for the period 1980 to 2006 are examined in section 4.2, section 4.3 presents the results of all the tests associated with the sustainability or otherwise of the balances while the issue of causality is handled in section 4.4.

4.2 Trend and Pattern of Current Account Balances in Individual Countries

4.2.1 Trend of Current Account Balances in Individual Countries

In this subsection, we analyse the trend in individual countries to bring out country-specific differences. This is shown in Tables 4.1 and 4.2.

Table 4.1: Total Actual Current Account Balances in ECOWAS (1980-2006)

YR	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO	Total of selected 10
1980	-82.25	-40.32	-108.06	-6.24	-48.11	-38.68	-49.39	48.24	-107.7	-35.07	-467.58
1981	-95.26	-38.71	-113.03	-3.71	-48.53	-37.34	-62.02	-66.65	-105.83	-26.57	-597.65
1982	-71.1	-38.53	-70.248	-0.19	-69.11	-30.84	-40.65	-70.24	-78.631	-31.34	-500.88
1983	-48.92	-32.52	-57.813	-4.33	-50.78	-30.04	-24.02	-32.91	-72.99	-10.38	-364.71
1984	-34.31	-21.77	34.096	-12.9	-60.28	-27.89	-30.07	-9.961	-59.625	-16.64	-239.34
1985	-35.33	-23.58	38.424	-15.7	-75.4	-48.68	-24.37	-2.026	-72.944	-30.79	-290.34
1986	-50.8	-37.37	16.95	-23.6	-38.86	-48.75	2.7198	-24.76	-65.097	-46.07	-315.65
1987	-59.87	-39.6	-39.702	-32.7	-60.16	-41.08	-14.28	-20.46	-75.038	-49.22	-432.10
1988	-64.48	-24.47	-48.021	-29.6	-76.78	-44.99	-3.206	-6.545	-71.133	-52.63	-421.86
1989	-43.53	-18.96	-100.76	-34.1	-93.06	-10.66	-15.08	-3.268	-67.345	-47.09	-433.88
1990	-47.59	-14.89	-101.78	-41.2	-75.58	-48.07	-36.63	14.69	-53.123	-51.08	-455.20
1991	-46.34	-5.461	-90.294	-42.9	-84.52	-43.75	-17.97	-8.944	-52.749	-43.09	-436.02
1992	-46.66	-7.908	-94.062	-51.4	-107.7	-53.69	-7.169	-24.69	-55.078	-45.15	-493.53
1993	-57.34	0.4641	-66.558	-69.6	-64.24	-42.62	-7.451	-30.4	-58.179	-38.37	-434.25
1994	-29.63	-29.52	23.615	-38.3	-48.68	-37.79	-17.6	-20.87	-33.381	-13.23	-245.38

BEN - Benin, BFA - Burkina Faso, CIV - Cote d'Ivoire, GHA - Ghana, GNB - Guinea-Bissau, MLI - Mali, NER - Niger, NGA - Nigeria, SEN - Senegal and TGO - Togo.
UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table 4.2: **Total Actual Current Account Balances in ECOWAS (1980-2006):Cont's**

YR	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO	Total of selected 10
1995	-41.17	-36.2	1.8756	-42.3	-65.28	-41.43	-18.05	-15.63	-34.71	-16.92	-309.78
1996	-52.88	-40.86	-12.469	-34.9	-62.28	-44.28	-14.8	47.65	-26.616	-34.71	-276.15
1997	-46.4	-38.83	67.438	-79.8	-51.96	-29.55	-15.51	3.457	-28.428	-44.81	-264.42
1998	-37.8	-41.14	90.989	-55.6	-45.1	-36	-17.84	-38.23	-29.267	-47.52	-257.51
1999	-45.6	-40.77	72.024	-77.3	-41.13	-43.32	-12.81	-25.67	-38.891	-38.31	-291.76
2000	-42.23	-37.69	38.716	-54.1	-40.32	-28.79	-13.09	37.58	-51.995	-54.88	-246.78
2001	-43.46	-31.37	53.348	-56.3	-60	-51.05	-13.16	10.63	-47.821	-54.35	-293.50
2002	-57.88	-28.78	61.018	-41.9	-36.14	-39.31	-16.9	-50.83	-54.504	-51.21	-316.45
2003	-56.25	-42.96	41.586	-50.4	-24.81	-50.21	-19.81	-24.09	-77.886	-50.94	-355.82
2004	-61.14	-54.4	50.12	-95.4	-35.88	-60.87	-23.52	7.415	-114.54	-62.04	-450.25
2005	-60.85	-52.54	32.179	-130	-40.78	-61.53	-23.01	67.35	-92.109	-65.15	-426.33
2006	-63.95	-55.84	54.378	-143	-54.36	-62.94	-25.46	-10.46	-74.625	-69.37	-505.39
N/B	-1423	-874.5	-226.02	-1267	-1560	-1134	-561.2	-249.6	-1700.2	-1127	-10122.50

UNIT: Per Capita Current U.S. Dollars.
N/B: Net Balance.
SOURCE: World Development Indicators of the World Bank, 2007.

Benin: Tables 4.1 and 4.2 show that Benin's current account was negative throughout the period of the study. On the aggregate, the net balance on the country's current account was -1423.00 per capita which shows that Benin was a net debtor to the rest of the world over the period covered.

Burkina Faso: The tables show that Burkina Faso's current account was negative throughout the period of the study, with the exception of 1993. On the aggregate, the net balance on the country's current account was -874.50 per capita which shows that Benin was a net debtor to the rest of the world over the period covered.

Cote d'Ivoire: The tables show that Cote d'Ivoire's current account was negative from 1980 to 1983, but positive from 1984 to 1986. It was also negative between 1987 and 1993, after which it became consistently positive for the rest of the period covered with the exception of 1996. This break was brought about by the increase in crude oil exports by the country during this period (WAMA, 2008). Overall, the current account for Cote d'Ivoire was in deficit for a little less than half of the period covered. On the aggregate, the net balance on the country's current account was -226.02 per capita which shows that Cote d'Ivoire was a net debtor to the rest of the world over the period covered.

Ghana: The tables show that Ghana's current account was negative throughout the period of the study. On the aggregate, the net balance on the country's current account was -1267.00 per capita which shows that Ghana was a net debtor to the rest of the world over the period covered.

Guinea-Bissau: The tables show that Guinea Bissau's current account was negative over the period of the study. On the aggregate, the net balance on the country's current account was -1560.00 per capita which shows that Guinea-Bissau was a net debtor to the rest of the world over the period covered.

Mali: The tables show that Mali's current account was negative throughout the period of the study. On the aggregate, the net balance on the country's current account was -1134.00 which shows that Mali was a net debtor to the rest of the world over the period covered.

Niger: The tables show that Niger's current account was negative throughout the period of the study. On the aggregate, the net balance on the country's current account was -561.20 per capita which shows that Niger was a net debtor to the rest of the world over the period covered.

Nigeria: The tables show that Nigeria's current account balances have fluctuated between deficits and surplus, depending largely on the price of crude oil (Okojie, 2005). This is not surprising since oil countributes 90-95 per cent of Nigeria's export earnings as well as about 40 per cent of GDP and 80 per cent of government revenue. The country's current account and overall balance of payments reflected changes in the world prices of crude oil and her obligation to OPEC to restrict her crude oil production and exports (Okojie, 2005). After being positive in 1980, which Adedeji (2001) attributed to substantial increases in the crude oil prices and stringent exchange controls over the period 1977-80, Nigeria's current account balance was consistently negative from 1981 to 1995 with the exception of 1990. It

became positive again between 1996 and 1997, after which it became negative from 1998 to 1999. It thereafter fluctuated between surplus and deficit for the rest of the period. Overall, the current account for Nigeria was in deficit for exactly two-thirds of the period covered. On the aggregate, the net balance on the country's current account was -249.60 per capita which shows that Nigeria was a net debtor to the rest of the world over the period covered. On the whole, the behaviour of Nigeria's current account appears to have been sensitive to developments in the world oil market, even after the introduction of economic reforms in 1986. This sensitivity reflects the non-diversification of the country's economic base (Adedeji, 2001)

Senegal: The tables show that Senegal's current account was negative throughout the period of the study. On the aggregate, the net balance on the current account of the country was -1700.20 per capita which shows that Senegal was a net debtor to the rest of the world over the period covered.

Togo: The tables show that Togo's current account was negative throughout the period of the study. On the aggregate, the net balance on the country's current account was -1127.00 per capita which shows that Togo was a net debtor to the rest of the world over the period covered.

ECOWAS: Pooling data for the ten ECOWAS countries as a group shows that put together, all the countries imported more goods and services than they exported for each of the years under study. Put differently, the results show that put together, the ten countries used more

resources from the rest of the world to meet their domestic consumption and investment requirements than they supplied. Hence, the deficits recorded throughout for the pooled data.

Table 4.3 reports the descriptive statistics of the total actual current account balances for the ten countries included in the study. The table shows that per capita, the mean and median of the countries range from 8.37 to 374.91 and 10.46 to 59.63 respectively in absolute term. Their standard deviations were however positive ranging from 11.57 to 99.19. In terms of maximum and minimum balances, Cote d'Ivoire has the highest current account balance of 90.99, while Ghana has the lowest balance of -143.00 over the period of the study.

Table 4.3: **Descriptive Statistics**

Country	Minimum	Maximum	Mean	Median	Std deviation	Range
BEN	-95.26	-29.63	-52.70	-48.92	14.62	65.63
BFA	-55.84	0.46	-32.39	-37.37	14.19	56.30
CIV	-113.00	90.99	-8.37	16.95	66.40	204.00
GHA	-143.00	-0.19	-46.93	-41.92	35.28	142.60
GNB	-107.70	-24.81	-57.77	-54.36	19.10	82.87
MLI	-62.94	-10.66	-42.00	-42.62	11.57	52.28
NER	-62.02	2.72	-20.78	-17.84	13.73	64.74
NGA	-70.24	67.35	-9.25	-10.46	32.80	137.60
SEN	-114.50	-26.62	-62.97	-59.63	24.03	87.92
TGO	-69.37	-10.38	-41.74	-45.15	15.46	58.99
Total of 10 countries	-597.65	-239.34	-374.91	-364.71	99.19	358.31

UNIT: Per Capital Current U.S. Dollars
SOURCE: Author's Computations, 2010.

