University of Wisconsin Milwaukee
UWM Digital Commons

Theses and Dissertations

December 2014

Impact of Monetary Uncertainty and Economic Uncertainty on Money Demand in Africa

Alice Kones
University of Wisconsin-Milwaukee

IMPACT OF MONETARY UNCERTAINY AND ECONOMIC UNCERTAINTY ON MONEY DEMAND IN AFRICA

by

Alice Kones

A Dissertation Submitted in Partial Fulfillment of

the Requirements for the Degree of

Doctor of Philosophy

in Economics

at

The University of Wisconsin-Milwaukee

December, 2014

ABSTRACT

IMPACT OF MONETARY UNCERTAINTY AND ECONOMIC UNCERTAINTY ON MONEY DEMAND IN AFRICA

by

Alice Kones

The University of Wisconsin-Milwaukee, 2014
Under the Supervision of Professor Mohsen Bahmani-Oskooee

This dissertation investigates the role that economic uncertainties and monetary uncertainties play in the money demand function for 21 African countries. The Auto-regressive Distributive Lag (ARDL) and F-test approach are employed using quarterly time series data covering the period from 1971I-2012IV. In particular, this paper aims to demonstrate both short and long-run relationships between the dependent variables, Real Money Aggregate (M2), and the independent variables that include real income (Y), inflation rate P_t / P_{t-1} nominal effective exchange rate (NEX), output uncertainty (VY), and monetary uncertainty (VM). We apply GARCH methodology to approximate the uncertainty measures. The empirical results show that except for Egypt, monetary VM and VY have significant short-run as well as long-run effects on money demand in all the countries, with some variables carrying negative or positive coefficient. We find that the coefficients of Y in all the countries is positive while that of P_t / P_{t-1} and NEX are negative, implying depreciation of domestic currency decreases demand for money. The results also indicate that CUSUM and CUSUMSQ test are stable, thus M2 is stable in all the countries except Egypt

ACKNOWLEDGEMENTS

I take this opportunity to first thank God for the many blessings through the ups and downs as a graduate student, a mother and a wife. I would like to especially express my deepest appreciation and gratitude to my advisor Professor, Bahmani-Oskooee for his encouragement and mentorship during my research journey. I thank him selfless guidance, instruction on profession and discipline that come along with being a scholar and a researcher. I would also like to thank my committee members, Professor Abera Gelan, Professor Arora, Professor Kundan Kishor, Professor James Peoples for their valuable comments, suggestions during the dissertation writing process. I am forever grateful for always leaving your doors open, whenever I needed help. I also owe a special kind of appreciation to Professor Scott Drewianka for making my graduate experience enjoyable despite the many challenges. I thank him for being kind and patient with me.

Lastly, it would not have been possible to successfully complete my studies without the love and support of my dear family, husband David, children Victor, Gabriel, and Natasha. Thank you all for your patience, thoughtful sacrifices, and understanding during my schooling. The rotating dishwashing and dinner preparations are forever appreciated. This would not have been possible without you. I love you all very much.

Dedicated to my husband and children, my mother, and all my brothers and sisters

TABLE OF CONTENT

1. INTRODUCTION AND THE MAIN OBJECTIVE

The simple relationship of real money balances, real income (wealth), and opportunity cost of holding money in the studies of money demand functions, cannot possibly explain the recent behavior of monetary aggregates. Existing literature examining the impact of some of the macroeconomics risks on money demand, include Greiber and Lemke (2005), Choi and Oh (2003), and Att-Mensah (2004), and Bahmani-Oskooee et al. (2011), who all agree that economic and financial future uncertainties affects current money demand. The existing studies strongly suggest that taking uncertainty output and monetary measures into account improves the stability performance of the demand for money. Research by Bahmani-Oskooee *et al.* (2011) investigated whether money demand in Australia is affected by economic uncertainty and monetary uncertainty, and they conclude that due to tightening during inflation, and loosening during recessionary period, it is important to include monetary uncertainty so as to establish a stable money demand function.

This becomes especially important given the recent innovation in the financial sector that has had a major impact on money demand. Further, since money is held by economic agents for transaction, uncertainty in the economy could have an impact on the quantity of money that agents are willing to hold. If, for instance, in the case where volatility (risk) of interest rate increases, the risk of bearing fixed-term interest-paying securities also increases, and economic agents substitute these securities for more money. Economic uncertainty thus plays an important role in decisions concerning the level of holding money, and should be included in the money demand function.

Macroeconomic stability has always been a key point of monetary policy. In many economies, demand for money plays a significant role in macroeconomic analysis for formulating an appropriate and effective monetary policy. A stable money demand enables policy makers to accurately predict the impact of macroeconomic variables. As such, finding a stable money demand function is crucial in establishing a link between relevant monetary aggregate and nominal income (output). Additionally, a stable money demand indicates a stable relationship between monetary growth and inflation, which not only provides a useful framework to policy makers for explaining, predicting, controlling and targeting inflation, but it also allows the policy makers to assess threats to the price stability in the long-run. It is due to its importance that has led to the permanent need to search for an empirically stable money demand function whose parameters do not significantly change over time.

The importance of this study is evidenced in the interest on the study of money demand in developed and developing countries, including the countries of Africa has increased significantly in recent years. Furthermore, with the significant expansion of globalization, financial deregulation and financial innovation, it is important to investigate if the underlying properties of the money demand function still hold (Melnick, 1995). In fact, research on stable money demand has generated considerable theoretical and empirical research in both developed and developing countries around the globe in the past several decades. In developed countries, such as the United States (U.S.) and the

United Kingdom (U.K), there is an abundance of literature investigating the stability of the money demand function, in relation to other macroeconomic variables. In the analysis of the stability of M2 in the U.S., Choi and Oh (2003) demonstrated the importance of including output uncertainty and monetary uncertainty in the analysis of money demand function. Others investigating the stability of the money demand function for Canada and European countries have included uncertainty measures. For Canada, Att-Mensah (2004) constructed an index of uncertainty as the weighted sum of volatilities of economic activities and other variables. His findings indicated that economic uncertainty measures improve the stability performance of money demand. Similarly for Europe, Greiber and Lemke (2005) show that including measures of uncertainty is crucial to the estimation of a stable money demand function.

Furthermore, Bahmani-Oskooee et al. (2011) investigated whether money demand in Australia is affected by economic uncertainty and monetary uncertainty. In their investigation, they argue that the business cycle and the Global Financial Crisis of 2008 affected unemployment, inflation, and trade in every country including Australia, thereby justifying the inclusion of economic uncertainty in the money demand function. Similarly, they conclude that due to tightening during periods of inflation, and loosening during recessionary periods, it is important to include monetary uncertainty so as to establish a stable money demand function.

The above existing studies strongly suggest that including economic uncertainty and monetary uncertainty in the money demand function becomes even more important given the differences in global financial systems, innovations, and business cycles. Despite this, existing empirical research on money demand estimation including uncertainties have mainly focused on developed countries. Studies of money demand models that have occurred in developing countries, including African countries have not included monetary and output uncertainties. Bahmani-Oskooee and Gelan (2009) carried out a comprehensive investigation on the stability of money demand in Africa but they did not include output uncertainty and monetary uncertainties.

The purpose of this thesis therefore is to fill this gap and extend the existing literature on money demand in African countries by investigating whether output uncertainty (VY), and monetary uncertainty (VM), along with real income (Y), inflation rate (Pt/P_{t-1}), nominal effective exchange rate (NEX) play any role in the stability of real money aggregate (M2) in Africa. This thesis further contributes to the existing literature by using the most robust and updated quarterly data for 21 African countries from 1971(I) to 2012(IV) from the International Monetary Fund's International Financial Statistics (IMF (IFS)) publication. The IFS is recognized as a leading source of comparable statistics on domestic and international finance for most countries of the world.

This thesis employs GARCH methodology, a standard tool for measuring volatility in time series data with heteroscedastic errors, to identify output uncertainty and monetary uncertainty. Unlike traditional regression approaches, recent advancement in econometric techniques allows for more accurate and effective diagnostics and avoids problems such as spurious regressions (Miller, S.M, 1991). We employ the Auto-regressive Distributive Lag (ARDL) approach to cointegration, along with CUSUM and CUSUMSQ stability tests to investigate the relationship between money demand function and the macroeconomic variables as outlined above. The plots of these CUSUM and

CUSUMSQ statistics stay within the 5% significant level in all the 21 countries except Egypt. The results indicate that including monetary uncertainty and output uncertainty in the money demand model, produces a stable money demand in all countries except Egypt. This implies that except for Egypt, money demand is stable in almost all African countries. This thesis is organized as follows: section 2 discusses the existing literature while section 3 provides model specifications and ARDL estimation method. Section 4 discusses Empirical results, section 5 concludes. Finally the Appendix shows data constructions procedures, tables, and figures.

2. LITERATURE REVIEW

Recent money demand studies have focused on money demand among African countries where financial market reforms are more recent. The resulting empirical studies on money demand in Africa not only differ by choice of variables, money specification, time period of study and data frequency, and methodology selected, they also offer mixed evidence as to the stability of money demand. Ajayi, S. I. (1977) used the OLS method to examine money demand function in Nigeria for the period from 1960 through 1970. His findings indicated that real income and interest rates have significant impact on M2, and that money demand function is stable in Nigeria for the study period. Darrat, A (1986) explored the demand for money in three major Organizations of the Petroleum Exporting Countries (OPEC) members including, Saudi Arabia, Libya and Nigeria, using Chow, Gupta and Farley and Hinich stability tests. His investigations indicated a stable money demand function in all the three countries. Arize and Lott (1986) also re-examined the demand for money in Nigeria, and found that both real income and expected inflation are important determinants of money demand in Nigeria.

Darrat, A (1986) also obtained similar results surrounding Kenyan M1, pointed that income elasticity was unexpectedly high with a value of 1.8. Similar research by Adam, C (1992) successfully established a series of single equation demand for money functions (M0, M1, M2 and M3) for the Kenyan economy from 1973 to 1989. His application of the Johansen technique suggested that income elasticity of money demand were around unity for M0 and slightly lower at around 0.8 for the other monetary aggregates; therefore he found that the demand for M1 is stable. Other money demand studies by Kallon, K (1992) investigated money demand function for Ghana, and the results showed stable real money balances during 1966-1986 period. In the same year, Darrat, A (1986) also obtained similar results surrounding Kenyan M1, and pointed that income elasticity was unexpectedly high with a value of 1.8. Similar research by Adam, C (1992) successfully established a series of single equation demand for money functions (M0, M1, M2 and M3) for the Kenyan economy from 1973 to 1989. His application of the Johansen technique suggested that income elasticity of money demand were around unity for M0 and slightly lower at around 0.8 for the other monetary aggregates. He therefore found that the demand for M1 is stable in the long-run. Fielding (1994) used data from 1976 I-1989II to examine money demand function in four African countries, including Cameroon, Nigeria, Ivory Coast, and Kenya. He interpreted the results as showing evidence of long run relationship between M2, real income and inflation. His investigation also finds that the income elasticity of M2 for Cameroon and Cote d'Ivoire is 1.50 and 1.58, respectively.

Ghartey (1998) estimated the demand for M1 money using the Engel and Granger and Johansen Maximum Likelihood (JML) techniques for data from 1970-2002, and finds stable money demand function for Ghana. In another study, Ghartey (1998) covers the period from 1970IV- 1992IV finds a stable demand function for nominal narrow money in Ghana. The estimated demand for real money indicates long-run prices and income are super exogenous to money. The first idea behind the results is that data from the 1980s exhibits excessive volatility and noise, and secondly financial and foreign exchange markets in Ghana were highly regulated before the 1990s. In the absence of market-based interest and exchange rates financial variables for these years, there is limited information value for determining money demand. All variables are quarterly except for the national accounts data which in Ghana are available only annually.

Further studies by Nell (1999), empirically tests the stability of the long-run money demand function for M3 over the period 1965-1997 for South Africa. The findings shows stable money demand function for M3 while demand for M1 and M2 display parameter instability following financial reforms in South Africa since 1980[1]. These results largely support the South African Reserve Bank's view that the M3 money stock could serve as an indicator for monetary policy. The study uses single equation estimation techniques developed by Engle and Granger (1987) and the maximum likelihood systems developed by Johansen et al (1990). For structural stability tests Nell applies standard chow-test and confirms the model as structurally stable, implying the parameter estimates are constant over the whole period. The error correction term indicates that the speed of adjustment is swift with about 88% of any disequilibrium between actual and equilibrium M3 money balances being made up during the course of a year.

Anoruo (2002), studied stability of demand of M2 in Nigeria around the Structural Adjustment Program (SAP) period (1986-1988), using the JML technique to quarterly data. His findings suggest that the M2 was stable during this period and that the money supply is a viable monetary policy tool in Nigeria. In addition to using Johansen

[1] Three different definitions of money demand will be considered-M1 which consists of coins, banknotes and other demand deposits, M2 which also includes other short and medium-term deposits, and M3 which additionally includes long-term deposits.

and Juselius cointegration approach methodology, Anoruo also implements CUSUM and the CUSUMSQ stability tests. The long run cointegration relationship between real M2 and discount rate, and economic activity, suggests M2 money demand function in Nigeria is stable, and M2 money supply is a viable monetary policy tool in Nigeria. Additionally, Nwaobi (2002) investigation on data from 1960 through 1995 and the Johansen cointegration framework finds money supply, real GDP, inflation and interest rate are cointegrated, and that money demand function in Nigeria is stable. Nell (2003) also examined the stability of money demand in South Africa, which has the most developed financial markets in Sub-Saharan Africa and is an inflation-target.

These studies reach similar conclusions that money demand has remained relatively stable in South Africa despite the rapid development of the country's financial markets. They note, however, that the linkage between money and inflation is weak and that money provides little information about future movements in prices. Onafowora, et, (2007) applied the JML technique to M2 quarterly data over a marginally longer time period (1986Q1-2001Q4) and also obtained an implausible income elasticity of approximately 2.1, which again suggests that M2 demand is stable in Nigeria. Using monthly data from 1983-1999 to study money demand in Ghana, Bawumia and Abradu-Otoo (2003) conclude that there is a stable long-run relationship between inflation and broad money in Ghana. Similarly, Sterken (2004) uses quarterly data over 1966Q4-1994Q4 period to estimate M1 demand for Ethiopia. The author employs JML; he identified a long run cointegration relating real per capita money demand, real per capita GNP, and the real export price of coffee.

The results shows income elasticity that exceeds unity and some evidence of instability in M1 demand during the period 1974–1975, perhaps due to changes in political regimes and natural disasters. Studies by Onafowora et al, (2007) using the JML technique to M2 quarterly data over a marginally longer time period (1986Q1-2001Q4) for Nigeria, resulted in an implausible income elasticity of approximately 2.1, suggesting that M2 demand is stable. Amoah and Mumuni (2008) use quarterly data from 1980Q1-2007Q1 for Ghana, and finds that structural reforms and the deregulation of the financial sector have resulted in parameter instability in the demand for broad money in late 1990s. As a result they concluded that money no longer provides useful information for predicting future.

Bahmani-Oskooee and Gelan (2009) carries out the most comprehensive investigation of money demand for 21 African countries including Ghana, and concludes that a stable money demand relation can be established between M2, income, inflation rate and nominal effective exchange rate. Using ARDL technique they obtain a long run relationship between M2 the specified macroeconomic variables for all the African countries. Further, application of CUSUM and CUSUMSQ tests revealed that the estimated models for both M2 and M3 were stable in all cases.

Evidence from the above review of existing empirical literature on money demand in Africa have not included monetary and output uncertainties, as other determinants of money demand models. As mentioned above, the purpose of this thesis is to extend the existing literature on money demand in Africa to investigate whether output uncertainty (VY), and monetary uncertainty (VM), along with other determinants play any role in the stability of real money aggregate (M2) in Africa.

3. MODEL SPECIFICATION AND METHOD

We begin with the most common specification of the demand for money in Africa by Bahmani-Oskooee and Gelan (2009) as given in model (1):

$$LnM_t = a + b\ln Y_t + c\ln(P_t / P_{t-1}) + d\ln NEX_t + \varepsilon_t \qquad \textbf{(1)}$$

Where M, is a measure of a monetary aggregate (real M2), Y is a measure of income (real GDP), inflation rate is measured by (P_t / P_{t-1}) as the opportunity cost of holding money, NEX is the exchange rate, and the error term assumes that $\varepsilon_t \sim n.i.i.d(0, \delta^2)$. Given that the monetary aggregate is positively related to real GDP, and negatively related to inflation rate, we expect an estimate for *b* to be positive, and *c* to be negative. The coefficient of exchange rate, *d* can either be negative or positive. And taking the currency substitution phenomenon into account, many studies on the demand for money in developing countries often include exchange rate variable in money demand function.