4.2.2 Pattern of Current Account Balances in Individual Countries

Figures (4.1)a to j plot the total actual current account balances for the ten ECOWAS countries.

Benin: Figure a shows that Benin's current account position, which was -82.25 1n 1980 fell to its minimum in 1982 after which it continued to rise until 1984. It, thereafter, fluctuated, during which it reached its maximum in 1994 and finally settled at -63.95 in 2006.

Burkina Faso: Figure b shows that Burkina Faso's current account position, which was -40.32 in 1980 rose until 1984 after which it fell for the next three years. It thereafter continued to pick up until it got to its maximum in 1993. It then declined for most of the remaining period and finally settled at its minimum in 2006.

Cote d'Ivoire: Figure c shows that Cote d'Ivoire's current account position, which was negative in 1980 (-108.06), declined to its minimum in 1981 after which it rose steadily until 1985. It thereafter declined until 1990 and then fluctuated during which it reached its maximum in 1998. It finally settled at 54.378 in 2006.

Ghana: Figure d shows that Ghana's current account position, which was -6.24 rose to its maximum in 1982 after which it declined until 1993. It, thereafter, fluctuated and finally settled at its minimum in 2006.

Guinea-Bissau: Figure e shows that Guinea-Bissau's current account position, which was -48.11 in 1980 fluctuated over the entire sample period. It reached its maximum in 1992

while it was at its minimum in 2003. It finally settled at -54.36 in 2006.

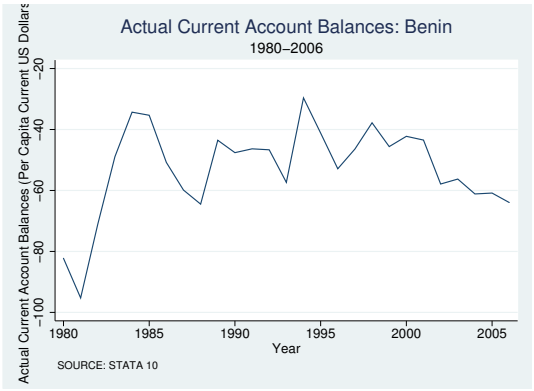
Mali: Figure f shows that Mali's current account position, which was -38.68 in 1980 also fluctuated over the period of the study. It reached its maximum in 1989 while it finally settled at its minimum in 2006.

Niger: Figure g shows that Niger's current account position, which was -49.39 in 1980 declined to its minimum in 1981 after which it rose for the next two years. It fluctuated for the rest of the period, reaching its maximum in 1986. It finally settled at -25.46 in 2006.

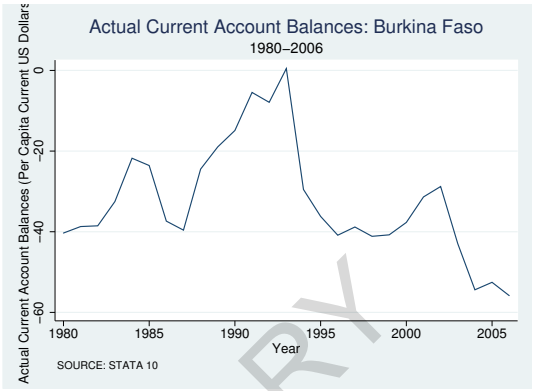
Nigeria: Figure h shows that Nigeria's current account position, which was 48.24 in 1980 declined considerably for the next two years and reached its minimum in 1982. It later picked up till 1986 after which it began to fluctuate. It reached its maximum in 2005 and finally settled at -10.46 in 2006.

Senegal: Figure i shows that Senegal's current account position, which was -107.70 in 1980 picked up till 1984. Although it fluctuated afterward, the rate at which it picked up was more than the rate at which it declined. It reached its maximum in 1996 after which it declined considerably till 2004 when it was at its minimum. It finally settled at -74.63 in 2006.

Togo: Figure j shows that Togo's current account position, which was -35.07 in 1980 rose to its maximum in 1983 after which it declined steadily till 1988. It thereafter began to pick up till 1994 after which it declined for most part of the remaining period. It finally settled at its minimum in 2006.



(a)



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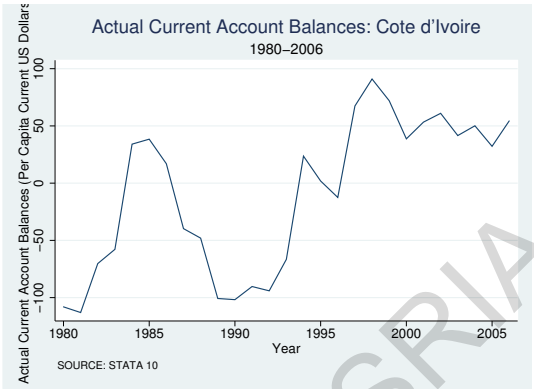
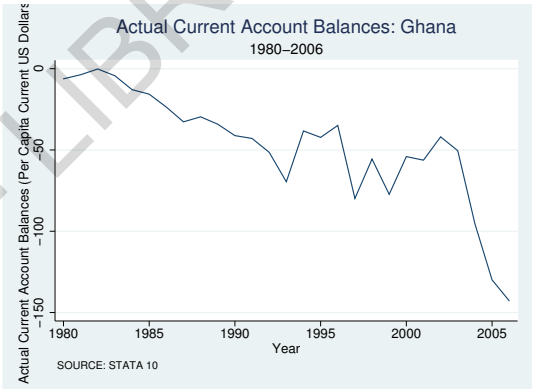
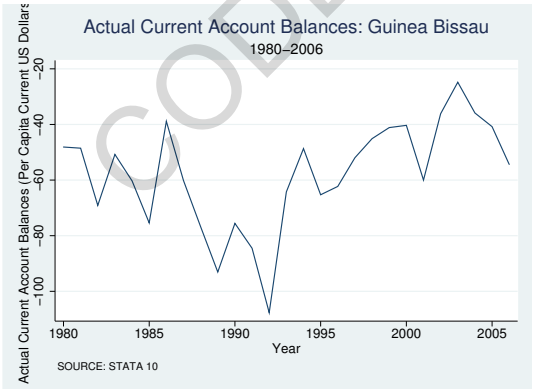


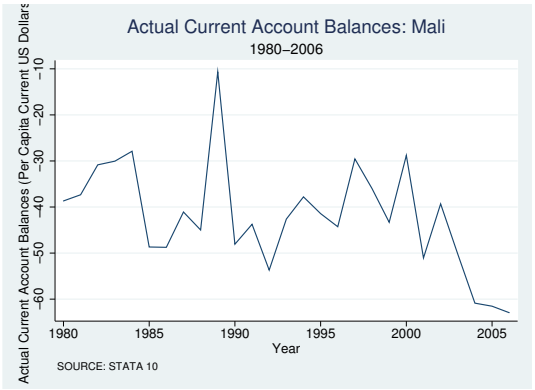
(c)



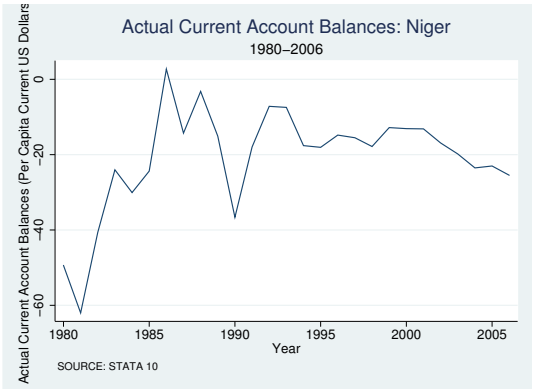
(d)



(e)

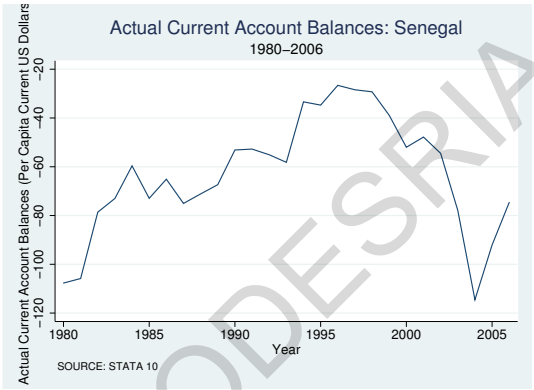


(f)

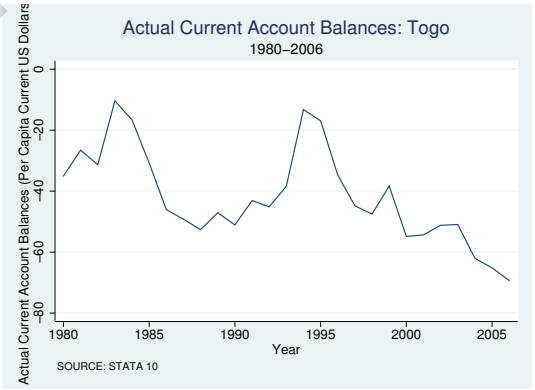


(g)

(h)



(i)



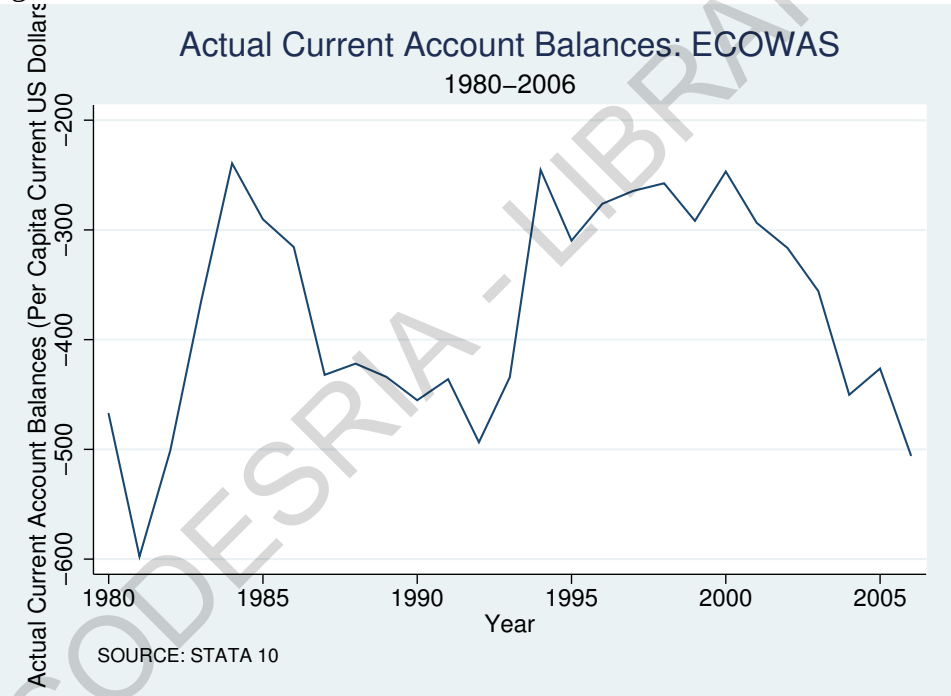
(j)

Figure 4.1: Total Actual Current Account Balances: (a) Benin (b) Burkina Faso (c) Cote d'Ivoire (d) Ghana (e) Guinea-Bissau (f) Mali (g) Niger (h) Nigeria (i) Senegal and (j) Togo.

Looking at the figures above, it can be observed that most of them recorded decline in their current account balances towards the end of the period of study, especially between 2004 and 2007. This can be attributed to lacklustre growth caused by falling agricultural revenues in the case of Benin and Senegal (The Daily Star, 2007); lower gold exports and higher oil prices in the case of Burkina Faso (Kabedi-Nbuyi, 2010); decrease in crude oil exports in the case of Cote d'Ivoire; trade deficit emanating mainly from falling exports in the case of Ghana (Opoku-Afari, 2005); ballooning petroleum imports in the case of Guinea-Bissau and Mali (The Daily Star, 2007); rising imports connected with petroleum and mining projects in the case of Niger (Zeine, 2010); rising investment income going to foreigners, deficits in non-oil exports and a deficit on the balance of trade in services in the case of Nigeria (Okojie, 2005); as well as cotton sales hit by western subsidies in the case of Togo (The Daily Star, 2007).

Figure 4.2 plots the pooled data on all the ten countries. The figure shows that put together, the current account balances of the ECOWAS countries were in deficits throughout the period of the study.

Figure 4.2: Pooled Data on all the Selected ECOWAS Countries, 1980-2006.



Five phases can be identified in the figure above. The first phase, between 1980 and 1982, is characterized by a decline in the pooled data on the ten countries. This decline was precipitated by the low level of the replenishment of gross reserves in the region (WAMA, 2008). Most of the countries recorded very low reserve levels that they could not completely finance months of imports. The second phase is between 1982 and 1985 when the balance of current transactions recorded net improvements due to surpluses from Nigeria, which benefited from oil price hikes an an exporter (WAMA, 2008). Hence the observed rise in the graph during this period. The third phase, between 1985 and 1994, can be divided into two parts. The first part, from 1985 to 1992, was characterized by a significant decline while the other part (1992 to 1994) was characterized by an equal rise in the graph. The rise recorded during the second part was brought about by the increase in gold exports in Mali and crude oil in Cote d'Ivoire (WAMA, 2008). The fourth phase, from 1994 to 2001, was characterized by slight fluctuations in the graph, while the last phase (2001 to 2006) is characterized by a downward trend caused by the inability of the gross reserves of six countries (Cote d'Ivoire, Ghana, Guinea, Niger, Senegal and Togo) to cover months of imports of goods and services (WAMA, 2008).

4.3 Current Account Sustainability in ECOWAS: Empirical Analysis

In this section, the results of the tests associted with the sustainability or excessiveness of the balances are presented.

4.3.1 Estimation of θ

It has already been pointed out in this study that the current account acts as a buffer to smooth consumption in the presence of shocks. Estimating the consumption-tilting parameter (θ) will enable us decompose total actual current account balances into its tilting and smoothing components. To be able to arrive at this parameter for each country, we need to estimate Eq.(3.14), which is a cointegration regression of net output adjusted for net factor payment, qr_t, on per capita private consumption expenditure, c_t. It should however be recalled that these two variables must be stationary in first differences as contained in chapter three. We therefore start this section by examining the stationarity or otherwise of qr_t and c_t.

Unit Root Test: qr_t and c_t

In order to test for the presence of unit roots and hence the degree of integration of these variables, we used the Augmented Dickey Fuller test (Dickey and Fuller, 1979). The results obtained from applying the ADF test are reported in Table 4.4.

Table 4.4: **ADF Test Results:** qr_t **and** c_t

Country	$qr_t^{\bullet\bullet}$	$\Delta qr_t^{\bullet\bullet\bullet}$	$c_t^{\bullet\bullet}$	$\Delta c_t^{\bullet\bullet\bullet}$
BEN	0.3044	-0.0452	-3.8540	-3.7734
BFA	0.0826	0.1095	-2.7669	-3.2138
CIV	0.1461	-0.0839	-3.7958	-3.9150
GHA	-0.3384	0.4064	-4.2768	-2.5013
GNB	0.0831	0.1093	-4.9611	-3.4082
MLI	0.5672	0.6290	-4.0425	-3.9801
NER	-0.5501	-0.8953	-4.2714	-3.6281
NGA	-0.4671	-0.9870	-1.7273	-2.5552
SEN	0.4203	0.2565	-3.1242	-3.2213
TGO	0.1039	0.1275	-3.8263	-3.6604

●●: Test in Level; Lag length is 1; Critical values are -2.6603 and -1.9552 (1 percent and 5 percent respectively).

●●●: Test in First Difference; Lag length is 1; Critical values are -2.6649 and -1.9559 (1 percent and 5 percent respectively).

SOURCE: Author's Computation, 2010.

The results above show that qr_t and c_t are non-stationary at 5 per cent significance level, while their first differences are stationary. These findings accord with our a priori expectation and this allowed us to proceed with the Johansen multivariate cointegration analysis.

Cointegration Test

It is necessary to determine the dynamic specification of the VAR model before testing for the existence of any cointegrating relationship between qr_t and c_t using the Johansen framework. Specifically, the appropriate lag length (k) for the VAR model must be determined. Following this development,we adopted the multivariate generalization of AIC and SIC criteria to track the optimal lag length. The results indicate VAR(1) for Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea-Bissau, Mali, Niger and Senegal, while VAR(2) is most appropriate for Nigeria and Togo.

Results of applying the Johansen and Juselius (1990) multivariate cointegration test are presented in Table 4.5.

Table 4.5: **Cointegration Test Results**

Country	Eigen Value	5 Percent Critical Value	1 Percent Critical Value	No. of CE(s)
BEN	0.591916	15.41	20.04	None**
BEN	0.028943	3.76	6.65	At most 1
BFA	0.408567	15.41	20.04	None*
BFA	0.112820	3.76	6.65	At most 1
CIV	0.572439	15.41	20.04	None**
CIV	0.107140	3.76	6.65	At most 1
GHA	0.421511	15.41	20.04	None*
GHA	0.006142	3.76	6.65	At most 1
GNB	0.440749	15.41	20.04	None*
GNB	0.154413	3.76	6.65	At most 1
MLI	0.496910	15.41	20.04	None**
MLI	0.044896	3.76	6.65	At most 1
NER	0.501131	15.41	20.04	None**
NER	0.189293	3.76	6.65	At most 1*
NGA	0.556824	15.41	20.04	None**
NGA	0.178622	3.76	6.65	At most 1*
SEN	0.370831	15.41	20.04	None*
SEN	0.152277	3.76	6.65	At most 1*
TGO	0.319886	15.41	20.04	None
TGO	0.231426	3.76	6.65	At most 1

*(**) denotes rejection of the hypothesis at 5 percent (1 percent) significance level

L.R. tests indicate 1 cointegrating equation for Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea-Bissau, Mali and Togo at 5 percent significance level

L.R. tests indicate 2 cointegrating equations for Niger, Nigeria and Senegal at 5 percent significance level

SOURCE: Author's Computation, 2010.

In general, the null of no cointegrating vector (r=0) in favour of at least one cointegrating vector is rejected at 5 percent significance level for all the countries. The results confirm the existence of long run relationship between qr_t and c_t for the ten ECOWAS countries.

The consumption-tilting parameter for each country, which is a bye-product of the regression above, is presented in Table 4.6.

Table 4.6: **Cointegrating Parameter**

Country	Consumption-Tilting Parameter, θ
BEN	0.82
BFA	0.86
CIV	0.97
GHA	0.86
GNB	0.64
MLI	0.8
NER	0.89
NGA	0.96
SEN	0.85
TGO	0.83

SOURCE: Author's Computations, 2010.

In all the cases, the parameters differ from unity ranging between 0.64 and 0.97, which indicated the presence of consumption-tilting dynamics. These results are sensible, being below unity, as would be expected for a group of borrowing developing countries and as the literature on "stages in the balance of payments" would suggest. Put differently, the fact that $\theta > 1$ for all the countries implies consumption-tilting towards the current period. This indicates that the ECOWAS countries are consuming more than their permanent net output and as a result, the observed current account deficits in most of the years covered by the study.

The fact that $\theta < 1$ implied the tendency to tilt consumption towards the present which provided evidence for the preferences of ECOWAS countries for current consumption over future consumption. In other words, the ECOWAS countries are consuming more than their permanent net output and must be running down their stock of external assets or increasing their external liabilities. This empirical evidence further complies with the observed current account deficits in these countries for most of the years covered by the study.

The next step is to compute the actual consumption-smoothing current account, $casm_t$, which we defined as the residual series from the cointegration regression above.

Tables 4.7 and 4.8 present the actual consumption-smoothing current account balances for all the countries obtained as the residual series from the regression of net output adjusted for net factor payment, qr_t, on per capita private consumption expenditure, c_t (Eq. 3.14).