The inclusion of exchange rate variable in the money demand function, along with income level and interest rate, was first suggested by Mundell (1963). Further analysis by Bahmani-Oskooee and Pourheydarian (1990), lead to the argument that if domestic currency is expected to depreciate more, domestic and foreign residents may act on these speculations and will hold less domestic money and more foreign currency. Changes in exchange rate may have two effects on the demand for domestic currency namely, wealth effect and currency substitution effect. If wealth holders evaluate their asset portfolio in terms of their domestic currency, then the exchange rate depreciation would increase the value of their foreign assets held by domestic residents, and hence be wealth enhancing. To maintain a fixed share of their wealth invested in domestic assets, they will repatriate part of their foreign assets to domestic assets, including domestic currency. Hence, exchange rate depreciation would increase the demand for domestic currency.

Movements in exchange rates can also generate a currency substitution effect through changes in expectation. Following an initial depreciation, investors (wealth holders) develop an expectation that the depreciation is likely to continue (Bahmani-Oskooee and Pourheydarian, 1990). Consequently, they respond by raising their share of foreign assets. Currency depreciation can be used to hedge against the risk of high opportunity cost of holding domestic money. Thus, exchange rate depreciation would decrease the demand for domestic money. The decrease of the nominal effective exchange rate indicates a depreciation of the domestic currency, therefore d is expected to be positive or negative. Note that, the rate of inflation is used as opportunity cost of holding money in money demand studies of developed and developing countries (Sriram 1999(b).

The choice of opportunity cost variable is a very important concept in modeling demand for money, otherwise not paying special attention risk producing poor results. Additionally, it is important to evaluate the macroeconomic situation and developments in the financial system[2] and the degree of openness of the economy before selecting appropriate opportunity cost variable, (Sriram 2001). This is because the underdeveloped financial system and government regulations in the developing economies, interest rates

[2] Including institutional detail and regulatory environment

may not be reliable in predicting the underlying economic conditions. Existing literature have examined the impact of some of the macroeconomic risks on money demand. Researchers including Greiber and Lemke (2005), Choi and Oh (2003), and Att-Mensah (2004), and Bahmani-Oskooee et al. (2011), all agree that economic and financial future uncertainties affects current money demand. And since business cycles and financial crises affect economic and financial systems in all countries globally, inclusion of monetary and output uncertainties in the money demand function is important. Therefore the equation as specified by model (1) is then extended to include economic uncertainty (VY) and monetary uncertainty (VM) in the long-run specification formula as shown in (2) below:

$$\ln M_t = a + b\ln Y_t + d\ln(p_t / P_{t-1}) + e\ln NEX_t + f\ln VY_t + g\ln VM_t + \varepsilon_t \qquad \textbf{(2)}$$

Estimating equation (2) only yields long-run coefficient estimates. It is important to include both the long-run and short-run dynamics of the adjustment process in the model, as both output uncertainty and monetary uncertainty could have short-run implications on money demand.

Existing literature using Johansen (1988) cointegration had to first perform unit root testing determine if the integration of variables are of the same order. Using Johansen methodology when variables under analysis are of both integration of order zero I(0) and order one I(1), might bring confusing results. Bewley (1979) and Wickens and Breusch (1988) argue that rather than employ Engle and Granger’s two-step procedure to estimate long-run and short-run, a more efficient long-run coefficients can be obtained if the long-run and short-run parameters are estimated simultaneously.

We employ the Autoregressive Distributive Lag (ARDL) approach to cointegration The ARDL estimation technique introduced by Pesaran et al. (2001) not only estimates both short-run and long run coefficients of each variable simultaneously, but also has the ability to be applied to small sample size. Additionally, they demonstrated that their approach is still valid irrespective of whether the variables are stationary I(0) or integrated of order one I(1) or a combination of both. Although there is no need for unit root testing (Akinlo 2006), it is important to perform Dickey–Fuller (ADF) unit root test for each variable in the model (See Table IV in the Appendix), to investigate if the second-difference are stationary, that is they are either I(0) or I(1). Furthermore, according to Bahmani-Oskooee and Tanku (2008), some volatility measures can be integrated of order one while others can be stationary or integrated of order zero, therefore using ARDL approach to cointegration in estimating this model is appropriate.

Since equation (2) only provides long run estimates, it is necessary to incorporate short-run dynamics into model (2) as specified in model (3). Harvey (1993) argues that variables are cointegrated if the short-run dynamics corresponding to the long-run equilibrium can be described by the error correction model. According to Engle-Granger (1987), the model is specified in model (3) below:

$$\begin{aligned}\Delta \ln M_t &= \alpha_0 + \sum_{t-1}^{n1} \beta_i \ln \Delta \ln M_{t-i} + \sum_{t=0}^{n2} \delta_i \Delta n Y_{t-i} + \sum_{t=0}^{n4} \gamma_i \Delta \ln (p_t / P_{t-1})_{t-i} \\ &+ \sum_{t=0}^{n5} \eta_i \ln NEX_{t-i} + \sum_{t=0}^{n6} \lambda_i \Delta \ln VY_{t-i} + \sum_{t=0}^{n7} \mu_i \ln VM_{t-i} + \psi \varepsilon_{t-1} + V_t\end{aligned} \quad \textbf{(3)}$$

Where the coefficient ψ measures the speed of adjustment as variables converge towards long-run equilibrium, and is expected to be negative and significant, implying the presence of cointegration between the dependent and independent variables. Pesaran et al. (2001) modify error-correction model (3) by including linear combination of lagged level variables instead of lagged error-correction term as follows. Equation (3) is obtained by solving for ε_t in model (2) as follows:

$$\varepsilon_t = \ln M_t + b \ln Y_t + c \ln(P_t / P_{t-1}) + d \ln NEX_t \qquad \textbf{(4)}$$

The resulting solution is lagged by one period to obtain the error term ε_{t-1} as represented in model (**5**) below.

$$\varepsilon_{t-1} = \ln M_{t-1} + b \ln_t Y_{t-1} + c \ln(P_{t-1} / P_{t-1})_{t-1} + d \ln NEX_{t-1} \qquad \textbf{(5)}$$

The equation as shown in (**5**) is then substituted into model (**3)** to obtain the error correction model as shown in equation **(6)** below.

$$\begin{aligned} \Delta \ln M_t &= \alpha_0 + \sum_{t-1}^{n1} \beta_i \Delta \ln M_{t-i} + \sum_{t=0}^{n2} \delta_i \Delta \ln Y_{t-i} + \sum_{t=0}^{n4} \gamma_i \Delta \ln(p_t / P_{t-1})_{t-i} \\ &+ \sum_{t=0}^{n5} \eta_i \Delta \ln EX_{t-i} + \sum_{t=0}^{n6} \lambda_i \Delta \ln VY_{t-i} + \sum_{t=0}^{n7} \mu_i \ln VM_{t-i} \qquad \textbf{(6)} \\ &+ \psi_0 \ln M_{t-1} + \psi_1 \ln Y_{t-1} + \psi_2 \ln(P_t / P_{t-1})_{t-1} + \psi_3 \ln NEX_{t-1} + \psi_4 \ln VY_{t-1} + \psi_5 \ln VM_{t-1} + v_t \end{aligned}$$

The short-run effects are given by the estimated coefficients of the first-differenced variables in model (6). For example, the short-run effect of inflation rate on money demand is determined by $\gamma_i 's$. Similarly, the long run effects are obtained by the estimated coefficients of $\psi_1 - \psi_5$ which are normalized on ψ_0. In order for the long-run coefficients to be meaningful it is necessary to justify why the lagged level variables are included in the model given by equation (4). This approach is based on the F-test with the assumption that the null hypothesis of no cointegration among variables versus the alternative hypothesis that cointegration exists among the variables. Bahmani-Oskooee and Brooks (1999) argues that the F-test is sensitive to the number of lags imposed on each first differenced variable in the model as specified in (4).

To justify the inclusion of the lagged level variables in the model we impose a fixed maximum of 6 lags, on each fixed variable before performing the F-test. Additionally, we use Akaike Information Criterion (AIC), to select the optimum lag length. Pesaran et al (2001) is under the assumption that for upper bound critical values all the variables are I (1), implying the presence of cointegration among the variables being examined. On the other hand the critical values for cointegration tests with the lower critical bounds assumes that all the variables are I(0), an indication that the data is stationary. The test statistics from the ARDL regression results of the model is then compared with the upper critical values and lower critical values provided by Pesaran et al. (2001), (See Table 7.6). The computed F-statistics offer three possible results. First, if the computed F statistics falls below the lower bound critical value then the null hypothesis of no cointegration among variables cannot be rejected. Secondly, if the calculated F statistic is above the upper bound critical value, at the level of significance provided, and therefore the null hypothesis of no cointegration is rejected, irrespective of whether the variables are integrated of order one I(1) or zero I(0). Finally, if the computed F-statistics lies between the upper critical bound and the lower bound critical values then the test results are inconclusive.

Furthermore, to determine whether the adjustment of variables is toward their long-run equilibrium values, the estimates of $\psi_1 - \psi_5$ in equation (2), are then used to determine the error-correction term, ECM. Then the lagged level variables in (4) are replaced by ECM_{t-1} and the new model is then estimated. A negative and significant resulting coefficient estimated for ECM_{t-1} supports adjustment toward long-run equilibrium, which according to Bahmani-Oskooee and Ardalain (2006), implies a cointegration of the variables.

4. EMPIRICAL RESULTS

Model (6) is estimated for a total of 21 African countries namely: Burkina Faso, Burundi, Cameroon, Cote D'Ivoir, Egypt, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Mauritius, Morocco, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, and Togo. The data for these countries was selected on the basis of availability of data from the period starting in 1971I to 2012IV. Based on the ARDL approach, the short-run coefficient estimates, as well as the long-run coefficient estimates and diagnostic statistics, resulting from the estimation of model as specified in (6), are outlined in Tables 1 through Table 21. Panel A of each table reports the short-run coefficients estimates for all variables in each country, while the estimated results for the long-run coefficient are presented in Panel B. Panel C of each table reports diagnostic statistics.

From Panel A, we observe that apart from Burkina Faso, and Togo, the short-run coefficient estimates for economic uncertainty (VY) and monetary uncertainty (VM_t) of 18 countries show at least one significant coefficient at 5% significant level as follows. First, the result for the coefficient of VY is significant at 5% level, in 9 countries (Burundi, Cote-D'Ivoire, Egypt, Ethiopia, Madagascar, Rwanda, Seychelles, Sierra Leone, and South Africa). This result implies that output uncertainty has significant short-term effect on money demand. The resulting coefficient estimates for VY does not have any effect in 9 countries (Burkina Faso, Cameroon, Ghana, Kenya, Morocco, Niger, Nigeria, Senegal, Tanzania and Togo).

Similarly, the coefficient estimates for monetary uncertainty (VM) also show at least one significant coefficient at 5% level in 11 countries (Burundi, Cameroon, Cote d'Ivoire, Ghana, Madagascar, Morocco, Niger, Nigeria, Senegal, Seychelles and Tanzania). This implies VM monetary uncertainty has significant short-run effect on money demand for the 11 countries. Also note that some of the coefficient estimates of output uncertainty (VY) and monetary uncertainty (VM), $\ln VM$ are also negative while others are positive. Furthermore, the coefficient estimates for both VY and VM for 4 Burundi, Kenya, Mauritius, and Togo, are significant at 5 % level, and thus both have uncertainties have significant effect on money demand function.

With the exception of Cameroon, Niger, Tanzania, South Africa and Senegal, some coefficient estimates for inflation rates (P_t / P_{t-1}) π_t are negative and significant at 5 % level, implying depreciation of the domestic currency increases demand for money. The results for Burkina Faso, Burundi, Egypt, Kenya, Madagascar, Mauritius, Rwanda, Senegal, Sierra Leone, South Africa and Togo show negative coefficients for nominal effective exchange rate (NEX)$\Delta \ln NEX_t$ implying the depreciation of domestic currency increases the demand for money. On the other hand, for Cameroon, Cote D'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Morocco, Niger, Nigeria, and Seychelles, the coefficients of nominal effective exchange rates are positive and significant at 5 % level, implying the appreciation of the domestic currency of these countries.

To find out whether the short-run effects of monetary uncertainties and economic uncertainties can last into the long-run, we move to Panel B of each Table corresponding to each country. In the long-run the real GDP coefficients for all countries are positive as expected and significant at 5% except for Egypt (Table 5), Niger (Table 13), Sierra Leone

(Table 18), and Togo (Table 21). Another result to note is that with the exception of Togo (Table 21), Kenya (Table 9), and Burundi (Table 2) the coefficients of real GDP for all countries are greater than unity, supporting Randa's (1999) argument that for developing countries, size of income elasticity can be greater than one. This implies a one percent increase in economic growth is accompanied by relatively higher (more than one percent) increase in monetary supply, to support a constant increase in money demand. Except for Cameroon (Table 3) and Niger (Table 13), the long-run coefficients for inflation rate are negative and significant at 5%. With high inflation rate it is difficult to make accurate money demand forecasts in order to implement monetary policy. Therefore to avoid high inflation domestic residents substitute their currency with real assets (Cagan, 1956, and Barro, 1970).

From Panel B of the corresponding Table for each country, the long run coefficients estimates for nominal effective exchange rate, NEX are negative and significant at 5 % level for Burkina Faso (Table 1), Kenya (Table 9), and Rwanda (Table 15). According to Arango and Nadiri, (1981) the implication is that a decrease in value of domestic currency or depreciation would increase money demand supporting wealth effect. This result also supports Bahmani-Oskooee and Pourheydarian (1990), conclusion that depreciation of domestic currency lowers the demand for money due to the expectation of further depreciation. Thus an increase in exchange rate is a phenomenon that indicates depreciation of domestic currency. Similarly, the coefficient estimates for Burundi (Table 2), Egypt (Table 5), Ghana (Table 8), and Mauritius (Table 11) are negative but not significant in the long-run. The estimated coefficients of NEX for Ethiopia (Table 6), South Africa (Table 19), and Tanzania (Table 20) are positive and significant at the 5%

level. As for the long run coefficients results for NEX Cameroon (Table 3), Cote D'Ivoire (Table 4), Gabon (Table 7), Madagascar (Table 10), Morocco (Table 12), Niger (Table 13) Nigeria (Table 14) Senegal (16), Seychelles (Table 17), Sierra Leone (Table 18), and Togo (Table 21) are positive and not significant.

From Panel B the coefficient of economic uncertainty VY for South Africa (Table 19) and Egypt (Table 5), are negative and significant, at the 5% level indicating a negative effect of economic uncertainty on money demand in the long-run. Similarly the coefficients estimates for VY, for Rwanda (Table 15) and Burkina Faso (Table 1) are positive and significant at 5% level, implying a positive long-run effect of VY on money demand function in these countries.

Apart from Ethiopia (Table 6) and Tanzania (Table 20) with negative and significant coefficients, Rwanda (Table 15), and South Africa (Table 19) have positive and significant coefficients, whereas, monetary uncertainty $\ln VM$ coefficient estimates for all the other countries do not have long-run impact on money demand for South Africa and Nigeria. The coefficient of inflation rate for Burkina Faso (Table 1), Cote d'Ivore (Table 4), Ethiopia (Table 6), Gabon (Table 7) (Ghana (Table 8), Kenya (Table 9), Madagascar, Nigeria, Rwanda (Table 15), and South Africa (Table 19), are negative and significant at 5% level. Except for Nigeria with positive and insignificant inflation rates coefficient estimates, the other remaining countries have negative coefficients and have no effect on money demand in the long-run.

Panel C of Table 1 through Table 21 reports diagnostic statistics including F test, ECM_{t-1}, Lagrange Multiplier test (LM) and Regression Specification Error Test (RESET) test. LM is a test for autocorrelation in the residuals and it is distributed as chi-square (χ^2) with four degrees of freedom, while RESET assumes a chi-square distribution (χ^2) with one degrees of freedom. The F-statistics for Egypt (Table 5), Ethiopia (Table 6), Gabon (Table 7), Kenya (Table 9), Nigeria (Table 14), Rwanda (Table 15), and South Africa (Table 19) are all greater than the upper bound critical values of 5.06 supporting cointegration among variables. For the remaining countries, we use ECM_{t-1} to investigate whether short-run effects can last into the long-run.