Table 4.7: Actual Consumption-Smoothing Current Account Balances (1980-2006)

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1980	-15.515	-2.765	-84.091	41.607	-11.471	6.645	-14.863	70.326	-44.351	2.641
1981	-32.578	-4.537	-93.861	42.125	-0.800	0.290	-30.819	-42.552	-52.225	9.582
1982	-22.545	-8.224	-54.169	43.393	-15.388	1.476	-11.696	-50.1875	-26.980	0.379
1983	-7.511	-5.969	-43.685	38.408	2.835	2.180	0.784	-18.891	-25.060	16.115
1984	3.592	2.0153	46.796	30.856	-12.076	3.926	-8.595	0.966	-17.372	10.238
1985	2.735	1.550	50.607	25.275	-14.946	-14.743	-4.324	9.126	-24.6663	-0.333
1986	-4.514	-4.969	33.588	26.332	6.923	-12.215	25.270	-17.023	-1.272	-7.113
1987	-7.456	-4.245	-20.940	11.482	-5.791	-2.293	12.576	-12.341	-0.195	-5.887
1988	-10.489	12.069	-29.622	14.054	-24.998	-6.058	19.859	1.014	6.890	-2.777
1989	4.339	15.192	-83.310	8.603	-25.676	27.318	8.277	3.998	2.191	-0.033
1990	8.179	23.175	-82.572	5.830	-0.835	-3.655	-8.704	21.972	28.341	-1.514
1991	8.685	30.342	-71.904	7.104	-8.718	-0.523	7.009	-1.789	23.823	5.979
1992	0.244	16.364	-75.093	-2.239	-41.651	-2.820	15.522	-16.419	26.579	10.738
1993	0.782	25.186	-48.878	-28.687	0.992	3.095	8.318	-24.765	14.392	2.855
1994	8.134	-6.980	35.056	-4.583	16.383	-8.333	-2.053	-14.526	12.778	15.482

UNIT: Per Capital Current U.S. Dollars
SOURCE: Author’s Calculations, 2010.

Table 4.8: Actual Consumption-Smoothing Current Account Balances (1980-2006):Cont's

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1995	6.768	-8.819	17.388	-1.932	7.184	-0.632	0.425	-7.684	21.411	20.837
1996	0.600	-10.341	4.745	6.428	10.270	-2.055	4.049	55.527	29.167	7.963
1997	3.279	-11.358	82.384	-35.025	15.197	7.110	0.901	12.572	23.938	2.147
1998	14.346	-13.124	107.354	-10.319	12.564	1.285	0.262	-29.775	24.336	-1.152
1999	6.882	-11.791	87.192	-26.260	13.581	-6.290	3.600	-17.156	13.382	6.529
2000	4.340	-11.203	52.102	-22.572	13.099	4.799	1.401	43.570	-1.842	-16.216
2001	3.697	-3.313	66.520	-24.041	-5.892	-16.840	1.947	16.962	2.316	-18.085
2002	-2.238	1.448	74.738	-7.144	13.197	4.706	-0.749	-42.870	0.295	-11.117
2003	8.527	-4.044	59.063	-13.374	23.644	4.333	0.123	-15.562	-10.959	-7.566
2004	10.416	-10.425	69.476	-50.181	19.690	0.570	-2.501	16.358	-36.406	-11.975
2005	10.043	-8.182	52.739	-72.757	16.792	1.251	-1.020	78.880	-11.859	-13.080
2006	9.376	-6.312	37.745	-82.896	14.163	3.186	1.776	140.148	13.597	-3.292

UNIT: Per Capital Current U.S. Dollars
SOURCE: Author's Calculations, 2010.

The results show that in order to smooth consumption, the selected ECOWAS countries ran current account surpluses for most of the period covered. Since the current account is determined by future expectations of changes in net output, where the extent of the movement in the current account is a decreasing function of these changes, according to Eq.(3.8), the implication of these surpluses is that most of the ECOWAS countries expected their net output to fall temporarily in the future. It is worth mentioning here that reconciling these results with the overall current account deficits recorded for most countries in Tables 4.1 and 4.2 may be difficult since the results in the tables above presents only the part of the results on the overall balances that is used as a buffer to smooth consumption in the presence of shocks, leaving out the other part.

It is however imperative to investigate whether the actual consumption-smoothing series obtained above supports the underlying theory in terms of their unit root property. As noted in chapter three, both the actual consumption-smoothing current account, $casm_t$, and change in net output, Δq_t, must be stationary at level. This leads us to the next subsection.

Unit Roots Test: $casm_t$ **and** Δq_t

As stated earlier, the next step is to examine the time-series properties of $casm_t$ and Δq_t using the same ADF test. The results reported from applying the ADF tests, which did not also include either a constant or a time trend for the underlying theory to be supported, are presented in Table 4.9.

Table 4.9: **ADF Test Results:** $casm_t$ **and** Δq_t

Country	$casm_t^{\bullet\bullet}$	$\Delta q_t^{\bullet\bullet}$
BEN	-4.3580	-3.4972
BFA	-2.7024	-3.2182
CIV	-2.1343	-4.1404
GHA	-2.0564	-4.5991
GNB	-2.2753	-4.9915
MLI	-3.6630	-3.9352
NER	-3.9182	-4.6080
NGA	-2.5900	-2.6025
SEN	-2.6835	-3.4653
TGO	-2.1133	-3.7584

$\bullet\bullet$: Test in Level; Lag length is 1; Critical values are -2.6603 and -1.9552 (1 percent and 5 percent respectively).

SOURCE: Author's Computation, 2010.

Both $casm_t$ and Δq_t for all the ten countries are found to be stationary at 5 percent significance level. Hence, we can go ahead with the computation of the optimal series.

4.3.2 Computation of the Optimal Current Account Series

As noted in chapter three, the optimal current account series (CA_t^*) that will be compared with the actual consumption-smoothing balances to determine their sustainability were generated from the evaluation of the VAR model in Eq. (3.13). The results of the estimation of the model are reported in Tables 4.10 and 4.11.

Table 4.10: Optimal Current Account Series (1980-2006)

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1980	-4.788	-0.853	-25.976	12.854	-3.544	2.054	-4.595	21.728	-13.698	0.819
1981	-12.687	-2.982	-40.706	12.129	1.616	-2.451	-12.217	-19.811	-20.749	2.948
1982	-10.930	-4.541	-20.929	12.499	-4.977	-1.098	-3.496	-23.506	-7.249	-2.2986
1983	-3.481	-3.362	-16.257	11.277	2.035	0.726	-1.592	-14.221	-9.355	4.311
1984	1.026	-0.074	16.204	9.471	-5.585	1.136	-5.145	-3.409	-6.964	2.723
1985	0.681	1.052	15.915	6.328	-4.514	-5.285	-1.991	4.016	-5.649	0.343
1986	0.909	1.229	19.198	12.394	3.180	-2.846	11.186	-12.675	8.269	0.480
1987	-0.424	0.100	-4.507	-0.034	-1.000	0.640	5.846	-1.985	4.961	-0.043
1988	-3.001	5.503	-10.453	4.258	-9.376	-2.060	4.314	-1.339	4.134	1.707
1989	0.564	3.843	-29.489	1.770	-5.757	8.443	1.275	2.273	-3.450	-1.018
1990	5.468	9.460	-20.517	3.410	2.413	0.544	-0.647	8.758	15.604	0.146
1991	2.341	8.906	-24.812	3.644	-2.712	-0.384	1.463	-2.939	4.888	2.218
1992	-3.107	-1.152	-22.483	-1.819	-16.885	1.220	4.013	-3.930	9.967	6.077
1993	3.973	8.678	-16.225	-14.451	3.451	-0.178	-2.025	-13.276	0.172	-5.055
1994	-3.883	-5.513	-0.546	-2.779	6.067	-7.951	-1.486	-2.544	-7.785	1.591

SOURCE: Author's Computation, 2010.

Table 4.11: Optimal Current Account Series (1980-2006):Cont's

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1995	5.518	-0.729	14.361	2.578	2.737	3.844	2.147	0.723	11.537	9.980
1996	1.603	-2.029	3.947	3.077	3.414	-0.316	1.557	21.692	8.759	2.981
1997	-0.264	-4.881	24.940	-12.423	4.080	1.275	-1.370	2.768	5.541	1.814
1998	5.896	-3.935	38.375	-1.084	2.364	0.121	0.964	-13.097	7.935	-0.906
1999	1.710	-3.095	22.837	-6.745	3.865	-2.627	0.354	-5.183	3.018	2.237
2000	-0.880	-4.533	8.789	-15.306	3.711	1.207	-0.869	16.319	-2.626	-9.083
2001	1.381	0.273	20.765	-7.372	-2.968	-5.789	0.982	2.630	0.891	-6.596
2002	1.772	1.745	25.159	0.230	4.458	6.318	0.222	-13.743	2.152	-1.638
2003	6.662	2.224	25.811	-3.473	8.025	3.863	2.222	-0.746	0.975	-0.865
2004	5.627	-1.383	26.488	-14.556	6.770	2.074	-0.349	10.098	-8.224	-1.546
2005	2.728	-2.171	17.807	-19.180	5.249	1.004	0.326	33.703	-0.984	-3.304
2006	1.648	-3.638	13.750	-23.643	4.944	2.645	1.586	56.836	3.251	-1.475

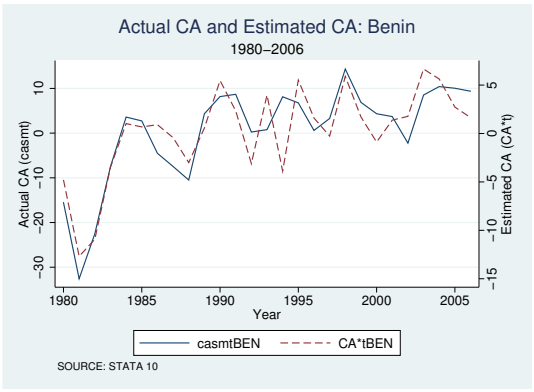
SOURCE: Author's Computation, 2010.

The implication of these results is that for ECOWAS countries to be able to achieve sustainability in their current account, they must expect their net output to fall temporarily in the future for most of the years of study and hence record more surpluses than deficits in their current account. When compared with the results obtained on the countries' actual consumption-smoothing current account balances in Tables 4.7 and 4.8, one would notice that they actually towed this line as they ran more surpluses than deficits.

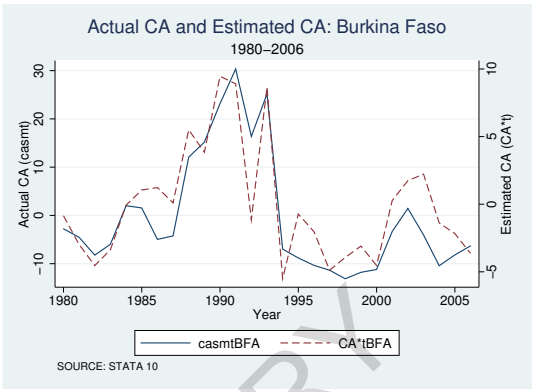
4.3.3 Test of Sustainability

The test of whether the current account balances of ECOWAS countries were sustainable or not between 1980 and 2006 was carried out by using two criteria. The first criterion is by visual inspection after plotting the actual current account for each country against the optimal current account from the intertemporal model (Adedeji, 2001; Opoku-Afari, 2005; and Lau et al., 2007). The second criterion will compare the optimal series with the actual or observed series in terms of their correlation coefficient (Adedeji, 2001) and the probability of the equality of their standard deviation (an idea borrowed from Matrix Laboratory or MATLAB). The closer the correlation is to one and the closer the probability is to zero, the closer the actual balances are to been sustainable.

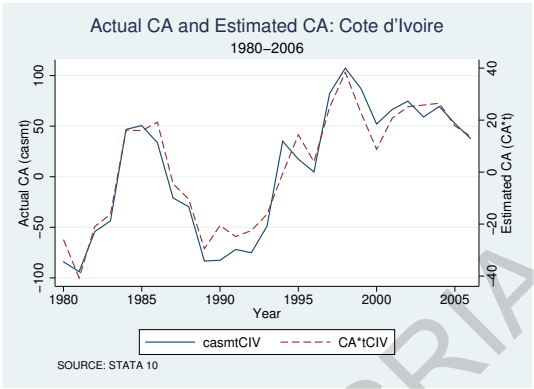
The results arrived at by applying the two criteria to the selected countries are presented below:



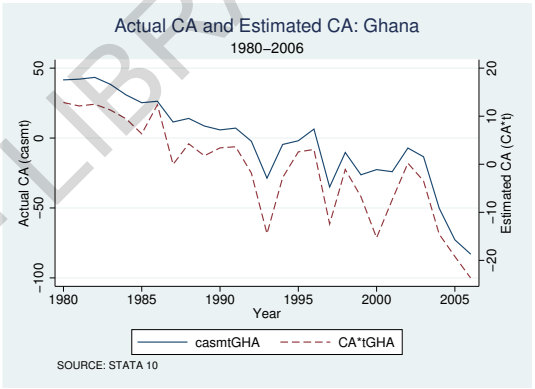
(a)



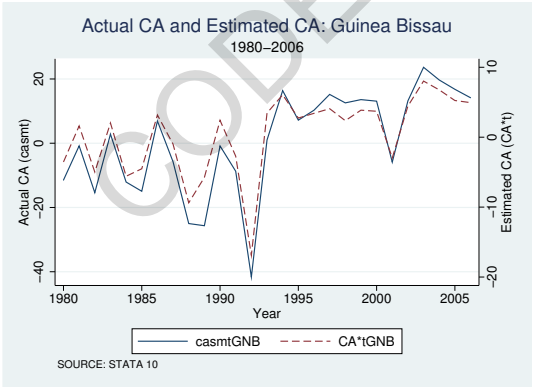
(b)



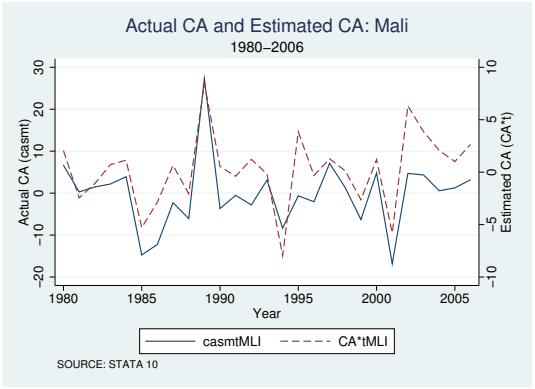
(c)



(d)

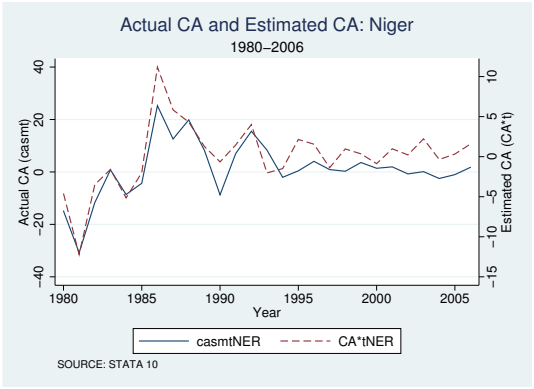


(e)

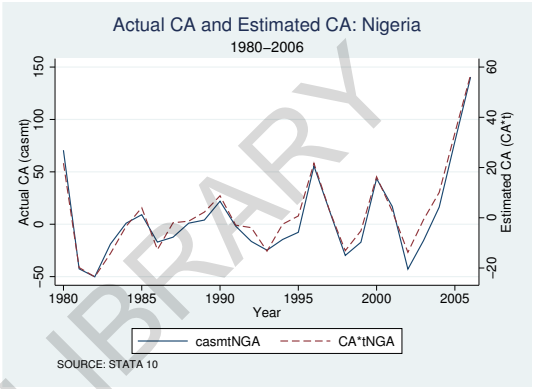


(f)

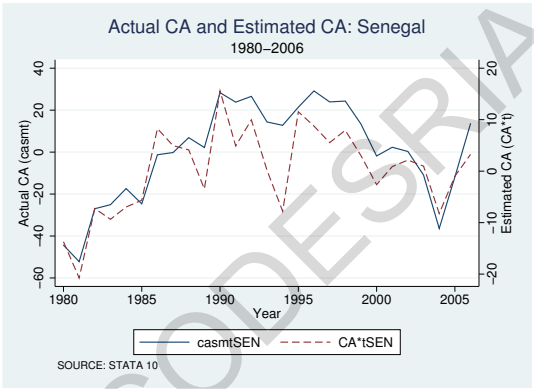
Figure 4.3: Actual Versus Optimal Current Account Series



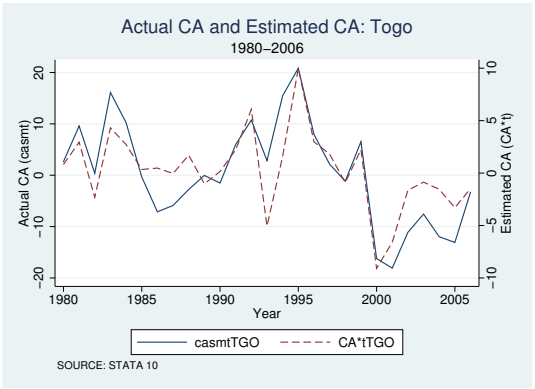
(a)



(b)



(c)



(d)

Figure 4.4: Actual Versus Optimal Current Account Series: Cont's

From the visual inspection of figures 4.3 and 4.4 above, it is quite clear that the forecast of the current account implied by the intertemporal model is able to track the behaviour of the actual current account for Nigeria closely, while it is not so for all the other countries. For countries like Burkina Faso, Guinea-Bissau, Mali and Niger, the optimal current account was in excess of the actual current account for most of the period of study, while the reverse is the case for Ghana and Senegal, the actual series been in excess. On the part of Benin, Cote d'Ivoire and Togo, one was in excess of the other for about half of the period of the study while the other was in excess for the other half. So in terms of the first criterion, the current account of Nigeria appear to be sustainable, while those of the others did not. However, we cannot rely solely on this criterion to determine the sustainability or otherwise of the countries' current account. This leads us to employing the second criterion.

Table 4.12: Sustainability Results

Country	CC	Equality of SD		
		df	F-statistic	P-value
BEN	0.8596	26, 2	5.336	0.9990
BFA	0.8943	26, 2	8.475	0.0001
CIV	0.8750	26, 2	8.544	0.9009
GHA	0.9116	26, 2	10.203	0.0000
GNB	0.9739	26, 2	8.084	0.9900
MLI	-0.5236	26, 2	5.650	0.8090
NER	0.0918	26, 2	7.104	0.9990
NGA	0.9741	26, 2	5.995	0.0000
SEN	0.9697	26, 2	7.752	0.9090
TGO	0.0267	26, 2	6.905	0.5170

CC = Correlation Coefficient between the Actual and Optimal series.
SD = Standard Deviation.
df= degrees of freedom.
P-value= Probability value
SOURCE: Author's computation, 2010.

The results showed that while the optimal and actual current account of Burkina Faso, Ghana and Nigeria were equal as implied by their correlation coefficients (0.89, 0.91 and 0.97 respectively) as well as the probability values of the equality of their standard deviations (P=0.00 respectively), it was not so for the other countries. The correlation coefficients for Mali, Niger and Togo were low (-0.52, 0.09 and 0.03 respectively) while the probability values of the equality of their standard deviations were far from zero (P=0.81, 1.00 and 0.52 respectively). The findings also showed that the probability values for Benin, Cote d'Ivoire, Guinea-Bissau and Senegal were far from zero (P=1.00, 0.90, 0.99 and 0.91 respectively).

Therefore by combining these two criteria, we conclude that while the current account balances of Burkina Faso, Ghana and Nigeria were sustainable, those of the other countries were not sustainable over the period 1980 to 2006.