The LM test for serial correlation is similar to Durbin-Watson (DW)[3], but since DW tests for only first-order serial correlation, LM is more reliable[4]. For Burundi (Table 2), Egypt (5), Gabon (7), Kenya (9), Mauritius (11), Morocco (12), Niger (14), Rwanda (Table 15), Seychelles (17), and Togo (21), the LM statistic is greater than the critical value of 3.84 at the 5% significance level, supporting autocorrelation among the residuals. For the remaining countries, the LM estimated coefficient of 3.35 is less than the 3.84 critical values therefore the residuals of the estimated ARDL model are free of serial correlation.

The RESET test is a diagnostic tool used to investigate whether the functional form of the regression is misspecified. It therefore indicates when the regression specification choice is inappropriate suggesting the need to transform one or more variables, for instance taking logarithm, but it does not indicate the correct specification. Sometimes the RESET test is referred to as an "omitted variables test" and it is

---

[3] Note: Results for Durbin Watson (DW) statistics is around 2 for all the four countries suggesting the regression is acceptable (A high DW is an indication of a problem). In this case we ignore the DW statistic and use serial correlation test.

interpreted as a test of neglected nonlinearities in the choice of functional form (Wooldridge 2002, pp. 124-5). The calculated RESET statistics in sixteen of the twenty one countries are less than the critical values of 5.59 as outlined in Table 1 through 21, implying the ARDL model is correctly specified for these countries except for Egypt, Morocco, Cameroon, Madagascar, Mauritius and Tanzania.

The size of the coefficient attached for ECM_{t-1} corresponds to the measure of speed of adjustment of the variables to the long-run. A larger estimate of the coefficient implies a faster adjustment whereas a smaller coefficient is an indication of slower adjustment. The negative sign of the ECM_{t-1} term indicates long-run convergence of the model to equilibrium as well as explaining the proportion and the time it takes for the disequilibrium to be corrected. The estimated coefficients for ECM_{t-1} all the twenty one countries carry a negative sign as expected and are highly significant at 5 % level. For example, the ECM_{t-1} coefficient for Nigeria is 0.03 (or 3 %,) and for South Africa 0.06 or 6 %, implying that the adjustment process is quite slow for both countries.

Following (Brown, Durbin and Evans, 1975) structural stability procedures we apply CUSUM and CUSUMSQ to check for structural change in the M2 money demand function. The CUSUM test is based on the cumulative recursive sum of recursive residuals. The CUSUMSQ test, on the other hand, is based on sum of squares of recursive residuals. Both the CUSUM and the CUSUMSQ procedures are updated recursively and are plotted against the break points. The parameter stability is indicated when the plots of the CUSUM and the CUSUMSQ stay within the 5 % significance level. However, the parameters and hence the variance are unstable if the plots of the CUSUM and the CUSUMSQ move outside the 5 % critical lines. Apart from Egypt whose plots are unstable, the CUSUM and CUSUMSQ plots for all twenty countries are within the 5% critical bounds. Therefore we can conclude that apart from Egypt, the money demand is stable for the twenty countries. Again from Panel C of each table, most models enjoy a reasonable goodness of fit, as reflected by the size of adjusted R^2 for all countries ranging anywhere between 50 % and 92 %.

5. CONCLUSION

The purpose of this thesis is to investigate whether output uncertainty and monetary uncertainty affect money demand in Africa. There are several reasons as to why monetary and economic uncertainties are important additional determinants in the money demand function. First, finding a stable money demand function is crucial for policy makers as it provides a useful framework to accurately predict the impact of macroeconomic variables, and for explaining, predicting, controlling and targeting inflation. It also allows the policy makers to assess threats to the price stability in the long-run. Economic uncertainty plays an important role in decisions concerning the level of holding money, and should be included in the money demand function. And since money is held by economic agents for transaction, uncertainty in the economy could have an impact on the quantity of money that the agents are willing to hold. If for instance in the case where volatility (risk) of interest rate increases, the risk of bearing fixed-term interest-paying securities also increases, and economic agents substitute these securities for more money.

The existing empirical literature on the inclusion of monetary uncertainty and output uncertainty in the study of money demand function have mainly focused on developed countries, yet business cycle and financial crisis affect economic and financial systems in all countries globally. We also saw from existing literature that including economic uncertainty and monetary uncertainty in money demand function becomes even more important given the differences in global financial systems, innovations, and business cycles. And while studies of money demand models have occurred in developing countries including African, they have not included monetary and output uncertainties. Bahmani-Oskooee and Gelan (2009) carried out comprehensive investigation on the stability of money demand in Africa but they did not include output uncertainty and monetary uncertainties.

In this thesis, we estimate money demand for 21 African countries that include Burkina Faso, Burundi, Cameroon, Cote d'Ivoir, Egypt, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Mauritius, Morocco, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, and Togo. The data for these countries was selected on the basis of availability of data from the period starting in 1971I to 2012IV from International Financial Statistics (IFS) of the International Monetary Fund (IMF), Federal Bank of St. Louis, Direction of Trade Statistics of IMF (University of Wisconsin Milwaukee Library), and Bahmani-Oskooee and Gelan (2009).

The method used for this thesis is based on ARDL bounds testing approach to cointegration and error-correction estimation technique introduced by Pesaran et al. (2001). One advantages of ARDL approach is that it estimates both short-run and long run coefficients of each variable simultaneously, in addition to having the ability to be applied to small sample size. Additionally, they demonstrated that their approach is still valid irrespective of whether the variables are stationary I(0) or integrated of order one I(1) or combination of both. Furthermore, according to Bahmani-Oskooee and Tanku (2008), some volatility measures can be I(1) or I(0). Since one of the important assumptions of ARDL approach is that that all variables are I(0) or I(1), it is imperative to carry out augmented Dickey–Fuller (ADF) unit root test for each variable in the model

(See Table IV in the Appendix), to investigate if the second-difference are stationary, that is they are either I(0) or I(1). The results in indicate all variables are stationary, and therefore, ARDL approach is the appropriate method to use.

Following (Brown, Durbin and Evans, 1975) structural stability procedures we apply CUSUM and CUSUMSQ to check for structural change in the M2 money demand function. The CUSUM test is based on the cumulative recursive sum of recursive residuals. Both the CUSUM and the CUSUMSQ procedures are updated recursively and are plotted against the break points. The parameter stability is indicated when the plots of the CUSUM and the CUSUMSQ stay within the 5 % significance level. However, the parameters and hence the variance are unstable if the plots of the CUSUM and the CUSUMSQ move outside the 5 % critical lines. The results show that apart from Egypt whose plots are unstable, the CUSUM and CUSUMSQ plots for all twenty countries, except Egypt, are within the 5% critical bounds. Therefore we can conclude that apart from Egypt, the money demand is stable for the twenty countries. Again from Panel C of each table, most models enjoy a reasonable goodness of fit, as reflected by the size of adjusted R^2 for all countries ranging anywhere between 50 % and 92 %.

Apart from Burkina Faso, Kenya, Mauritius, and Togo, the short-run coefficient estimates for economic uncertainty (VY) and monetary uncertainty (VM) of all 17 countries show at least one significant coefficient at 5% significant level as follows. First, the coefficient for economic uncertainty is significant at 5% level in 9 countries namely, Burundi, Cote-d'Ivoire, Egypt, Ethiopia, Madagascar, Rwanda, Seychelles, Sierra Leone, and South Africa. This result implies that output uncertainty has significant short-term effect on money demand. The resulting coefficient estimates also show VY $\ln Y_t$ has no effect in ten countries namely, Burkina Faso, Cameroon, Ghana, Kenya, Morocco, Niger, Nigeria, Senegal, Tanzania and Togo.

Similarly, the coefficient estimates for monetary uncertainty *VM* also at least one significant coefficient at 5% level in 11 countries (Burundi, Cameroon, Cote D'Ivoire, Ghana, Madagascar, Morocco, Niger, Nigeria, Senegal, Seychelles and Tanzania). This implies *VM* monetary uncertainty has significant short-run effect on money demand for the 11 countries. Also note that some of the coefficient estimates of output uncertainty for *VY* and monetary uncertainty *VM* are also negative while others are positive. Furthermore, the coefficient estimates for both *VY* and $\ln VM$ for 4 Burundi, Kenya, Mauritius, and Togo, are significant at 5 % level.

With the exception of Cameroon, Niger, Tanzania, South Africa and Senegal, some coefficient estimates for inflation rates P_t / P_{t-1} are negative and significant at 5 % level. The results for Burkina Faso, Burundi, Egypt, Kenya, Madagascar, Mauritius, Rwanda, Senegal, Sierra Leone, South Africa and Togo show negative coefficients for nominal effective exchange rate, *NEX* , Teyebi et al. (2011) argues that the coefficient of nominal exchange rate has negative and significant. This result confirms the substitution effect. $\Delta \ln NEX_t$On the other hand, for Cameroon, Cote D'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Morocco, Niger, Nigeria, and Seychelles, the coefficients of nominal effective exchange rates are positive and significant at 5 % level. Similarly, a positive coefficient of nominal effective exchange rate suggests that the substitution effect dominates wealth effect.

To find out whether the short-run effects of monetary uncertainties and economic uncertainties can last into the long-run, we move to Panel B of each Table corresponding to each country. In the long-run the real GDP coefficients for all countries are positive as expected and significant at 5% except for Egypt (Table 5), Niger (Table 13), Sierra Leone (Table 18), and Togo (Table 21). Another result to note is that with the exception of Togo (Table 21), Kenya (Table 9), and Burundi (Table 2) the coefficients of Real GDP for all countries are greater than unity, supporting Randa's (1999) argument that for developing countries, size of income elasticity can be greater than one. This implies a one percent increase in economic growth is accompanied by relatively higher (more than one percent) increase in monetary supply, to support a constant increase in money demand. Except for Cameroon (Table 3) and Niger (Table 13), the long-run coefficients for inflation rate are negative and significant at 5%. With high inflation rate it is difficult to make accurate money demand forecast in order to implement monetary policy. Therefore to avoid high inflation domestic residents substitute their currency with real assets (Cagan, 1956, and Barro, 1970).

From Panel B of the corresponding Table for each country, the long run coefficients estimates for nominal effective exchange rate $\ln NEX$ are negative and significant at 5 % level for Burkina Faso (Table 1), Kenya (Table 9), and Rwanda (Table 15). According to Arango and Nadiri, (1981) the implication is that a decrease in value of domestic currency or depreciation would increase money demand supporting wealth effect. This result also supports Bahmani-Oskooee and Pourheydarian (1990), conclusion that depreciation of domestic currency lowers the demand for money due to the expectation of further depreciation. Thus an increase in exchange rate is a phenomenon that indicates depreciation of domestic currency.

Similarly, the coefficient estimates for Burundi (Table 2), Egypt (Table 5), Ghana (Table 8), and Mauritius (Table 11) are negative but not significant in the long-run. The estimated coefficients of $\ln NEX$ for Ethiopia (Table 6), South Africa (Table 19), and Tanzania (Table 20) are positive and significant at 5% level. The long run coefficients results for $\ln NEX_t$ Cameroon (Table 3), Cote D'Ivoire (Table 4), Gabon (Table 7), Madagascar (Table 10), Morocco (Table 12), Niger (Table 13) Nigeria (Table 14) Senegal (16), Seychelles (Table 17), Sierra Leone (Table 18), and Togo (Table 21) are positive and not significant.

From Panel B the coefficient of economic uncertainty (VY) for South Africa (Table 19) and Egypt (Table 5), are negative and significant, at 5% level and indicating the presence of long-run effect of economic uncertainty on money demand. Similarly, coefficients estimates for (lnVY) for Rwanda (Table 15) and Burkina Faso (Table 1) are positive and significant at 5% level. Apart from Ethiopia (Table 6) and Tanzania (Table 20) with negative and significant coefficients, and Rwanda (Table 15), and South Africa (Table 19) with positive and significant coefficients, monetary uncertainty VM coefficient estimates for all the other countries do not have long-run impact on money demand for South Africa and Nigeria. The coefficient of inflation rate for Burkina Faso (Table 1), Cote d'Ivore (Table 4), Ethiopia (Table 6), Gabon (Table 7) (Ghana (Table 8), Kenya (Table 9), Madagascar, Nigeria, Rwanda (Table 15), and South Africa (Table 19), are negative and significant at 5% level. Except for Nigeria with positive and insignificant inflation rates coefficient estimates, the other remaining countries have negative coefficients and have no effect on money demand in the long-run.

Panel C of Table 1 through Table 21 reports diagnostic statistics including F test, ECM-1, Lagrange Multiplier test (LM) and Regression Specification Error Test (RESET) test. LM is a test for autocorrelation in the residuals and it is distributed as chi-square (χ^2) with four degrees of freedom, while RESET assumes a chi-square distribution (χ^2) with one degrees of freedom. The F-statistics for Egypt (Table 5), Ethiopia (Table 6), Gabon (Table 7), Kenya (Table 9), Nigeria (Table 14), Rwanda (Table 15), and South Africa (Table 19) are all greater than the upper bound critical values of 5.06 supporting cointegration among variables. For the remaining countries, we use ECM_{t-1} to test whether short-run effects continue to the long-run.

We apply the LM test to test for serial correlation and find that for ten countries as follows: Burundi (Table 2), Egypt (5), Gabon (7), Kenya (9), Mauritius (11), Morocco (12), Niger (14), Rwanda (Table 15), Seychelles (17), and Togo (21), the LM statistic is found to be greater than the critical value, evidence that supports autocorrelation among the residuals. For the remaining 12 countries, the estimated LM coefficient was found to be less than the critical values, hence the estimated ARDL model is correctly specified. The RESET test is to determine if the functional form of the regression is misspecified and whether it is necessary to transform any of the variables. The calculated RESET statistics in sixteen of the twenty one countries are less than the critical values of 5.59 as outlined in Table 1 through 21, implying the ARDL model is correctly specified for these countries except for Egypt, Morocco, Cameroon, Madagascar, Mauritius and Tanzania.

Similarly, a larger coefficient estimate of ECM_{t-1} implies a faster adjustment of the variables towards the long-run. We find the estimated coefficients for ECM_{t-1} in all the 21 countries carry a negative sign as expected and are highly significant at 5 % level.

Taking Nigeria for example, we find that the ECM_{t-1} coefficient is 0.03 (or 3 %,), while that of South Africa 0.06 or 6 %. This numbers are quite small signifying that the adjustment process is quite slow for both countries.

Applying CUSUM and CUSUMSQ to check for structural change in the M2 money demand function, we find that that apart from Egypt, the CUSUM and CUSUMSQ for 20 countries are within the 5% critical bounds, implying the stability of money demand. The R^2 between 50 % and 92 % show that for all countries, most models enjoy a reasonable goodness of fit,

Additionally, the empirical results show short-run effects as well as long-run effects of the macroeconomic variables on money demand. The results of the long-run economic uncertainty affect money demand in South Africa, Rwanda, and Burkina Faso, whereas monetary uncertainty has long-run impact on Tanzania, and Ethiopia, Rwanda, and South Africa. Furthermore, including monetary uncertainty and output uncertainty in the estimation method, yields stable money demand in countries except Egypt.

6. REFERENCES

Adam, C. (1992) “On the dynamic specification of money demand in Kenya": Journal of African Economies 1, 233-270.

Ajayi, S.I. (1977), "Some Empirical Evidence Demand for Nigeria in Nigeria," American Economist, 21, No.1, 51-54

Akinlo, A. E. (2005) “The stability of money demand in Nigeria: An autoregressive distributed lag approach”, Journal of Policy Modeling 28, 445-452.

Arango, S., and M. Nadiri 1981: "Demand for money in open economies." Journal of Monetary Economics 7:69-83

Amoah, B, Mumuni, Z. (2008). “Choice of monetary policy regime in Ghana”: Working Paper, Bank of Ghana, Accra.

Anoruo, E. (2002) “Stability of the Nigerian M2 money demand function in the SAP period,” Economics Bulletin 14,1-9

Arize, A. C, Darrat, A. F. and Meyer, D. J. (1990) “Capital mobility, monetization and money demand: evidence from Africa”, The American Economist XXXIV, 69-75

Arize, A. and E. Lott (1986), "Re-Examination of Money of the Demand for Money in Nigeria, “Atlantic Economic Journal, 27-335.

Atta-Mensah, J.(2004). "Money Demand and Economic Uncertainty," Working Papers 04-25, Bank of Canada.

Bahmani-Oskooee, M. and Z. Ardalani, (2006) "Exchange Rate Sensitivity of U.S. Trade Flows: Evidence from Industry Data", Southern Economic Journal, Vol. 72, pp. 542-559.

Bahmani-Oskooee, M and M. Bohl (2000), "Germany Monetary Unification and the Stability of the German M3 Money Demand Function," Economics Letters, 66, 203-208.