4.4 Granger Causality Test

The issue of granger-causality between the actual current account balances and changes in net output is an important implication of the intertemporal consumption-smoothing model. Towards this end, we used the VAR models in equations (3.15) and (3.16). The results of the tests are presented in Table 4.13.

Table 4.13: **F-test**

Country	F-test for lagged casm		F-test for lagged Δq	
	F(1, 24)	*Prob* > *F*	F(1, 24)	*Prob* > *F*
BEN	3.82	0.0625	0.05	0.8293
BFA	4.54	0.0435	0.32	0.5761
CIV	4.82	0.0361	0.94	0.3416
GHA	1.20	0.2839	0.62	0.4388
GNB	4.30	0.0491	0.39	0.5393
MLI	1.75	0.1980	0.23	0.6380
NER	0.22	0.6434	1.26	0.2720
NGA	0.43	0.5182	0.65	0.4270
SEN	1.56	0.2233	0.09	0.7608
TGO	1.33	0.2594	3.95	0.0583

SOURCE: Author's Computation, 2010.

The deduction that can be made from Table 4.13 is that a one-way causality from actual consumption-smoothing current account to changes in net output existed for Burkina Faso, Cote d'Ivoire and Guinea-Bissau. The implication of these findings is that the sequence of current account deficits recorded for Burkina Faso, Cote d'Ivoire and Guinea-Bissau indicate expected lower income growth. On the other hand, there exists no causality between actual current account and changes in net output for Benin, Ghana, Mali, Niger, Nigeria, Senegal and Togo which implies that expectations of higher output do not necessarily result in current account deficit in the current period in these countries. These findings however negate existing studies like Ghosh and Ostry (1995) on Ghana, Nigeria and Senegal; Adedeji (2001) on Nigeria; and Opoku-Afari (2005) on Ghana.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents a summary of the study, the major conclusions drawn from it and the policy implications. Following this introductory section, the study and its major findings are summarized and their policy implications are discussed.

5.2 Summary of Study

The main objective of the study was to analyze the sustainability or otherwise of the current account of selected ECOWAS countries between 1980 and 2006.

To achieve this objective, the necessary background to the study was laid while the problems were identified and justified accordingly in chapter one. Three specific objectives were also outlined as means of realizing the broad objective.

In chapter two, we undertook a detailed review of literature where we identified the major gap in the existing literature. The review showed that while studies have examined current account positions in some ECOWAS countries individually, systematic studies on ECOWAS as a group are yet to emerge particularly given the increased emphasis on establishing a monetary union in the region. This is the gap this study attempted to fill in the contemporary ECOWAS economies.

Chapter three presented the methodology used in achieving the specific objectives of the study. The theoretical framework was adapted from the Intertemporal Model of the Current Account as put together by Adedeji (2001). The estimating model for the study was then derived from this framework. This model yielded the optimal current account series which was compared with the actual balances to determine the excessiveness or otherwise of the current account.

Three tasks were carried out in chapter four. One, we examined the trend and pattern of the selected countries' current account balances for the period 1980 to 2006 and found that the actual current account balances for the ten ECOWAS countries were in deficits for most of the period covered which made all of them net debtors to the rest of the world. Two, we presented empirical results after carrying out all the necessary tests, namely, the unit root test, cointegration test and the test of sustainability which showed that out of the ten ECOWAS countries selected for the study, only the current account of Burkina Faso, Ghana and Nigeria were sustainable. Lastly, we determined the direction of causality

between the actual current account balances and changes in net output which revealed that a one-way causality from actual consumption-smoothing current account to changes in net output existed for Burkina Faso, Cote d'Ivoire and Guinea-Bissau.

5.3 Conclusion

This study has investigated the sustainability or excessiveness of selected ECOWAS countries' current account deficits between 1980 and 2006. Excessiveness of the current account position was examined through a model that yields optimal current account series which are compared with actual current account balances. The study found out that the model tracked historical data for three (Burkina Faso, Ghana and Nigeria) out of the ten countries over the period 1980 to 2006. Hence, only these countries' current account were sustainable. We therefore conclude that

5.4 Recommendation

This study has established that it might be difficult, if not impossible, for the ECOWAS region to achieve its major objective of establishing a monetary union in the region due to the excessiveness of some of the member countries' current account deficits, which studies have blamed on a few fundamental structural problems. Important among them is the fact that the structure of these economies has virtually remained the same for the past two decades and over (Opoku-Afari, 2005). They have been relying on the same sources

of export revenues such as oil for Nigeria, Cotton and cocoa for Cote d'Ivoire as well as gold and cocoa for Ghana. It is therefore reasonable to say that trade deficits constitute one of the facors that have driven current account deficits in these economies (Opoku-Afari, 2005). This therefore makes the critical importance of trade in ensuring the sustainability of current account deficits in these countries evident. Policy makers should therefore see the need for a complete structural change aimed at improving trade deficit, particularly export drive aimed at increasing access to international market, which Opoku-Afari (2005) argue is only possible through improvement in competitiveness achieved by properly aligned real exchange rate as well as quality standards acceptable on the international markets. This in conjunction with improved local firm level competitiveness as a result of stable and enabling macroeconomic and political environment is the needed recipe for a structural change aimed at improving exports and correcting the worsening trade deficit driving the current account deficit. Ultimately, it would make current account deficits in ECOWAS countries sustainable and not fragile (over-depending on aid flows).

Again, the financial and capital markets should be developed to boost the confidence of investors (both domestic and foreign) in the economies thereby encouraging investment. It is also incumbent on policy makers to properly manage the massive capital inflows into these economies in order not to harm the real sector. Now that ECOWAS countries have been presented with the lifeline of exiting the debt trap by securing debt relief from their foreign creditors such as the Paris Club (IMF, 1999; UNOCI, 2010), future borrowings have

to be scrutinized to ensure that terms are acceptable and in the interest of these countries.

5.5 Area for Future Research

As noted in chapter one, an important implication of the intertemporal model of the current account is that the current account must granger-cause changes in net output. However, empirical results of this study showed that this hypothesis was supported in only three out of the ten countries selected for this study. These results also negate the findings of some existing studies. Why is this so?

One reason that has been suggested in the literature why there may be inconsistency between data and theoretical prediction of the model is the possibility of the presence of a structural break. Hence, it is suggested that future studies in this area should try and explore potential presence of structural breaks in the data of the selected countries.

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Appendix A

DERIVATION OF THE INTERTEMPORAL (DYNAMIC) BUDGET CONSTRAINT

In this appendix, we show how Eq.(3.3) is obtained from Eq.(3.2)

Recall from Eq.(3.2) that

$$CA \equiv B_{t-1} - B_t = rB_t + Y_t - C_t - I_t - G_t$$

Let $X_t = (C_t + I_t + G_t)$

This implies that:

$$B_{t-1} - B_t = rB_t + Y_t - X_t$$

and

$$B_t + rB_t = B_{t-1} - (Y_t - X_t)$$

Hence,

$$B_t = (\frac{1}{1+r})B_{t-1} - (\frac{1}{1+r})(Y_t - X_t) \tag{3.2a}$$

Iterating Eq.(3.2a) backwards by one period, we get:

$$B_{t-1} = (\frac{1}{1+r})B_{t-2} - (\frac{1}{1+r})(Y_{t-1} - X_{t-1}) \tag{3.2b}$$

Substituting Eq.(3.2b) into Eq.(3.2a), we have:

$$B_t = (\frac{1}{1+r})\left[(\frac{1}{1+r})B_{t-2} - (\frac{1}{1+r})(Y_{t-1} - X_{t-1})\right] - (\frac{1}{1+r})(Y_t - X_t)$$

This implies that:

$$B_t = (\frac{1}{1+r})^2 B_{t-2} - (\frac{1}{1+r})^2(Y_{t-1} - X_{t-1}) - (\frac{1}{1+r})(Y_t - X_t) \tag{3.2c}$$

Iterating to time n, we have:

$$B_t = (\frac{1}{1+r})^n B_{t-n} - \sum_{i=0}^{n}\left(\frac{1}{1+r}\right)^{i+1}(Y_{t-i} - X_{t-i}) \tag{3.2d}$$

Setting n $\rightarrow \infty$, we get

$$B_t = (\frac{1}{1+r})^{\infty} B_{t-\infty} - \sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i+1}(Y_{t-i} - X_{t-i}) \tag{3.2e}$$

Taking the expectation of Eq.(3.2e), we have

$$E_t(B_t) = E_t\left[(\frac{1}{1+r})^{\infty} B_{t-\infty}\right] - E_t\left[\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i+1}(Y_{t-i} - X_{t-i})\right] \tag{3.2f}$$

By imposing a solvency or tranversality condition to rule out the possibility of bubbles, the first term on the right hand side reduces to zero. Hence, Eq.(3.2f) becomes:

$$E_t(B_t) = -E_t\left[\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i+1}(Y_{t-i} - X_{t-i})\right] \tag{3.2g}$$

Multiplying Eq.(3.2g) through by (1+r), we have

$$E_t\left[(1+r)B_t\right] = -E_t\left[\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i}(Y_{t-i} - X_{t-i})\right] \tag{3.2h}$$

Simplifying Eq.(3.2h), we have:

$$E_t\left[\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i}Y_{t-i} + (1+r)B_t\right] = E_t\left[\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i}X_{t-i}\right] \tag{3.2i}$$

By representing the starting or initial period by τ instead of zero, Eq.(3.2i) becomes

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}Y_t + (1+r)B_t\right] = E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}X_t\right] \tag{3.2j}$$

Recall that $X_t = (C_t + I_t + G_t)$. Hence, the Intertemporal (Dynamic) Budget Constraint is expressed as:

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}Y_t + (1+r)B_t\right] = E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(C_t + I_t + G_t)\right] \tag{3.3}$$

Appendix B

Deriving the Optimal Path of Consumption Using the Hamiltonian Approach

Given a quadratic utility function of the form:

$$U(C_t) = \frac{1}{2}C_t^2 \tag{3.3a}$$

Substituting Eq.(3.3a) into (3.1), the problem amounts to:

$$\max_{C_t} E_t \left\{ \sum_{t=\tau}^{\infty} \beta^{t-r} (\frac{1}{2}C_t^2) \right\}; 0 < \beta < 1 \tag{3.3b}$$

s.t.

$$B_{t-1} - B_t = rB_t + Y_t - C_t - I_t - G_t \tag{3.3c}$$

The Lagrangian is then given as:

$$L = E_t \sum_{t=\tau}^{\infty} \beta^{t-r} \left\{ \frac{1}{2}C_t^2 + \beta\lambda_{t-1} \left[(rB_t + Y_t - C_t - I_t - G_t) - (B_{t-1} - B_t) \right] \right\} \tag{3.3d}$$

Define the discrete form Hamiltonian function:

$$H(B_t, C_t) = E_t \left\{ \frac{1}{2} C_t^2 + \beta \lambda_{t-1} \left[rB_t + Y_t - C_t - I_t - G_t \right] \right\} \tag{3.3e}$$

which can be maximized by satisfying the conditions:

$$\frac{\partial L}{\partial C_t} = \frac{\partial H}{\partial C_t} = 0; t = \tau, \tau + 1, ..., \infty$$

$$\frac{\partial L}{\partial B_t} = \frac{\partial H}{\partial B_t} + \beta \lambda_{t-1} - \lambda_t = 0; t = \tau + 1, \tau + 2, ..., \infty$$

$$\frac{\partial L}{\partial \lambda_{t-1}} = \frac{\partial H}{\partial \lambda_{t-1}} - (B_{t-1} - B_t) = 0; t = \tau, \tau + 1, ..., \infty$$

More succinctly:

$$\frac{\partial H}{\partial C_t} = 0; t = \tau, \tau + 1, ..., \infty$$

$$\beta \lambda_{t-1} - \lambda_t = -\frac{\partial H}{\partial B_t}; t = \tau + 1, \tau + 2, ..., \infty$$

$$B_{t-1} - B_t = \frac{\partial H}{\partial \lambda_{t-1}} = rB_t + Y_t - C_t + I_t + G_t; t = \tau, \tau + 1, ..., \infty$$

The transversality condition is

$$\lim_{t \to \infty} [\lambda(t).B(t)] = 0$$

Our optimality conditions are therefore:

$$\frac{\partial H}{\partial C_t} = C_t - \beta \lambda_{t-1} = 0 \tag{3.3f}$$

$$\beta\lambda_{t-1} - \lambda_t = -\beta\lambda_{t-1}r \tag{3.3g}$$

$$B_{t-1} - B_t = (rB_t + Y_t - C_t + I_t + G_t) \tag{3.3h}$$

From Eq.(3.3f),

$$C_t = \beta\lambda_{t-1}$$

This implies that

$$\lambda_{t-1} = \frac{C_t}{\beta} \tag{3.3i}$$

Iterating Eq.(3.3i) forward by one period, we have:

$$\lambda_t = \frac{C_{t+1}}{\beta} \tag{3.3j}$$

Substituting Eqs.(3.3i) and (3.3j) into (3.3g), we get:

$$\beta(\frac{C_t}{\beta}) - \frac{C_{t+1}}{\beta} = -\beta(\frac{C_t}{\beta})r$$

This implies that

$$C_t + C_t r = \frac{C_{t+1}}{\beta}$$

Then

$$(1+r)C_t = \frac{C_{t+1}}{\beta} \tag{3.3k}$$

If we assume that

$$\beta = \frac{1}{1+r}$$

Eq.(3.3k) becomes:

$$C_t = C_{t+1} = C^* \tag{3.3l}$$

Eq.(3.3l) states that consumption this period is the same as consumption next period and so on, yielding the optimal level of consumption (C^*). This emphasizes the notion of consumption-smoothing.

If we now substitute Eq.(3.3l) into (3.3) in the main work, we have:[5]

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} Y_t + (1+r)B_t\right] = E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(C_t^* + I_t + G_t)\right] \tag{3.3m}$$

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} Y_t + (1+r)B_t\right] = E_t\left[(\frac{1+r}{r})C_t^* + \sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(I_t + G_t)\right]$$

This implies that

$$C_t^* = (\frac{r}{1+r})E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} Y_t + (1+r)B_t - \sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(I_t + G_t)\right] \tag{3.3n}$$

Therefore

$$C_t^* = \left[rB_t + (\frac{r}{1+r})\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t\,(Y_t - I_t - G_t)\right]$$

The equation above is the same as Eq.(3.4) in the main work which gives the optimal path of consumption. It should however be noted that the equation emphasizes only the

[5]Recall that Eq.(3.3) is given as:

$$E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} Y_t + (1+r)B_t\right] = E_t\left[\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}(C_t + I_t + G_t)\right]$$

consumption smoothing component of the current account while leaving out the other component–the consumption-tilting component. The equation can therefore be respecified to incorporate this other component.

Following Adedeji (2001), the alternative specification is given as:

$$c_t^* = \frac{1}{\theta}\left\{\left[rB_t + \frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t(Y_t - I_t - G_t)\right]\right\} + \varsigma_t$$

where θ is the long-run cointegrating parameter between net output and consumption.[6]

[6]In the case where β is different from r, given the quadratic utility function, θ is given by:

$$\theta = \frac{\beta(1+r)r}{\beta(1+r)^2 - 1}$$

In this case, there are two factors driving movements in the current account balance: consumption smoothing and tilting. when $\theta < 1$, the agent will tilt consumption towards the present. Accordingly, economic agents have an incentive to tilt (shift) consumption to the present, run current account deficits and increase the economy's level of net liabilities. This will eventually lower consumption over time. Conversely, if $\theta > 1$, the agent would tilt consumption towards the future. Economic agents thus have an incentive to tilt consumption to the future, run current account surpluses and lower the economy's level of net liabilities. This will gradually raise consumption over time. If $\theta = 1$, the consumption-tilting component of the current account is zero.

Appendix C

OTHER MANIPULATIONS INVOLVING THE INTERTEMPORAL MODEL

In this appendix, we show how Eq.(3.8) is obtained from Eq.(3.7).

According to Obsfeld and Rogoff (1996), we can define the relationship between the permanent value of a variable and its current value as:

$$\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}\hat{Z}_{\tau}=\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}Z_{t}$$

But

$$\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}\hat{Z}_{\tau}=\frac{1+r}{r}\hat{Z}_{\tau}$$

This implies that the permanent value of Z is given by:

$$\hat{Z}_{\tau}=\frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}Z_{t}$$

Using this definition, we can rewrite Eq.(3.7) as:

$$CA_t^* = Y_t - \frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t Y_t + \frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t I_t + \frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t G_t - I_t - G_t \quad (3.7a)$$

$$CA_t^* = \left[Y_t - \frac{r}{1+r}\left(\frac{1+r}{r}\right)E_t\hat{Y}_t\right] - \left[I_t - \frac{r}{1+r}\left(\frac{1+r}{r}\right)E_t\hat{I}_t\right] - \left[G_t - \frac{r}{1+r}\left(\frac{1+r}{r}\right)E_t\hat{G}_t\right] \quad (3.7b)$$

$$CA_t^* = \left(Y_t - E_t\hat{Y}_t\right) - \left(I_t - E_t\hat{I}_t\right) - \left(G_t - E_t\hat{G}_t\right)$$

This implies that:

$$CA_t^* = (Y_t - I_t - G_t) - E_t\left(\hat{Y}_t - \hat{I}_t - \hat{G}_t\right) \quad (3.7c)$$

$$CA_t^* = Q_t - E_t\hat{Q}_t \quad (3.7d)$$

where Q_t represents net output, and is defined as gross domestic output less gross investment and government expenditure.

That is

$$Q_t = Y_t - I_t - G_t$$

The permanent value of net output, $\hat{Q}$ can be expressed as:

$$\hat{Q} = \frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_t Q_t \quad (3.7e)$$

Substituting Eq.(3.7e) into Eq.(3.7d) and taking τ as the current period yields:

$$CA_{\tau}^{*} = Q_{\tau} - E_{\tau}\frac{r}{1+r}\sum_{t=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau}E_{\tau}Q_{t} \tag{3.7f}$$

We can set $\frac{1}{1+r} = \psi$. This implies that $\frac{r}{1+r} = 1-\psi$. Therefore, Eq.(3.7f) can be written as:

$$CA_{\tau}^{*} = Q_{\tau} - (1-\psi)\sum_{t=\tau}^{\infty}\psi^{t-\tau}E_{\tau}Q_{t} \tag{3.7g}$$

$$CA_{\tau}^{*} = Q_{\tau} - E_{\tau}\left[\sum_{t=\tau}^{\infty}\psi^{t-\tau}Q_{t} - \sum_{t=\tau}^{\infty}\psi^{t-\tau+1}Q_{t}\right] \tag{3.7h}$$

$$CA_{\tau}^{*} = Q_{\tau} - Q_{\tau}E_{\tau}\left[\sum_{t=\tau+1}^{\infty}\psi^{t-\tau}Q_{t} - \sum_{t=\tau}^{\infty}\psi^{t-\tau+1}Q_{t}\right] \tag{3.7i}$$

Note that:

$$\sum_{t=\tau}^{\infty}\psi^{t-\tau+1}Q_{t} = \sum_{t=\tau+1}^{\infty}\psi^{t-\tau}Q_{t-1}$$

This implies that Eq.(3.7h) can be expressed as:

$$CA_{\tau}^{*} = -E_{\tau}\left[\sum_{t=\tau+1}^{\infty}\psi^{t-\tau}Q_{t} - \sum_{t=\tau+1}^{\infty}\psi^{t-\tau}Q_{t-1}\right] \tag{3.7j}$$

$$CA_{\tau}^{*} = -E_{\tau}\left[\sum_{t=\tau+1}^{\infty}\psi^{t-\tau}\left(Q_{t} - Q_{t-1}\right)\right] \tag{3.7k}$$

But $\psi = \frac{1}{1+r}$.

Therefore, Eq.(3.7k) becomes:

$$CA_{\tau}^{*} = -\sum_{t=\tau+1}^{\infty}\left(\frac{1}{1+r}\right)^{t-\tau} E_{\tau}(Q_t - Q_{t-1}) \tag{3.7l}$$

It was from Eq.(3.7l) that Eq.(3.8) in the main work was derived,

where (ΔQ_t)=$(Q_t - Q_{t-1})$.