Bahmani-Oskooee, M. (2001), "The Demand for Money in Japan: Evidence from Cointegration Analysis," Japan and World Economy, 8, 1-10.

Bahmani-Oskooee, M and Abera Gelan,(2009), “How Stable is the Demand for Money in African Countries,”Journal of Economic Studies, 36(3), pp. 216-235

Bahmani-Oskooee, M and A. Tanku, 2008, “Black Market Exchange Rate vs. Official Rate in Testing the PPP: Which Rate Fosters the Adjustment Process”, Economics Letters, Vol. 99 (2008), pp. 40-43

Bahmani-Oskooee, M., & Xi, d. (2011). “Economic uncertainty, monetary uncertainty and the demand for money in Australia. Australian Economic Papers”, 50(4), 115-128.

Bahmani-Oskooee, M. and M. Pourheydarian, (1990): “Exchange rate sensitivity of the demand for money and effectiveness of fiscal and monetary policies. Applied Economics”, 22:1377-1384

Bewley, R.A.(1979): “The Direct Estimation the Equilibrium Response in a Linear Model”. Economics Letters 3357-361

Brock, W. A., Hsieh, D. A., and LeBaron, B., (1991), “Nonlinear Dynamics, Chaos, and Instability: Statistical Theory and Economic Evidence, MIT Press, Cambridge, Massachusetts”

Brown,R.L, Durbin, J. and Evans, J.M (1975). “Techniques for Testing the Constancy of Regression Relationships over Time, ”Journal of the Royal Statistical Society, Ser.B,vol.37, pp.149 – 192.

Cagan, P. (1956) “The Monetary Dynamics of Hyperinflation,” in Friedman, M. (Ed.), Studies in the Quantity Theory of Money, University of Chicago Press, Chicago and London, 25-117

Cziraky D Gillman M, (2006). “Money demand in an EU accession country: VECM study of Croatia. Bulletin of Economic Research”, 58(2): 73–159.

Choi, W.G. and S. Oh, (2003). “Demand functions with output uncertainty, monetary uncertainty, and financial innovations. Journal of Money, Credit, and Banking” 35:685-709.

Darrat, A. (1986) “The demand for money in some major OPEC members: Regression estimates and stability results”, Applied Economics 18, 127-142

Engle R. F, & Granger C. W. J. (1987). ”Cointegration and error correction: Representation, estimation, and testing Econometrica” 55: 251–276

Engle, Robert F. (1982). “Autoregressive Conditional Heteroskedasticity with Estimates of the variance of United Kingdom Inflation.” Econometrica.50:4, pp. 987–1007

Fielding, D.(1994):“Money Demand in Four African Countries”. Journal of Economic Studies, 21(2): 3–37.

Ghartey, E. E. (1998) “Monetary dynamics in Ghana: evidence from cointegration, error correction modelling, and exogeneity”, Journal of Development Economics 57, 473-86

Greiber, C., Lemke, W. (2005): “Money demand and macroeconomic uncertainty”, Deutsche Bundesbank Discussion Paper 26/05.

Harvey, A. C., (1993): Long memory in stochastic volatility: Forecasting Volatility in Financial Markets, J. Knight and S. Satchell (editors), 307-320, Oxford: Butterworth-Heineman.

Johansen, S and K. Juselius (1990) “Maximum Likelihood Estimation and Inference on Cointegration: with Application to the Demand for Money”, Oxford Bulletin of Economics and Statistics, 52, 169-210.

Kallon, K. (1992) ‘An econometric analysis of money demand in Ghana’, Journal of Developing Areas 26, 475-488

Melnick, R.“ Financial Services, Cointegration and the Demand for Money in Israel” .Journal of Money, Credit and Banking,1995, Vol.27, No.1, pp.321-350.

Miller, S.M. (1991):“Monetary dynamics: An application of Cointegration and error –correction modeling. Journal of Money, Credit and Banking” 23(2), 139-154.

Mundell, A. R. (1963), “Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates,” Canadian Journal of Economics and Political Science, 29(4), 475-85.

Nell, K.S. (1999), “The Stability of Money Demand in South Africa, 1965-1997, University of Kent at Canterbury, Department of Economics, Studies in Economics” , no.99/5

Nell, K. S. (2003) “The stability of M3 money demand and monetary growth targets: The case of South Africa”, Journal of Development Studies 39, 151-180

Nwaobi, G. (2002), "A Vector Error Correction and Non-nested Modeling of Money Demand-Function in Nigeria," Economics Bulletin, 3, 4, 1-8.

Onafowora, O. A. and O. Owoye (2007) Structural Adjustment And The Stability Of The Nigerian Money Demand Function. International Business & Economic Research Journal, Vol. 3, No. 8.

Pesaran, M. H Y. Shin and R. J. Smith (2001), “Bound Testing Approaches to the Analysis of Level Relationships”, Journal of Applied Econometrics, 16: 289-326.

Randa, John (1999), “Economic Reform and the Stability of the Demand for Money in Tanzania” Journal of African Economies 8(3): 307-34

Simmons, R. (1992) “An error-correction approach to demand for money in five African developing countries” ,Journal of Economic Studies 19, 29-48

Sriram, Subramanian S., (1999a), “Demand for M2 in an Emerging-Market Economy: An Error-Correction Model for Malaysia, IMF Working Paper 99/173 (Washington: International Monetary Fund)

Sriram, Subramanian S, (2000), “The Demand for Money in Malaysia”: A Study of M2 (Bangalore, India: Southern Economist.

Tayebi, K Alboosoveilem M and Soheili, F(2011). *International Financial Crisis and Money Demand in Australia: ARDL Approach*: University of Isfahan working paper.

Wickens, M.R., Breusch, T.S (1988). “Dynamic Specification, the Long-Run and the Estimation of Transformed Regression Models” The Economic Journal 98189-205

Wooldridge, J. M. (2002). “Econometric Analysis of Cross Section and Panel Data” 1st ed. Cambridge, MA: MIT Press.

7. APPENDIX

7.1 Data Construction

DATA:

a.) International Financial Statistics (IFS) of the International Monetary Fund (IMF),

b.) Federal Reserve Bank of St. Louis.

c.) Direction of Trade Statistics of IMF (University of Wisconsin Milwaukee Library).

d.) Bahmani-Oskooee and Gelan (2009)

e.) Federal Reserve bank of New York website (www.economagic.com/fedny.htm)

The data were constructed following Bahmani-Oskooee and Gelan (2009) as follows:

REAL M2:

Defined as real quarterly M2, was not available and had to be constructed. First the quarterly data for M1 from source a) is added to Quasi money also from source a) to obtain money supply (M2). That is M2 = M1+Quasi Money. Finally, the resulting M2 is divided by the P as measured by CPI, the price level, to find the resulting real M2.

Y: QUARTERLY REAL GDP

With the assumption that the scale variable is used as a measure of transaction related to economic activities, it is represented by level of income, expenditure or wealth, while price variable is represented by consumer price index (CPI) (Sriram 2001).

According to (Laider 1993), Gross National Product (GNP), Net National Product (NNP), and Gross Domestic Product (GDP) move together and, either one can be used in measuring income. Since the scale variable (GDP in this case), represents the transactions or wealth effect it is positively related to the demand for money. Defined as nominal GDP divided by consumer price index (CPI) (since no GDP deflator was available), for all countries. Quarterly GDP was not available and had to be constructed. For this thesis, annual GDP or GDP_n data was used to construct quarterly GDP following Bahmani-Oskooee and Gelan (2009), by initially applying the identity $GDP_a = VM_2$ and solving for $\hat{V}_i$ we obtain $\hat{V}_i = \frac{GDP_a}{M_2}$, where M_2 is the monetary aggregate for the fourth quarter, and assuming that velocity of money is constant for at least one year, $\hat{V}_1 = \hat{V}_2 = \hat{V}_3 = \hat{V}_4 = \hat{V}$. The quarterly GDP, $\hat{Y}_i = \hat{V} M_{q_i}$ where M_{qi} are the quarterly monetary data and $i = 1,2,3,4$ for the four quarters. Using the formula $(\frac{GDP_a}{\sum_1^4 \hat{Y}_i}) * Y_i$ for i = 1, 2, 3 and 4 we compute the values of each of the quarterly GDP. For example, multiplying by $\hat{Y}_1$ calculates the quarter one GDP. Note that the total values of the calculated quarterly GDP $\sum_1^4 \hat{Y}_i$ may not be equal to the actual annual GDP data. Therefore to correct for the imbalance we add together the values from the ratio:

$$(\frac{GDP_a}{\sum_{i=1}^{4} \hat{Y}}) * \hat{Y}_1 + (\frac{GDP_a}{\sum_{i=1}^{4}}) * \hat{Y}_2 + (\frac{GDP_a}{\sum_{i=1}^{4} \hat{Y}}) * \hat{Y}_3 + (\frac{GDP_a}{\sum_{i=1}^{4} Y_4}) * Y_4 = GDP_{annual} \quad \textbf{(7)}$$

Where, each of the four components represents the quarterly GDP. Note, summing up all the values equals the annual GDP as indicated in equation (7)

P: PRICE LEVEL

P is measured by CPI, and the data came from source a, and e), and it is used to measure the inflation rate.

REEX:

Real effective exchange rate. Data not available and was constructed following Bahmani-Oskooee and Gelan (2007), using formula (8).

$$REEX_J = \sum_{i=1}^{20} \lambda_{ij}\left[\frac{\left(\frac{P_J . E_{iJ}}{P_i}\right)_t}{\left(\frac{P_J . E_{ij}}{P_i}\right)_{2003}} x100\right] \qquad \textbf{(8)}$$

$$NEX_J = \sum_{i=1}^{20} \lambda_{ij}\left[\frac{(E_{ij})_t}{(E_{ij})_{2003}} x100\right] \qquad \textbf{(9)}$$

NEX

Similarly, data was not viable and had to be constructed following Bahmani-Oskooee and Gelan (2007), using the formula in equation (9). The data relevant for construction of NEX came from sources a), b), and part c). NEX is defined as index of nominal effective exchange rate, where a decline reflects a depreciation of domestic currency. Nominal effective exchange rate for country j, given as NEX_j is constructed in the same way except that the price levels are dropped from the formula NEX_j is constructed in the same way except that the price levels are dropped from the formula (9). Where E_{ij}, is the bilateral nominal exchange rate[5] of country j, (data comes from sources a, and e), with trading partner i defined as number of i's currency per unit of j's currency. To obtain real effective exchange rates, E_{ij} is multiplied by P_j, which is the price level in country j, and divided by P_i, (the price levels in country j), as shown in equation (8). The resulting solution is then divided by the value in 2003 as the base year. λ_{ij} is denoted as the share (weights) of each country's imports by the trading partner (which were different for each country).

Note that the $\sum\lambda_{ij} =1$. The resulting Table is shown in the Appendix.

VY: Volatility measure of real GDP (output volatility).

VM: Volatility measure of nominal M2 (monetary volatility)

[5]Apart from the U.S dollar, the Bilateral exchange rates, Eij, and the exchange rates of the trading partners had be generated for all the 21 countries, since it wasn't readily available.

7.2 ARCH and GARCH

Generalized Autoregressive Conditional Heteroscedasticity (GARCH), which is a more generalized form of ARCH model proposed by Engel (1982). GARCH is widely used in time series modeling of economics and financial data due to its ability to capture time varying volatility. Furthermore GARCH allows for a wider range of behavior, in particular, more persistent volatility. GARCH (p, q) is a more flexible structural model that is used in the case of long lag length q. Where p refers to the lags on σ_t^2 and q refers to the lags on ε_t^2. For both VY and VM volatility measures the data was not readily available and was generated using GARCH approach, following Bahmani-Oskooee et al (2010). GARCH allows the variance of the particular variable, for instance X, to change over time. It assumes that X is a random variable which is drawn from a conditional density function f $(X_t|X_{t-1})$. Under standard assumptions, the forecast of X and its variance are not constant and depend on the past information. The initial assumption for GARCH model is that $X_t = \alpha_0 + \alpha_1 X_{t-1} + \varepsilon_t$, a first order-autoregressive process, where ε_t is white noise with E(ε)=0 and $V(\varepsilon) = \sigma^2$. To be able to forecast the variance of X, we must first estimate the time-varying conditional variance of ε_t. The theoretical specification of a GARCH model which is being used is as follows:

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \varepsilon_t \quad \textbf{(10)}$$

$$\varepsilon_t \mid I_{t-1} \sim N(0, \sigma_t^2) \quad \textbf{(11)}$$

$$V(X_t \mid I_{t-1}) = V(\varepsilon_t \mid I_{t-1)} = \sigma_t{}^2 \quad \textbf{(12)}$$

$$\sigma_t^2 = \beta_0 + \beta_1\varepsilon_{t-1}{}^2 + \beta_2\varepsilon_{t-2}{}^2 + ... + \beta_q\varepsilon_{t-q}{}^2 + \psi_1\sigma_{t-1}{}^2 + \psi_2\sigma_{t-2}{}^2 + ... + \psi_p\sigma_{t-p}{}^2 \quad \textbf{(13)}$$

Where I_{t-1} includes all available information and, p is the GARCH term of $\sigma_t{}^2$, and q is lag length the ARCH. The GARCH (p, q) model outlined by equation (13) is used to generate predicted value of as a measure of volatility of X (which is output and monetary aggregate in this research). Before estimating GARCH (p, q), in equation (13) it is important to first test for the presence of ARCH effect in the variable X, where ARCH effect is a situation where the variance of the error term is a function of the of the lagged error terms in the past periods as shown in the equation below.

$$\varepsilon_t^2 = \alpha_0 + \alpha_1\varepsilon_{t-1}{}^2 + \alpha_2\varepsilon_{t-1}^{\backslash}{}^2 + ... + \alpha_q\varepsilon_{t-q}{}^2 \quad \textbf{(14)}$$

Any coefficients of the αs that is found to be significant, is enough to support the presence of ARCH effect. The next step after testing the ARCH effect is to estimate the equations (10) and (11) simultaneously. Usually, to determine the order of GARCH in equation (13) greatly depend on the significance of the βs and ψs. For a simple version of equation (13), GARCH (1,1) is usually estimated. Volatility is the standard deviation calculated following GARCH (1,1) formulation.

7.3 ADF UNIT ROOT TESTING

ADF Unit Root Test Results for All African Countries

COUNTRY	SECOND DIFFERENCE	VARIABLES					
		ln Y	**ln M**	$\ln P_t / P_{t-1}$	**ln NEX**	**ln VY**	**lnVM**
BURKINA FASO	Constant, No Trend	-6.1(13)*	-6.7(10)*	-7.58(2)*	-8.0(6)*	-6.6(12)*	-7.0(12)*
	Constant, Trend	-6.1(13)*	-6.7(10)*	-7.7(2)*	-8.0(6)*	-6.59(12)*	-7.0(12)*
BURUNDI	Constant, No Trend	-9.0(6)*	-6.0(10)*	-7.7(11)*	-7.6(7)*	-8.4(11)*	-6.7(9)*
	Constant, Trend	-8.9(6)*	-6.0(10)*	-7.8(11)*	-7.5(7)*	-8.4(11)*	-6.7(9)*
CAMEROON	Constant, No Trend	-4.8(6)*	-6.7(6)*	-5.0(4)*	-9.2(0)*	-4.4(7)*	-7.8(2)*
	Constant, Trend	-4.7(6)*	-6.3(6)*	-5.2(4)*	-9.1(0)*	-4.2)*(7)*	-7.4(2)*
COTE D' VOIRE	Constant, No Trend	-6.9(10)*	-6.9(10)*	-7.1(3)*	-6.7(10)*	-6.7(12)*	-7.2(11)*
	Constant, Trend	-6.9(10)*	-7.0(10)*	-7.2(3)*	-6.6(10)*	-6.7(12)*	-7.2(11)*
EGYPT	Constant, No Trend	-5.7(13)*	-6.6(10)*	-7.6(2)*	-8.7(5)*	-7.5(12)*	-7.1(7)*
	Constant, Trend	-5.7(13)*	-6.6(10)*	-7.7(2)*	-8.7(5)*	-7.5(12)*	-7.0(7)*
ETHOPIA	Constant, No Trend	-6.4(11)*	-6.7(11)*	-9.8(2)*	-8.1(5)*	-6.2(12)*	-7.4(13)*

	Constant, Trend	-6.4(11)*	-6.7(11)*	-10.0(2)*	-8.1(5)*	-6.3(12)*	-7.4(13)*
GABON	Constant, No Trend	-5.2(11)*	-6.9(5)*	-8.3(2)*	-9.3(3)*	-17.0(10)*	-9.2(5)*
	Constant, Trend	-5.3(11)*	-6.9(5)*	-8.4(2)*	-9.4(3)*	-17.2(10)*	-9.2(5)*
GHANA	Constant, No Trend	-5.8(10)*	-6.1(10)*	-7.5(11)*	-6.4(7)*	-6.1(12)*	-7.9(10)*
	Constant, Trend	-5.8(10)*	-6.1(10)*	-7.6(11)*	-6.33(7)*	-6.1(12)*	-7.8(10)*
KENYA	Constant, No Trend	-7.6(6)*	-7.4(10)*	-6.7(3)*	-8.8(7)*	-8.7(5)*	-8.5(6)*
	Constant, Trend	-7.5(6)*	-7.3(10)*	-6.2(3)*	-8.6(7)*	-8.7(5)*	-8.5(6)*
MADACASCAR	Constant, No Trend	-8.4(6)*	-6.99(10)*	-4.5(3)*	-7.3(7)*	-6.8(13)*	-6.6(12)*
	Constant, Trend	-8.3(6)*	-7.02(10)*	-4.6(3)*	-7.3(7)*	-6.8(13)*	-6.6(12)*
MAURITIUS	Constant, No Trend	-6.2(10)*	-6.1(12)*	-9.2(0)*	-8.6(5)*	-8.4(7)*	-8.2(8)*
	Constant, Trend	-6.0(10)*	-6.1(12)*	-9.3(0)*	-8.6(5)*	-8.3(7)*	-8.1(8)*
MOROCCO	Constant, No Trend	-7.0(12)*	-6.2(10)*	-4.5(3)*	-8.0(7)*	-6.7(11)*	-7.0(13)*
	Constant, Trend	-7.1(12)*	-6.2(10)*	-4.5(3)*	-8.0(7)*	-6.4(11)*	-7.0(13)*
NIGER	Constant, No Trend	-8.4(7)*	-7.9(7)*	-14.0(0)*	-7.64(0)*	-6.8(10)*	-7.9(7)*
	Constant, Trend	-8.37(7)*	-7.9(7)*	-14.0(0)*	-7.73(0)*	-6.8(10)*	-7.9(7)*
NIGERIA	Constant, No Trend	-8.7(7)*	-7.2(11)*	-7.3(11)*	-10.6(2)*	-7.8(6)*	-7.2(12)*
	Constant, Trend	-8.7(7)*	-7.3(11)*	-7.2(11)*	-5.8(6)*	-7.76)*	-7.1(12)*
RWANDA	Constant, No Trend	-6.2(10)*	-7.1(10)*	-9.6(1)*	-10.7(4)*	-7.9(7)*	-6.7(10)*
	Constant, Trend	-6.4(10)*	-7.1(10)*	-9.9(1)*	-10.6(4)*	-7.9(7)*	-6.6(10)*

SENEGAL	Constant, No Trend	-3.9(13)*	-8.1(10)*	-8.9(11)*	-7.3(7)*	-6.9(10)*	-6.1(10)*
	Constant, Trend	-3.9(13)*	-8.1(10)*	-8.9(11)*	-7.3(7)*	-7.0(10)*	-6.1(10)*
SYCHELLES	Constant, No Trend	-5.9(1)*	-8.6(6)*	-6.7(5)*	-7.8(6)*	-6.3212)*	-7.2(12)*
	Constant, Trend	-5.9(1)*	-6.4(9)*	-6.8(5)*	-7.9(6)*	-6.3(12)*	-7.2(12)*
SIERRA LEONE	Constant, No Trend	-8.8(5)*	-7.9(6)*	-6.3(13)*	-14.5(4)*	-7.6(10)*	-6.6(12)*
	Constant, Trend	-8.7(5)*	-7.9(6)*	-6.5(13)*	-14.6(4)*	-7.6(10)*	-6.6(12)*
SOUTH AFRICA	Constant, No Trend	-6.3(13)*	-8.0(6)*	-4.7(10)*	-7.1(8)*	-6.7(13)*	-6.8(11)*
	Constant, Trend	-6.3(13)*	-8.0(6)*	-4.7(10)*	-7.1(8)*	-6.6(13)*	-6.8(11)*
TANZANIA	Constant, No Trend	-8.8(7)*	-8.7(7)*	-6.9(12)*	-7.7(6)*	-6.7610)*	-7.1(8)*
	Constant, Trend	-8.8(7)*	-8.6(7)*	-7.0(12)*	-7.7(6)*	-6.7(10)*	-7.2(8)*
TOGO	Constant, No Trend	-4.1(7)*	-4.5(5)*	-8.7(3)*	-10.1(0)*	-4.9(4)*	-2.5(6)*
	Constant, Trend	-4.0(5)*	-4.5(5)*	-8.5(3)*	-10.1(0)*	-5.0(4)*	-2.5(6)*

ADF Unit Root Test based on the following Regression forms:

1. Without Constant and Trend: $\Delta Y_t = \delta Y_{t-1} + U_t$
2. With Constant: $\Delta Y_t = \alpha + \delta Y_{t-1} + U_t$
3. With Constant and Trend: $\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + U_t$

The hypothesis is: $H_o: \delta = 0\ (Unit\ Root)$ and $H_1: \delta \neq 0$

Decision Rule: If t*> ADF critical value ➔ not reject null hypothesis, i.e., unit root exists

If t*< ADF critical value ➔ reject null hypothesis, i.e., unit root does exists

(Note: Plot data shows increasing upward trend therefore not stationary.

7.4 LIST OF TABLES 1-21

Table 1: Full-Information Estimate of the Money Demand for Burkina Faso

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	*5*
Δ ln M		-0.06(0.83)	-0.17(2.82)	-0.05(0.80)	0.11(1.9)	
Δ ln Y	1.13(.86)					
Δ ln(Pt/Pt-1)	-0.02(6.5)					
Δ ln NEX	-0.02(2.58)					
Δ ln VM	-0.02(0.32)					
Δ ln VY	-0.09(9.23)	-0.01(0.89)	-0.03(3.34)			

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-4.872(4.31)	1.13(8.78)	-4.47(3.18)	-0.35(2.78)	0.58(3.01)	0.63(0.22)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
4.96	-0.11(5.49)	0.95	3.89	S	S	0.56

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 2: Full-Information Estimate of the Money Demand for Burundi

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	***5***
Δ ln M		0.26(2.18)				
Δ ln Y	0.32(8.95)	-0.21(2.59)	-0.24(4.57)	0.07(1.69)	0.22(4.96)	
Δ ln(Pt/Pt-1)	-0.37(2.85)					
Δ ln NEX	-0.02(0.34)					
Δ ln VM	-0.32(1.18)	0.54(2.43)				
Δ ln VY	0.19(5.17)	0.25(5.34)	0.09(2.98)			

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
7.80(3.49)	0.90(4.27)	-3.39(1.66)	-.17(1.96)	0.59(0.78)	-0.41(1.01)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
3.49	-0.16(4.59)	6.06	0.75	S	S	0.63

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 3: Full-Information Estimate of the Money Demand for Cameroon
Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	**5**
Δ ln M		0.29(5.99)	-0.07(1.33)	0.12(2.54)		
Δ ln Y	0.69(15.83)					
Δ ln (Pt/Pt-1)	0.05(0.49)	0.18(1.99)				
Δ ln NEX	0.01(0.38)					
Δ ln VM	0.23(2.85)					
Δ ln VY	0.16(2.34)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
0.16(0.04)	0.16(0.04)	0.16(0.04)	0.16(0.04)	0.16(0.04)	0.16(0.04)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
0.91	-0.05(2.32)	1.09	18.07	S	S	0.70

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 4: Full-Information Estimate of the Money Demand for Cote d' Ivoire

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	**5**
Δ ln M	0.04(0.99)	0.11(2.56)	0.09(2.19)	0.09(2.38)		
Δ ln Y	0.82(22.65)					
Δ ln (Pt/Pt-1)	-0.02(6.5)					
Δ ln NEX	-0.03(1.38)					
Δ ln VM	-0.09(3.57)	0.07(2.91)				
Δ ln VY	-0.02(0.75)	0.05(2.38)	-0.07(3.25)	-0.05(2.91)		

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
4.81(0.60)	1.28(0.60)	4.60(1.31)	0.47(2.02)	0.97(1.68)	0.71(0.53)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
14.34	-0.06(3.28)	0.84	0.48	S	S	0.92

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2).}$ At the 5% level, the critical value of $\chi^2_{(1)}$ = 3.84 and the critical value of $\chi^2_{(2)}$ = 5.99.

Table 5: Full-Information Estimate of the Money Demand for Egypt

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	*5*
Δ ln M		-0.44(5.08)	0.17(2.39)			
Δ ln Y	0.29(7.19)	0.30(6.12)	0.28(5.17)	0.19(4.15)	-0.11(3.00)	-0.07(1.81)
Δ ln (Pt/Pt-1)	-0.02(6.5)					
Δ ln NEX	-0.02(2.58)					
Δ ln VM	-0.02(0.32)					
Δ ln VY	-0.09(9.23)	-0.01(0.89)	-0.03(3.34)			

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-4.50(1.29)	1.16(3.12)	42.45(1.57)	-0.33(1.34)	-1.64(1.53)	0.70(0.30)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
14.34	0.03(9.46)	7.09	19.27	Unstable	Stable	0.85

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2).}$ At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 6: Full-Information Estimate of the Money Demand for Ethiopia

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	5
Δ ln M		0.01(0.18)	-0.16(2.37)	-0.10(1.43)	0.28(4.25)	-0.14(2.03)
Δ ln Y	0.31(8.12)	0.05(6.57)	0.03(3.58)	-0.02(2.78)		
Δ ln (Pt/Pt-1)	-0.63(10.28)	0.13(1.07)	-0.09(0.81)	-0.13(1.44)		
Δ ln NEX	0.00(0.39)					
Δ ln VM	-0.02(1.21)					
Δ ln VY	0.02(2.10)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-6.38(3.07)	1.35(11.24)	-16.35(3.11)	0.15(2.81)	0.26(1.48)	-1.61(2.54)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
6.31	-0.04(6.27)	3.36	0.09	S	S	0.8

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)}$ = 3.84 and the critical value of $\chi^2_{(2)}$ = 5.99.

Table 7: Full-Information Estimate of the Money Demand for Gabon

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	**5**
Δ ln M						
Δ ln Y		0.33(10.10)				
Δ ln (Pt/Pt-1)	-0.60(5.40)					
Δ ln NEX	0.02(0.3)					
Δ ln VM	-0.00(0.15)					
Δ ln VY	0.09(9.23)	0.03(0.22)	0.28(2.62)			

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
-1.17(0.31)	1.09(6.24)	-2.99(2.78)	0.32(1.87)	0.46(0.30)	-0.07(0.47)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
7.12	-0.13(6.61)	5.8	0.33	Stable	Stable	0.62

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 8: Full-Information Estimate of the Money Demand for Ghana

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	***5***
Δ ln M		0.02(0.22)	0.05(0.78)	-0.08(1.28)	0.11(1.70)	0.18(2.83)
Δ ln Y	0.67(13.07)					
Δ ln (Pt/Pt-1)	-0.41(6.84)	-0.09(0.82)	-0.01(0.10)	-0.04(0.40)	0.06(0.77)	-0.13(2.91)
Δ ln NEX	0.00(0.12)					
Δ ln VM	-0.18(5.49)	-0.04(1.21)	-0.07(2.07)	-0.08(2.34)		
Δ ln VY	0.00(0.48)					

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
2.32(6.38)	-3.65(0.76)	-0.01(0.37)	0.08(0.32)	0.21(0.41)	2.32(6.38)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
3.46	-0.07(4.70)	2.96	4.57	Stable	Stable	0.91

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 9: Full-Information Estimate of the Money Demand for Kenya

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	***5***
Δ ln M		0.15(2.78)				
Δ ln Y	0.44(7.07)					
Δ ln (Pt/Pt-1)	-0.70(5.75)					
Δ ln NEX	0.10(2.37)		-0.07(1.50)	0.1(2.40)		
Δ ln VM	0.05(0.86)	-0.00(0.02)	-0.03(0.64)	0.15(0.60)		
Δ ln VY	-0.03(0.73)					

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
5.40(2.58)	0.50(2.07)	-5.73(2.90)	-0.16(2.99)	-0.17(0.92)	0.17(1.07)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
6.33	-0.12(6.27)	4.69	5.54	Stable	Stable	0.62

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 10: Full-Information Estimate of the Money Demand for Madagascar
Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	5
Δ ln M		-0.03(0.43)	-0.06(0.84)	0.33(4.50)	-0.08(1.41)	
Δ ln Y	0.06(0.76)	-0.01(0.09)	-0.03(0.39)	-0.20(3.05)		
Δ ln (Pt/Pt-1)	-0.47(5.36)					
Δ ln NEX	-0.02(0.51)					
Δ ln VM	0.16(2.31)					
Δ ln VY	-0.06(2.13)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
1.96(2.45)	-7.64(2.25)	0.17(1.07)	-0.53(1.12)	1.34(1.36)	1.96(2.45)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
4.1	-0.05(5.0)	3.47	7.64	Stable	Stable	0.69

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)}$ = 3.84 and the critical value of $\chi^2_{(2)}$ = 5.99.

Table 11: Full-Information Estimate of the Money Demand for Mauritius

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	1	2	3	4	5
Δ ln M						
Δ ln Y	0.67(16.82)		0.05(0.98)	0.18(3.59)	0.15(3.67)	0.09(2.60)
Δ ln (Pt/Pt-1)	-0.73(5.05)	-0.43(2.48)	-0.46(3.08)			
Δ ln NEX	-0.03(0.67)					
Δ ln VM	-0.01(0.44)					
Δ ln VY	0.02(1.50)	-0.02(1.16)	-0.00(0.17)			

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-0.44(0.29)	1.47(12.43)	-0.74(0.40)	-0.16(1.07)	0.17(1.62)	-0.44(0.29)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
2.72	-0.10(0.99)	21.83	20.16	Stable	Stable	0.84

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 12: Full-Information Estimate of the Money Demand for Morocco

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	**5**
Δ ln M		-0.15(2.31	0.15(2.16)	-0.05(0.75)	0.12(1.60)	0.25(3.39)
Δ ln Y	0.44(10.56)					
Δ ln (Pt/Pt-1)	-0.71(5.94)	-0.18(0.97)	-0.01(0.05)	-0.12(0.69)	0.04(0.24)	0.33(2.88)
Δ ln NEX	0.003(0.74)					
Δ ln VM	0.02(2.97)	-0.02(3.02)	-0.02(3.11)			
Δ ln VY	0.00(0.15)					

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
9.88(3.29)	1.70(10.04)	-14.09(1.87)	0.91(0.34)	-.02(0.06)	0.64(1.65)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
2.37	-0.06(3.83)	8.28	8.68	Stable	Stable	0.6

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 13: Full-Information Estimate of the Money Demand for Niger

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	***5***
Δ ln M		0.07(1.23)				
Δ ln Y	0.72(14.48)					
Δ ln (Pt/Pt-1)	0.03(0.10)					
Δ ln NEX	0.012(1.81)					
Δ ln VM	0.22(2.63)	-0.06(0.83)	-0.03(0.40)	-0.20(2.90)	-0.11(1.59)	
Δ ln VY	0.04(1.16)					

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
3.29(0.12)	43.01(0.08)	11.60(0.09)	2.93(0.07)	41.39(0.07)	3.29(0.12)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
1.71	-0.00(3.23)	6.21	13.66	Stable	Stable	0.6

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 14: Full-Information Estimate of the Money Demand for Nigeria
Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	**5**
Δ ln M		-0.03(0.35)	0.03(0.38)	0.00(0.00)	0.22(3.54)	
Δ ln Y	0.23(4.56)	0.18(3.27)				
Δ ln (Pt/Pt-1)	-0.77(6.76)					
Δ ln NEX	0.22(1.96)					
Δ ln VM	0.06(2.14)					
Δ ln VY	0.08(1.61)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
14.72(2.78)	1.56(2.17)	-16.9(2.20)	-0.29(0.76)	0.83(1.06)	2.93(1.60)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
6.25	-0.04(6.19)	3.54	3.73	S	S	0.55