Appendix D

DATA ON Δq_t, qr_t AND c_t

In this appendix, we present data on change in net output, Δq_t; net output adjusted for net factor payment, qr_t; and Per capita private consumption expenditure, c_t, that were in empirical analysis.

Table D.1: Data on Change in Net Output, Δq_t (1980-2006)

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1980	0	-111.33	456.57	-403.85	-208.34	59.46	-5.16	452.74	-103.18	-256.89
1981	-35.44	-21.33	-157.95	-11.93	25.14	-34.28	-36.33	-90.02	-62.28	-0.2
1982	-53.52	-27.00	-56.59	-12.22	-3.00	-20.97	1.62	-108.03	14.62	-32.61
1983	-15.69	-20.49	-37.25	-7.94	15.65	0.69	-24.69	-113.15	-21.77	-9.01
1984	-1.16	-9.40	23.63	-0.83	-25.00	-1.06	-33.54	-50.03	-21.55	-5.96
1985	-2.23	7.72	3.86	-19.97	1.40	-9.88	-8.81	16.10	26.56	5.98
1986	31.02	37.25	119.01	57.42	14.06	12.47	45.63	-100.05	116.79	36.06
1987	5.29	19.01	26.47	-48.32	10.66	18.16	26.49	24.6	67.71	23.9
1988	3.18	23.93	-17.55	-1.16	-22.3	-2.57	-24.49	-22.31	27.04	34.53
1989	-10.5	-11.47	-50.64	-12.00	29.33	0.06	-17.23	13.97	-55.65	-13.64
1990	39.63	31.03	67.27	21.66	36.04	22.54	27.57	26.56	92.37	8.22
1991	-4.65	-6.29	-35.08	19.50	-0.24	-3.06	-9.42	-32.21	-33.30	4.95
1992	-42.94	-83.70	9.60	-15.25	-54.19	28.16	-10.50	15.36	23.71	37.16
1993	50.27	12.11	-15.2	-75.42	42.42	-15.32	-61.93	-75.90	-57.62	-80.09
1994	-86.26	-45.29	-153.34	-18.42	13.60	-72.53	-11.46	26.17	-158.2	-43.05

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table D.2: **Data on Change in Net Output, Δq_t (1980-2006):Cont's**

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1995	46.18	26.89	121.26	42.78	7.01	54.44	27.2	41.71	66.39	47.75
1996	19.08	15.69	33.49	14.68	3.29	4.27	4.17	61.21	-3.36	6.98
1997	-17.25	-18.52	-6.79	-21.69	-8.25	-12.44	-22.20	-15.07	-24.98	15.47
1998	19.71	1.58	70.38	28.33	-20.42	-3.74	11.93	-52.64	5.65	-7.47
1999	-5.64	7.35	-55.17	18.37	-4.43	-9.25	-10.2	1.52	-15.04	2.92
2000	-29.97	-14.48	-98.46	-112.42	-4.49	-3.74	-17.52	38.57	-27.73	-54.98
2001	3.19	17.47	2.98	0.70	-15.46	-7.95	5.16	-35.21	2.37	-13.66
2002	33.17	17.49	28.01	32.82	5.17	65.57	6.14	-6.81	27.78	24.16
2003	54.27	46.82	102.09	8.84	9.76	34.01	29.49	54.71	58.78	19.8
2004	32.44	24.75	67.85	12.68	9.30	25.55	5.75	68.00	40.72	28.98
2005	-5.09	4.78	20.50	44.33	0.87	8.29	8.68	125.90	36.12	9.86
2006	-5.02	5.51	21.57	43.55	10.28	8.26	11.8	105.85	39.46	10.28

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table D.3: Data on Net Output Adjusted for Net Factor Payment, qr_t (1980-2006)

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1980	287.88	223.81	657.56	323.75	54.21	184.26	254.02	577.96	316.59	187.26
1981	252.39	201.64	499.27	312.38	84.76	147.75	212.16	511.32	253.22	186.58
1982	198.18	174.60	443.47	300.40	80.91	128.13	213.75	410.72	267.32	155.66
1983	180.77	154.17	393.56	290.44	98.94	128.44	193.95	303.28	248.05	145.85
1984	175.88	145.51	439.82	288.81	74.34	128.59	158.64	252.08	223.38	141.85
1985	175.77	153.15	427.65	266.61	93.42	118.23	151.75	265.41	250.42	148.78
1986	205.91	190.46	548.51	320.82	89.00	130.95	200.87	160.76	362.40	183.65
1987	230.83	209.05	559.71	271.94	91.67	149.72	221.72	174.17	426.26	206.27
1988	234.98	232.48	539.79	271.53	67.82	146.49	199.47	174.73	451.46	241.30
1989	221.96	221.20	456.63	260.65	95.11	176.13	190.15	170.96	398.40	230.37
1990	261.72	252.80	511.78	282.88	133.14	170.40	208.78	189.34	492.52	241.16
1991	258.84	246.32	497.25	302.00	127.15	168.86	201.54	162.65	460.12	246.25
1992	213.46	162.78	512.00	287.91	76.71	196.54	192.23	173.58	491.86	284.38
1993	265.03	174.32	498.30	212.31	117.92	182.23	131.12	104.65	427.9	204.72
1994	179.80	129.00	389.13	194.14	133.00	107.12	119.04	131.38	275.78	156.09

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table D.4: **Data on Net Output Adjusted for Net Factor Payment, qr_t (1980-2006):Cont's**

1995	224.70	156.36	497.46	235.84	137.08	159.25	144.34	174.98	341.18	205.71
1996	243.72	173.76	537.51	250.12	140.32	163.40	150.85	236.64	347.01	216.90
1997	229.14	154.34	544.94	229.15	135.58	150.78	128.71	222.04	322.32	232.05
1998	251.41	155.87	613.85	256.68	115.94	147.39	141.20	164.63	329.76	225.90
1999	245.51	163.01	556.61	274.61	111.65	138.81	131.42	178.52	311.23	226.06
2000	216.07	148.57	466.38	163.23	108.85	136.43	114.24	181.24	283.92	173.07
2001	218.09	165.94	474.17	166.00	91.09	117.23	119.57	162.39	287.99	159.49
2002	250.72	183.82	499.33	197.91	101.63	177.20	125.01	139.97	312.54	185.19
2003	303.03	230.68	599.95	205.21	110.50	218.10	155.37	180.47	370.39	204.80
2004	335.74	254.82	668.54	216.51	119.29	241.34	161.15	221.87	408.79	233.14
2005	332.35	259.42	689.05	264.07	120.00	247.27	170.23	343.79	445.40	241.89
2006	329.54	264.54	710.64	314.54	120.44	253.95	181.54	464.67	483.09	264.63

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table D.5: Data on Per Capita Private Consumption Expenditure, c_t (1980-2006)

Year	BEN	BFA	CIV	GHA	GNB	MLI	NER	NGA	SEN	TGO
1980	370.13	264.13	765.61	329.99	102.32	222.94	303.41	529.72	424.29	222.33
1981	347.65	240.35	612.29	316.09	133.29	185.08	274.18	577.98	359.05	213.14
1982	269.28	213.13	513.71	300.59	150.02	158.97	254.40	480.96	345.96	187.00
1983	229.69	186.68	451.37	294.78	149.72	158.49	217.97	336.19	321.04	156.23
1984	210.19	167.28	405.72	301.71	134.62	156.48	188.71	262.04	283.01	158.49
1985	211.10	176.73	389.22	282.26	168.82	166.91	176.11	267.43	323.37	179.57
1986	256.71	227.83	531.55	344.43	127.86	179.70	198.15	185.52	427.49	229.72
1987	290.70	248.66	599.41	304.63	151.83	190.80	236.00	194.63	501.29	255.48
1988	299.47	256.94	587.81	301.14	144.61	191.48	202.68	181.27	522.60	293.93
1989	265.49	240.16	557.39	294.80	188.17	186.79	205.23	174.22	465.75	277.46
1990	309.30	267.69	613.55	324.04	208.72	218.47	245.41	174.65	545.64	292.24
1991	305.18	251.78	587.54	344.90	211.67	212.61	219.51	171.59	512.87	289.34
1992	260.12	170.69	606.06	339.36	184.39	250.24	199.40	198.27	546.93	329.53
1993	322.38	173.85	564.86	281.86	182.17	224.85	138.57	135.05	486.07	243.10
1994	209.42	158.52	365.52	232.43	181.68	144.92	136.64	152.26	309.16	169.32

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.

Table D.6: **Data on Per Capita Private Consumption Expenditure, c_t (1980-2006):Cont's**

1995	265.87	192.56	495.59	278.10	202.36	200.68	162.39	190.61	375.89	222.64
1996	296.6	214.62	549.98	285.02	202.61	207.68	165.66	188.99	373.63	251.61
1997	275.55	193.17	477.50	308.97	187.55	180.33	144.22	218.58	350.74	276.86
1998	289.20	197.01	522.86	312.28	161.04	183.39	159.04	202.87	359.03	273.42
1999	291.11	203.78	484.59	351.89	152.78	182.13	144.24	204.19	350.12	264.37
2000	258.30	186.26	427.67	217.31	149.17	165.22	127.32	143.66	335.92	227.95
2001	261.55	197.31	420.82	222.27	151.09	168.28	132.72	151.75	335.81	213.84
2002	308.60	212.60	438.32	239.82	137.77	216.51	141.91	190.80	367.04	236.39
2003	359.29	273.64	558.37	255.65	135.31	268.31	175.18	204.57	448.28	255.74
2004	396.89	309.21	618.42	311.92	155.17	302.21	184.67	214.45	523.33	295.18
2005	393.20	311.96	656.88	393.95	160.78	308.80	193.24	276.44	537.51	307.04
2006	390.74	315.75	694.64	464.84	165.56	314.75	202.85	338.65	551.9	322.64

UNIT: Per Capita Current U.S. Dollars.
SOURCE: World Development Indicators of the World Bank, 2007.