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 15: Full-Information Estimate of the Money Demand for Rwanda
Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	5
Δ ln M		-0.19(1.81)	-0.17(1.94)	-0.12(1.48)	0.27(3.43)	
Δ ln Y	0.63(14.09)	0.08(0.88)	0.01(0.11)	0.06(0.85)		
Δ ln (Pt/Pt-1)	-0.40(5.06)	0.40(3.61)	0.22(2.31)	0.06(0.88)		
Δ ln NEX	-0.02(0.69)	-0.01(0.45)	-0.06(2.44)	-0.06(2.35)	-0.07(2.91)	
Δ ln VM	-0.09(0.71)					
Δ ln VY	0.17(2.04)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
8.06(11.20)	1.02(6.86)	-6.46(5.86)	-0.17(4.38)	0.99(3.74)	0.64(2.06)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
6.68	-0.13(6.42)	9.18	6.78	Stable	Stable	0.83

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 16: Full-Information Estimate of the Money Demand for Senegal

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	*5*
Δ ln M			0.03(0.47)	-0.04(0.58)	0.47(6.84)	-0.16(3.39)
		0.14(1.85)				
Δ ln Y	0.79(17.14)	0.03(0.35)	-0.02(0.23)	0.02(0.30)	-0.35(4.84)	0.79(17.14)
Δ ln (Pt/Pt-1)	-0.30(0.11)					
Δ ln NEX	-0.00(0.11)					
Δ ln VM	0.06(1.73)	-0.07(2.64)				
Δ ln VY	0.01(0.22)					

Panel B: Long-Run Coefficient Estimates

Constant	*Constant*	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*
-0.55(0.22)	1.88(4.10)	-2.47(0.93)	0.10(0.28)	-0.09(0.25)	-0.55(0.22)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
1.87	-0.05(3.41)	1.23	0.12	Stable	Stable	0.81

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 17: Full-Information Estimate of the Money Demand for Seychelles

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	**1**	**2**	**3**	**4**	**5**
Δ ln M		0.03(0.35)	-0.06(0.79)	-0.12(1.49)	0.39(4.83)	
Δ ln Y	-0.00(0.03)	0.05(0.84)	0.14(2.21)	-0.11(1.62)	-0.00(0.03)	
Δ ln (Pt/Pt-1)	-0.43(5.34)					
Δ ln NEX	0.11(2.65)					
Δ ln VM	0.03(1.25)	-0.02(0.96)	0.02(0.96)	0.02(1.15)	0.05(2.52)	
Δ ln VY	0.00(0.20)	-0.09(3.74)				

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
1.78(8.77)	-1.79(0.52)	1.95(2.90)	0.36(1.68)	0.00(0.01)	1.78(8.77)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
4.64	-0.08(5.37)	8.97	0.19	Stable	Stable	0.77

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 18: Full-Information Estimate of the Money Demand for Sierra Leone
Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	**5**
Δ ln M		0.09(1.47)	-0.12(2.16)	-0.04(0.62)	-0.14(2.62)	
Δ ln Y	0.42(11.34)					
Δ ln (Pt/Pt-1)	-0.37(3.06)					
Δ ln NEX	-0.03(1.62)	-0.05(2.31)				
Δ ln VM	-0.07(1.07)					
Δ ln VY	0.00(0.43)	0.01(0.60)	0.00(0.43)			

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-11.70(0.58)	2.45(0.91)	-40.57(0.48)	1.55(0.55)	2.45(0.33)	-40.57(0.21)

Panel C: Diagnostic Statistics

F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
0.44	-0.01(1.62)	2.73	3.82	Stable	Stable	0.71

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 19: Full-Information Estimate of the Money Demand for South Africa

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	**5**
Δ ln M						
Δ ln Y	0.02(3.83)	-0.05(6.57)	-0.03(3.58)	-0.21(2.79)		
Δ ln (Pt/Pt-1)	-0.99(6.5)					
Δ ln NEX	-0.02(2.57)					
Δ ln VM	-0.02(0.32)					
Δ ln VY	-0.09(9.23)	-0.01(0.89)	-0.03(3.35)			

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
-2.17(0.52)	1.28(9.99)	-21.33(4.91)	0.20(3.37)	-0.94(7.32)	0.31(2.89)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
14.28	-0.06(9.39)	3.35	0	Stable	Stable	0.5

Explanations of Tables Contents

1. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The numbers inside parenthesis are absolute value of t-ratios.
2. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
3. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
4. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 20: Full-Information Estimate of the Money Demand for Tanzania

Panel A: Short-Run Coefficient Estimates

Lag Order	***0***	***1***	***2***	***3***	***4***	**5**
Δ ln M		-0.09(1.09)	0.29(3.40)	-0.05(0.63)	0.24(3.20)	
Δ ln Y	0.69(19.36)	-0.14(1.87)	-0.50(6.51)	-0.08(1.14)		
Δ ln (Pt/Pt-1)	0.04(0.47)					
Δ ln NEX	-0.18(3.98)	0.24(4.58)	0.02(4.04)			
Δ ln VM	-0.02(0.32)					
Δ ln VY	0.02(1.29)					

Panel B: Long-Run Coefficient Estimates

Constant	***ln Y***	***ln (Pt/Pt-1)***	***ln NEX***	***ln VY***	***ln VM***
1.68(5.34)	-1.70(0.69)	0.15(2.42)	0.13(2.42)	-7.75(1.11)	1.68(5.34)

Panel C: Diagnostic Statistics

F	***ECMt-1***	***LM***	***RESET***	***CUSUM***	***CUSUMSQ2***	***Adj. R2***
10.82	-0.08(8.08)	2.58	12.95	Stable	Stable	0.91

Explanations of Tables Contents

5. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis is absolute value of t-ratios.
6. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
7. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
8. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

Table 21: Full-Information Estimate of the Money Demand for Togo

Panel A: Short-Run Coefficient Estimates

Lag Order	*0*	*1*	*2*	*3*	*4*	5
Δ ln M		0.13(2.22)	0.19(3.31)			
Δ ln Y	0.65(14.40)					
Δ ln (Pt/Pt-1)	-0.11(1.06)	-0.26(2.66)				
Δ ln NEX	-0.08(1.35)	-0.13(2.02)				
Δ ln VM	-0.02(0.49)					
Δ ln VY	-0.17(0.64)					

Panel B: Long-Run Coefficient Estimates

Constant	*ln Y*	*ln (Pt/Pt-1)*	*ln NEX*	*ln VY*	*ln VM*
-8.93(.97)	0.92(1.12)	-5.81(0.58)	0.23(0.72)	-3.07(0.32)	-0.20(0.97)

Panel C: Diagnostic Statistics

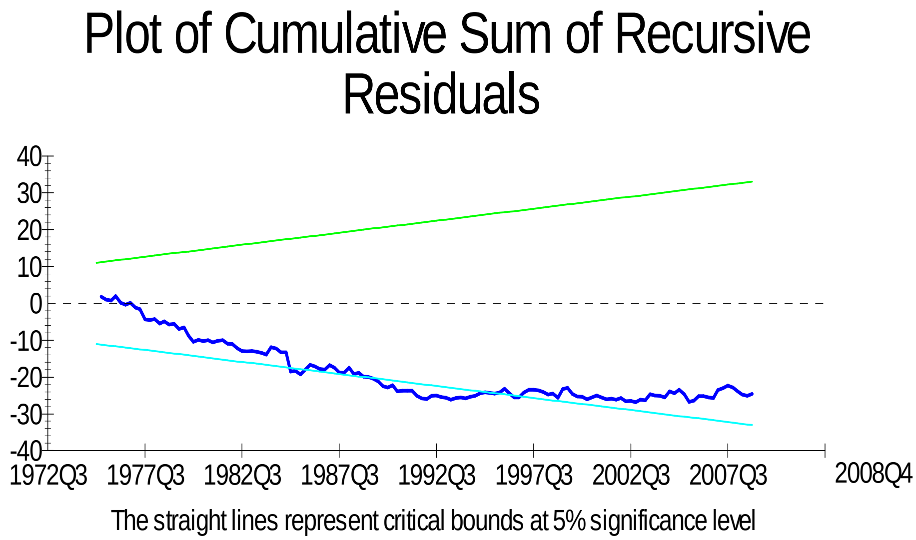
F	*ECMt-1*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ2*	*Adj. R2*
1.01	-0.02(2.20)	4.06	2.7	Stable	Stable	0.62

Explanations of Tables Contents

5. From the reported figures above, the number within the parenthesis and adjacent to the coefficient is t-ratios in absolute terms. The number inside parenthesis are absolute value of t-ratios.
6. LM is the Lagrange Multiplier test for serial correlation. It has a $\chi^2(1)$ distribution.
7. Ramsey's RESET test for functional form. It is distributed as $\chi^2_{(1)}$.
8. Normality test is based on a test of skewness and kurtosis of residuals. It is distributed as $\chi^2_{(2)}$. At the 5% level, the critical value of $\chi^2_{(1)} = 3.84$ and the critical value of $\chi^2_{(2)} = 5.99$.

7.5 LIST OF FIGURES 1-21

FIGURE 1: BURKINA FASO CUSUM AND CUSUMSQ



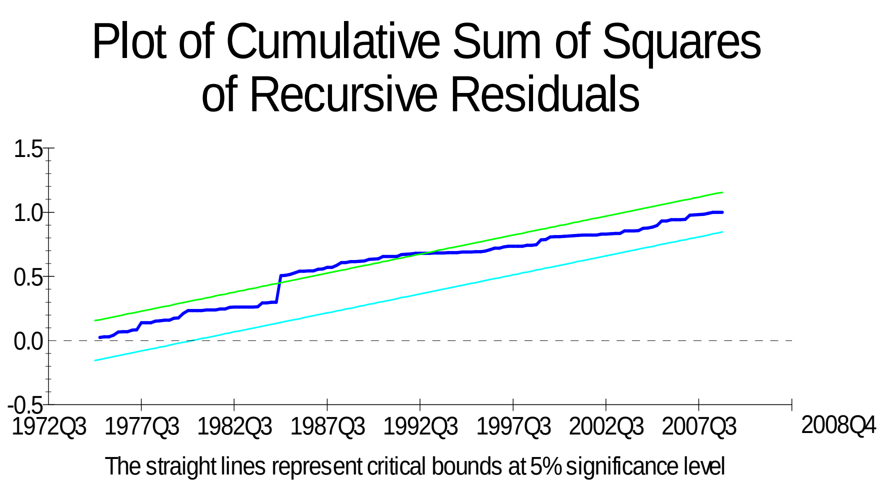
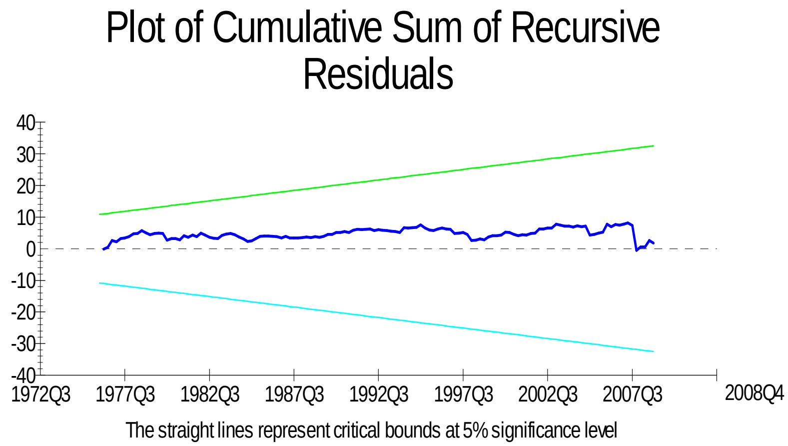


FIGURE 2: BURUNDI CUSUM AND CUSUMSQ



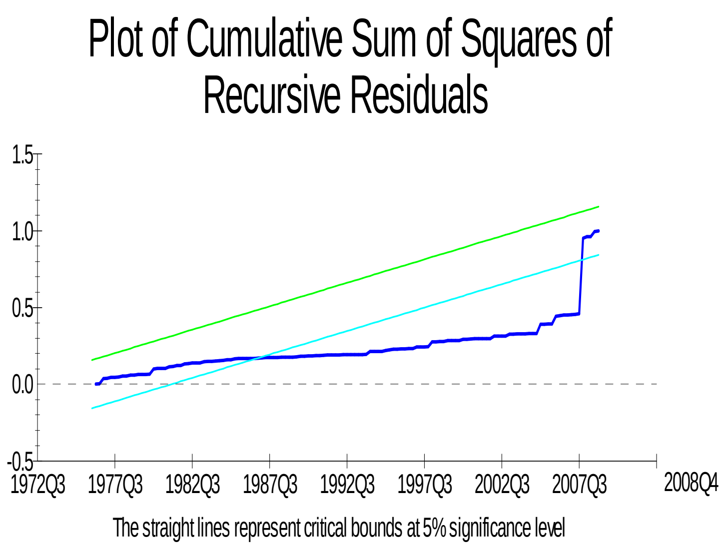
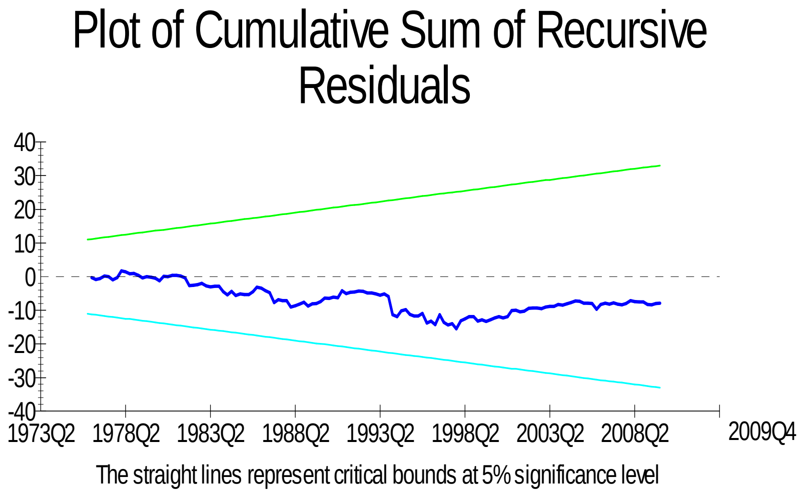


FIGURE 3: CAMEROON CUSUM AND CUSUMSQ



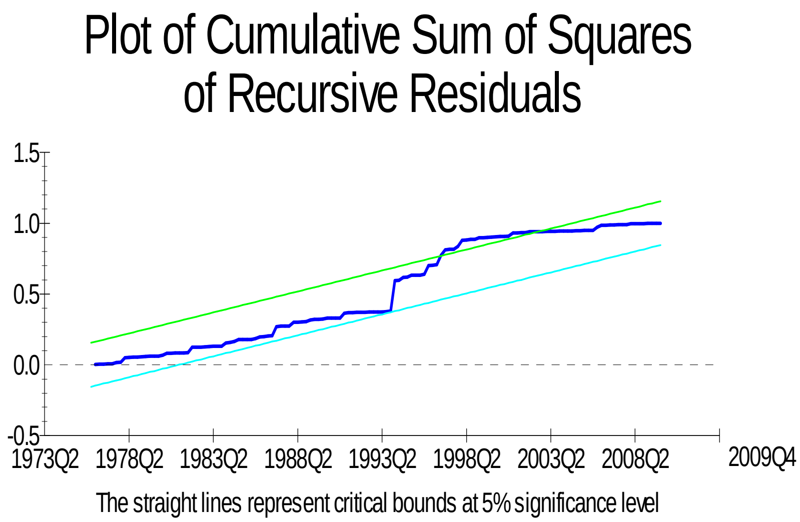
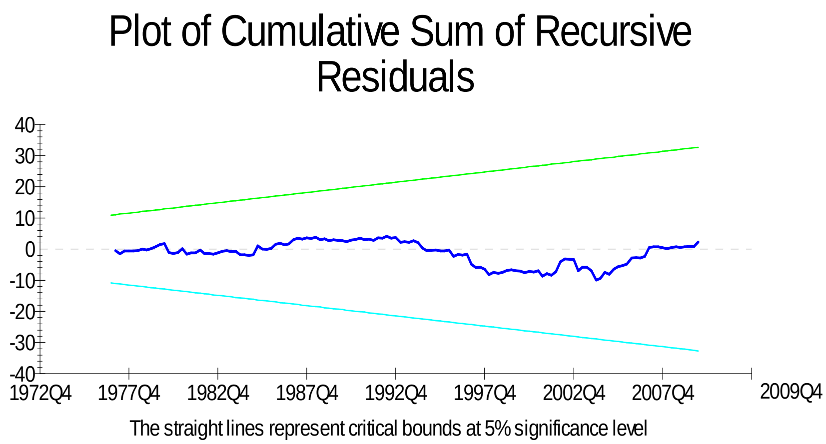


FIGURE 4: COTE D'IVOIRE CUSUM AND CUSUMSQ



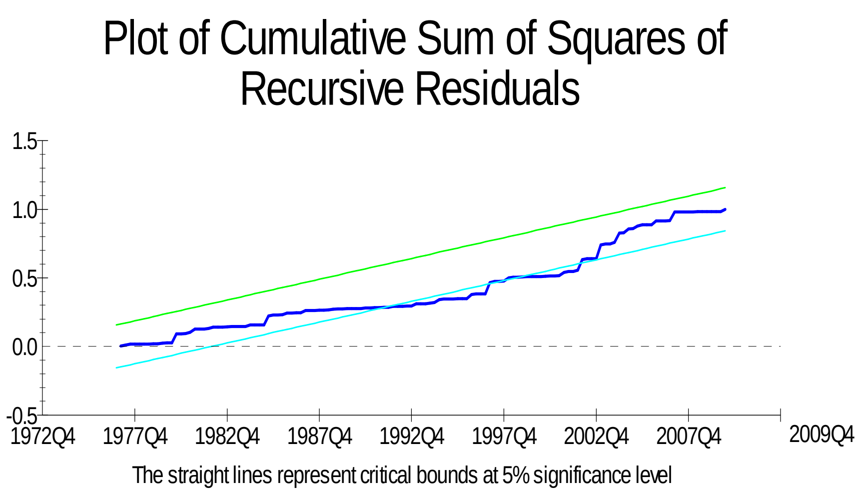
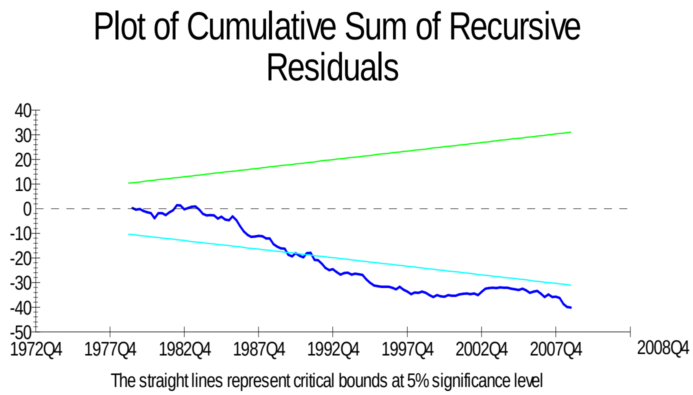


FIGURE 5: EGYPT CUSUM AND CUSUMQ



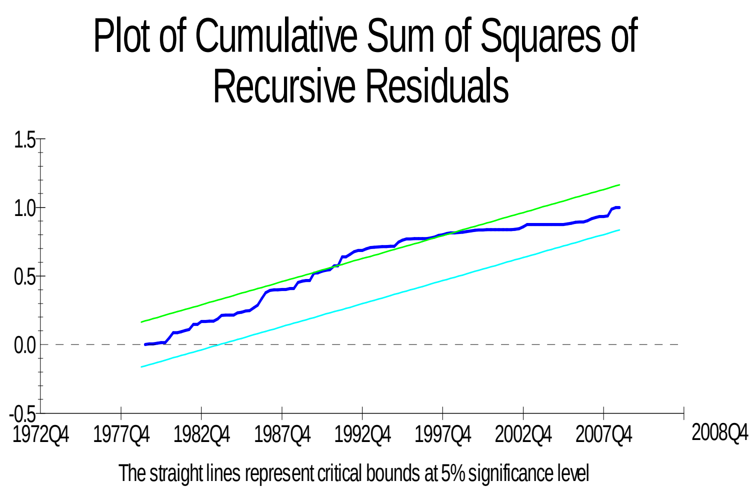
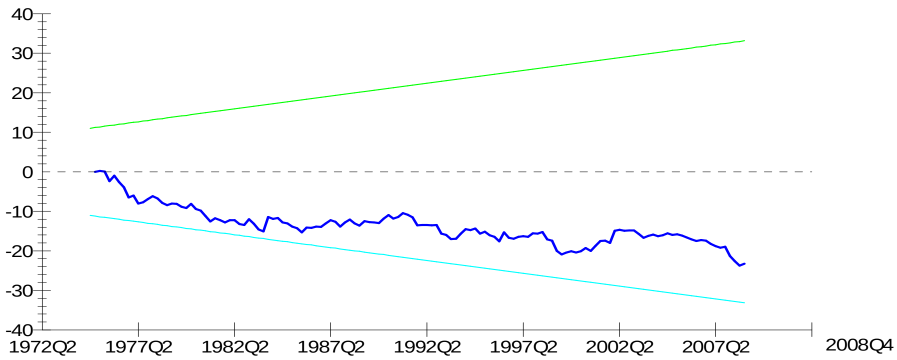


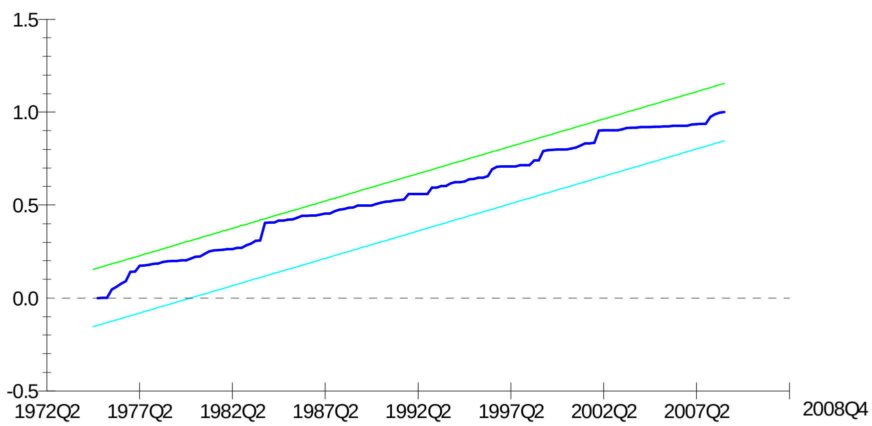
FIGURE 6: ETHIOPIA CUSUM AND CUSUMSQ

Plot of Cumulative Sum of Recursive Residuals



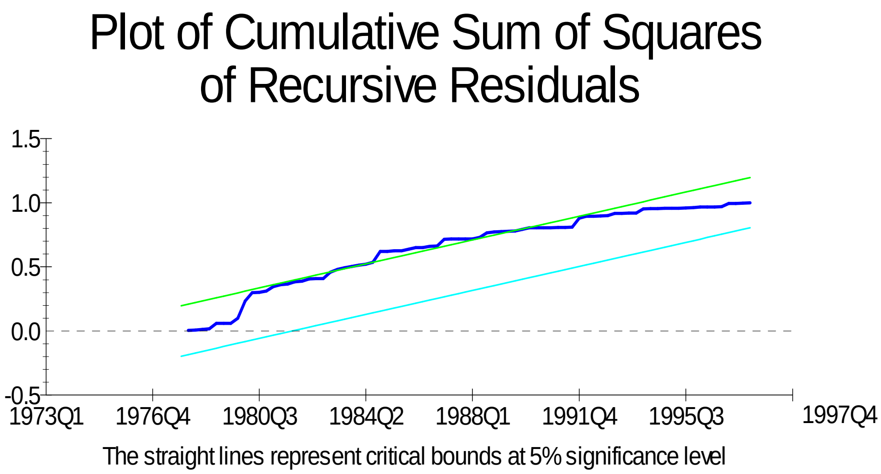
The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

FIGURE 7: GABON CUSUM AND CUSUMSQ



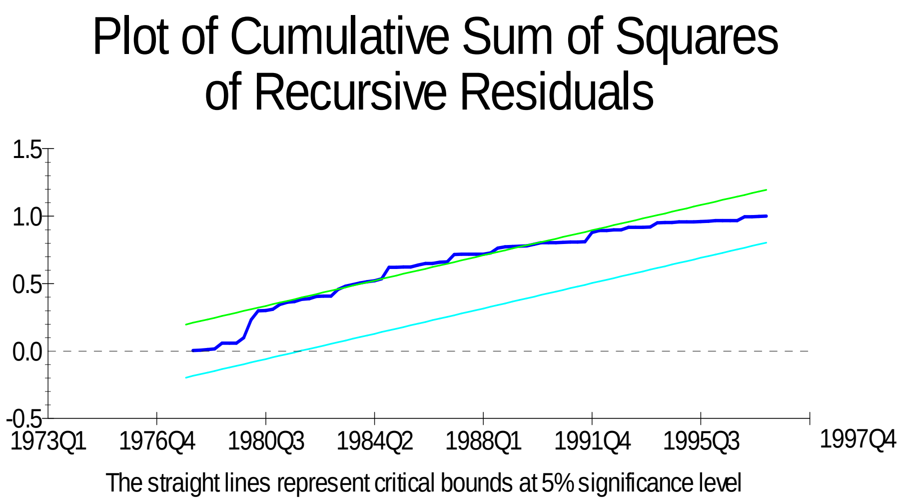
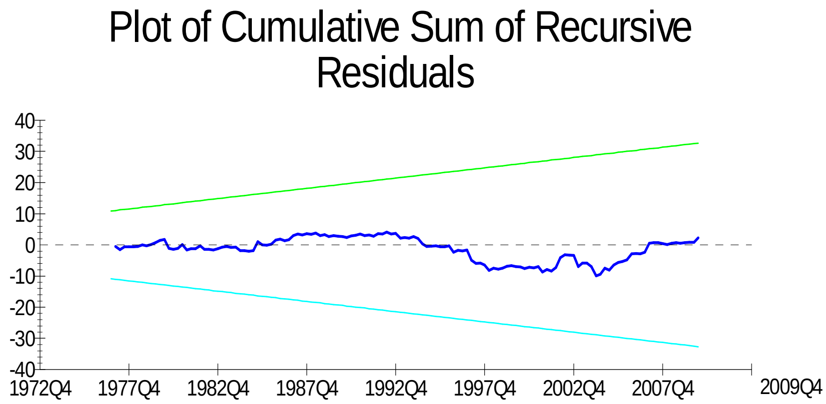
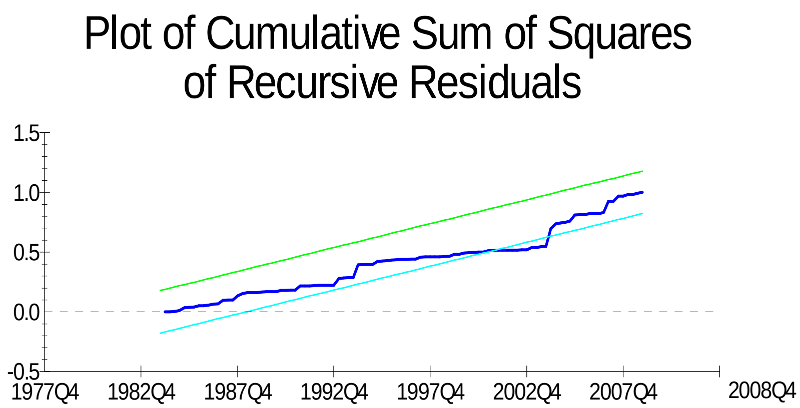


FIGURE 8: GHANA CUSUM AND CUSUMSQ



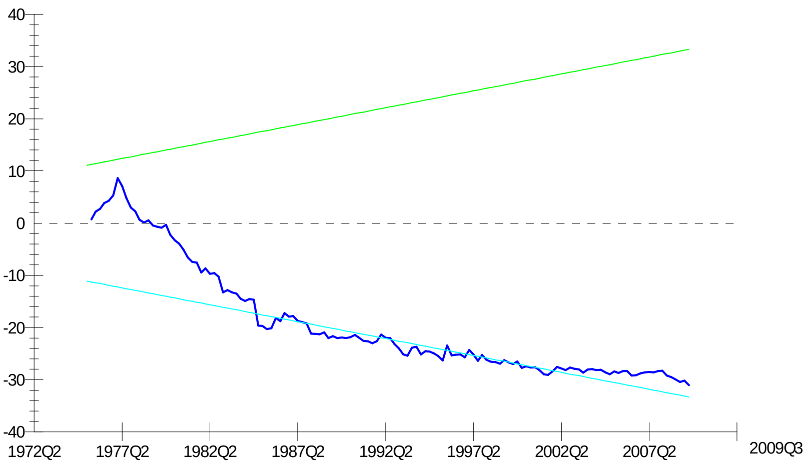
The straight lines represent critical bounds at 5% significance level



The straight lines represent critical bounds at 5% significance level

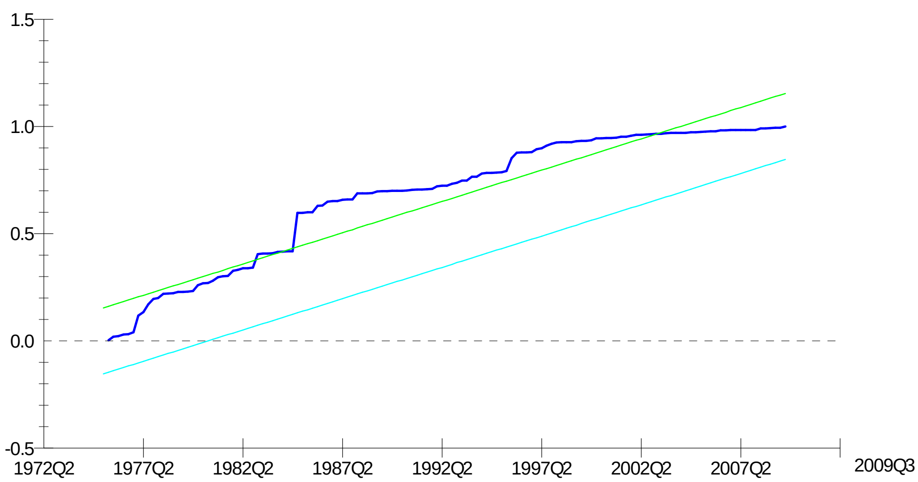
FIGURE 9: KENYA CUSUM AND CUSUMSQ

Plot of Cumulative Sum of Recursive Residuals



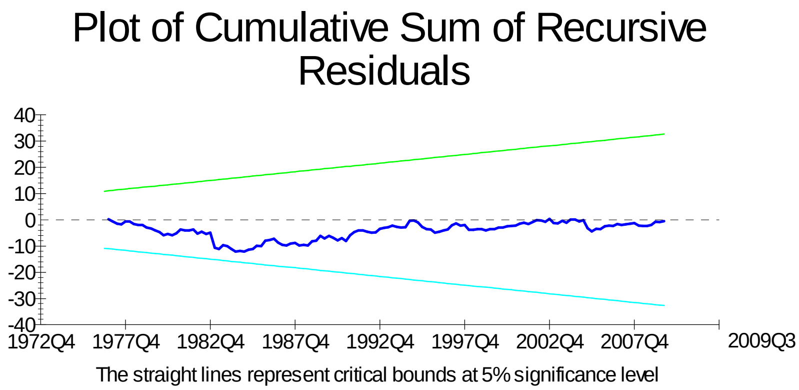
The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

FIGURE 10: MADAGASCAR CUSUM AND CUSUMSQ



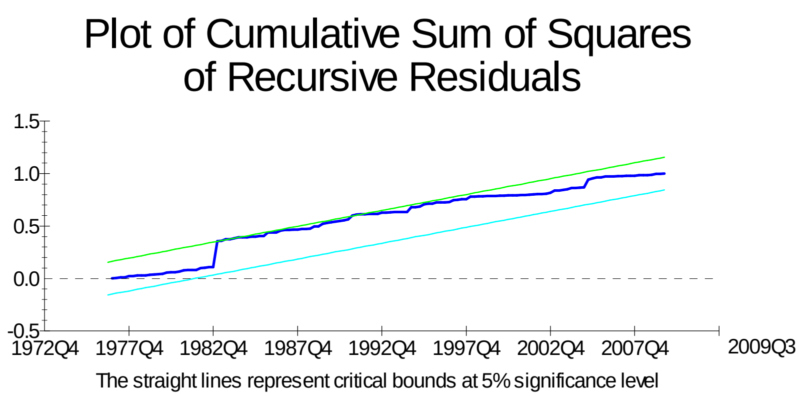
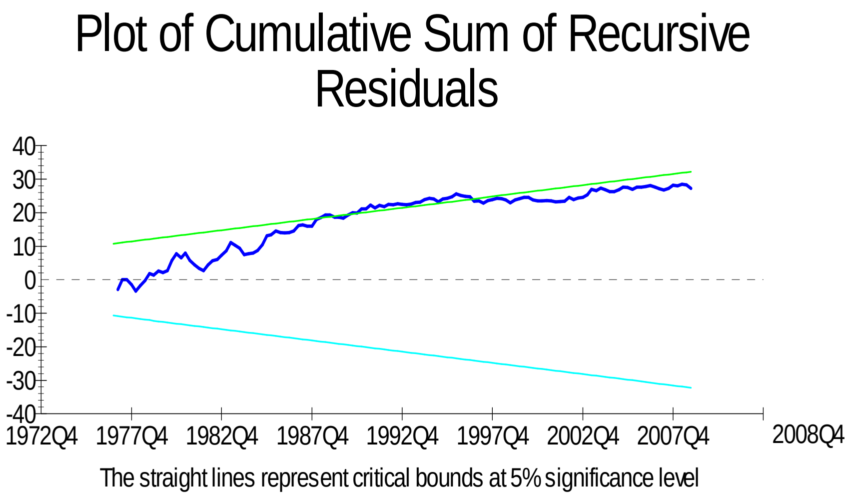


FIGURE 11: MAURITIUS CUSUM AND CUSUMSQ



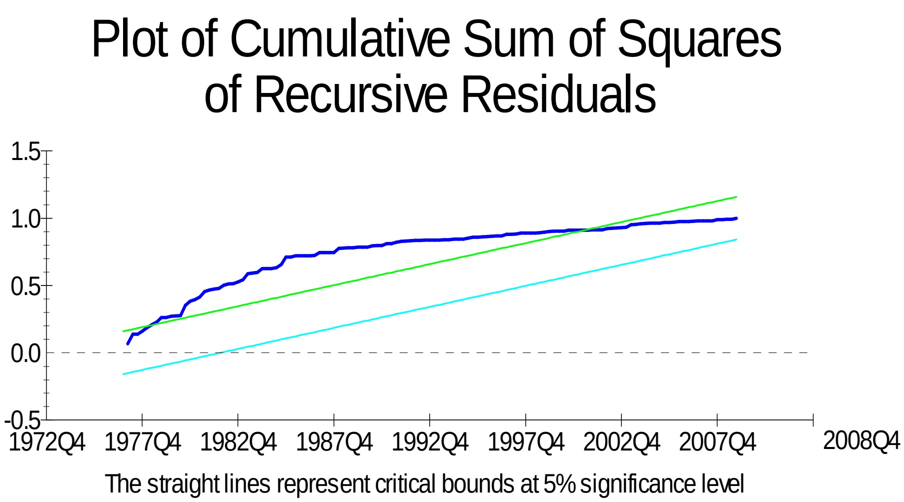
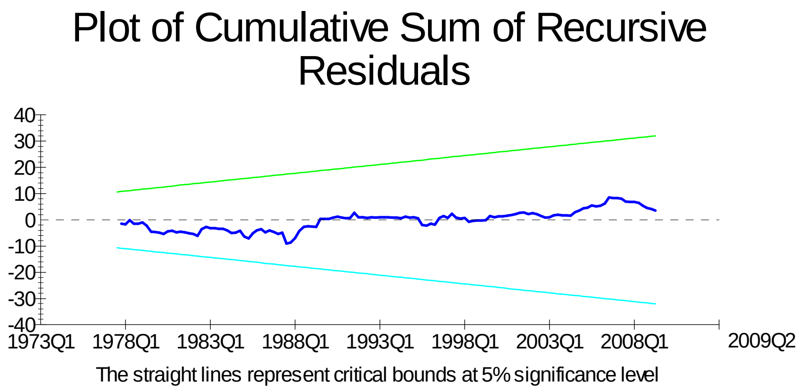


FIGURE 12: MOROCCO CUSUM AND CUSUMSQ



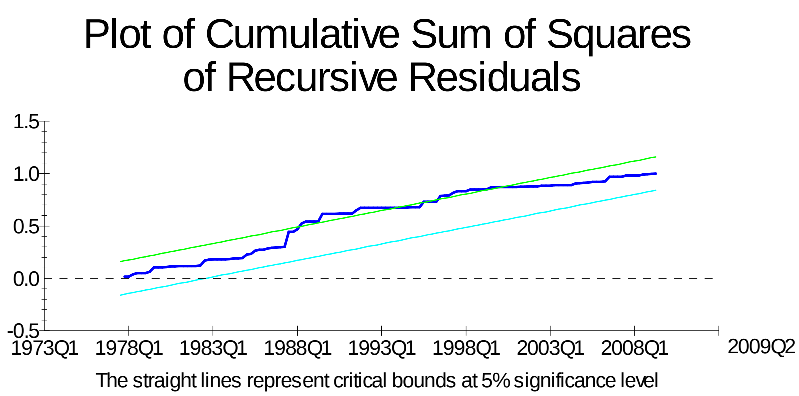
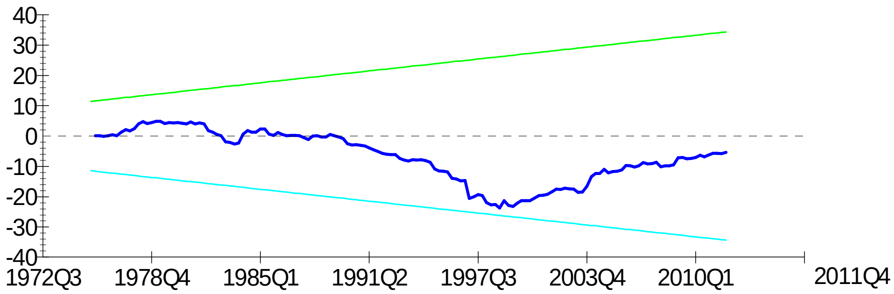


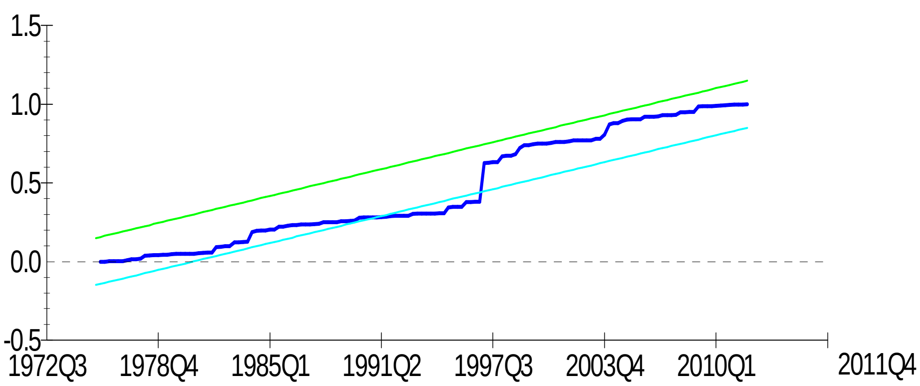
FIGURE 13: NIGER CUSUM AND CUSUMSQ

Plot of Cumulative Sum of Recursive Residuals



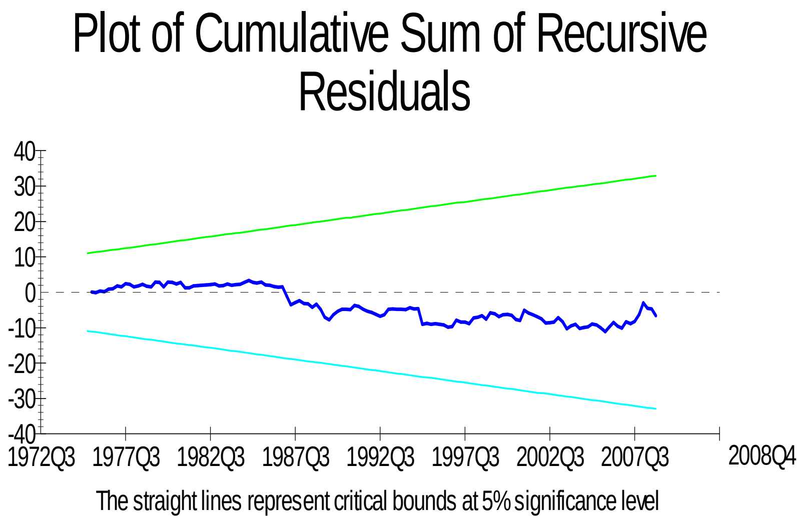
The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

FIGURE 14: NIGERIA CUSUM AND CUSUMSQ



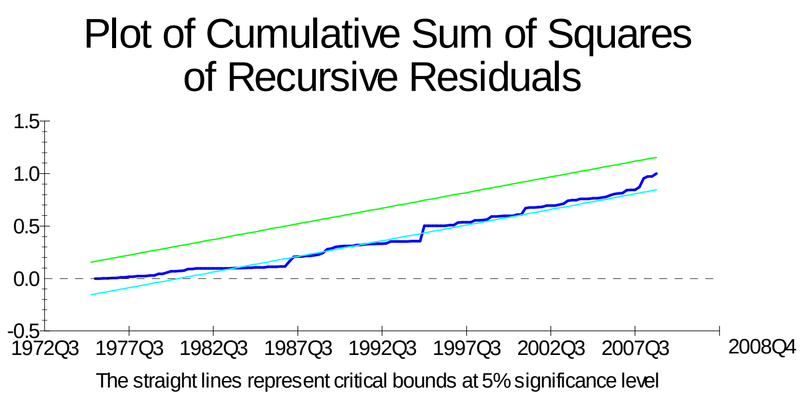
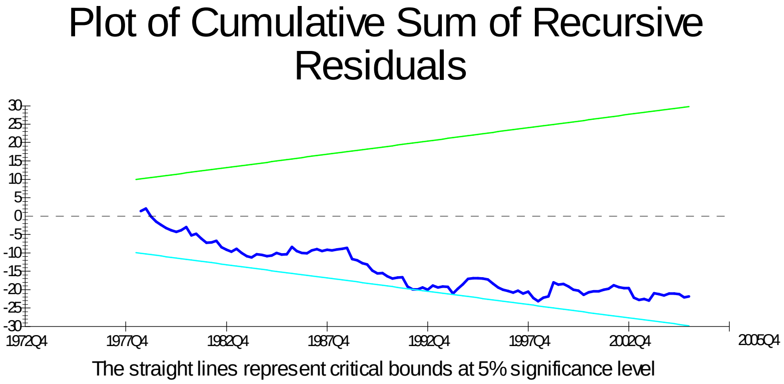


FIGURE 15: RWANDA CUSUM AND CUSUMSQ



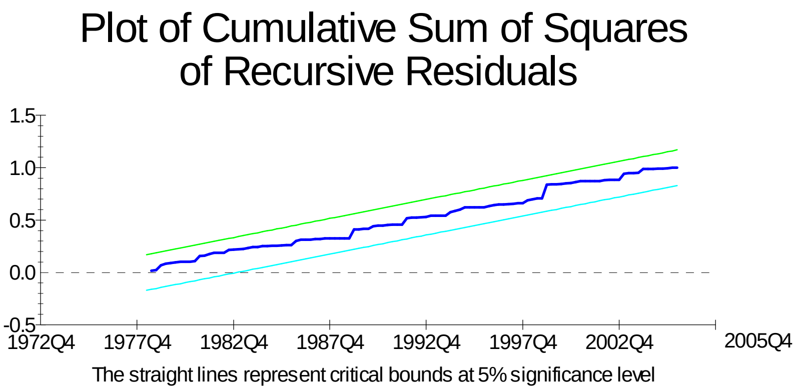
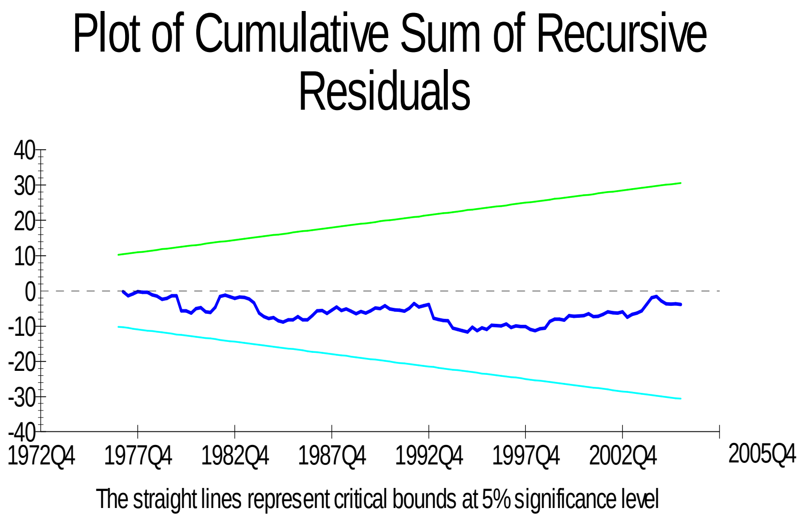


FIGURE 16: SENEGAL CUSUM AND CUSUMSQ



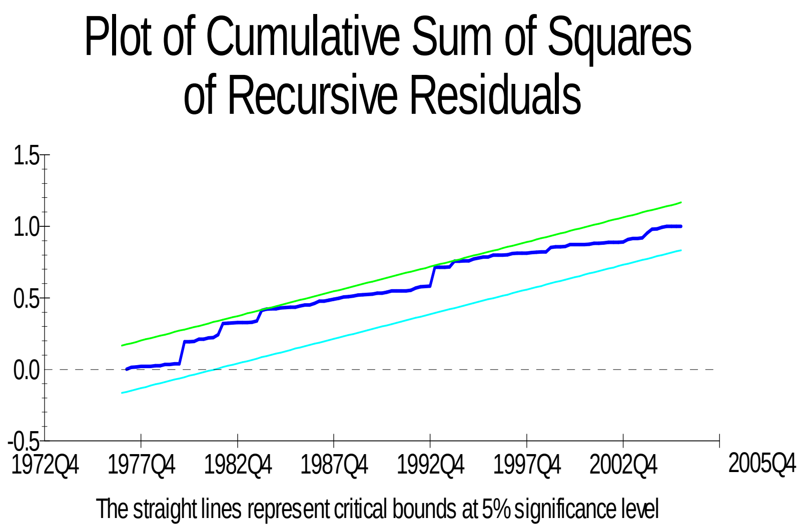
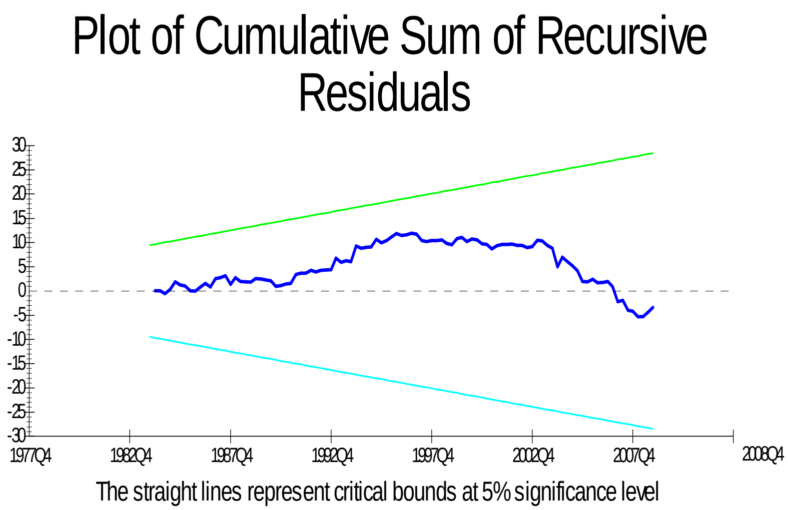


FIGURE 17: SYCHELLES CUSUM AND CUSUMQ



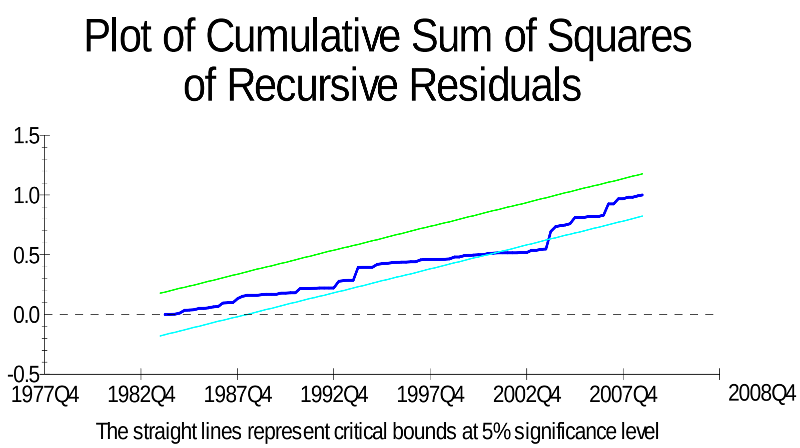
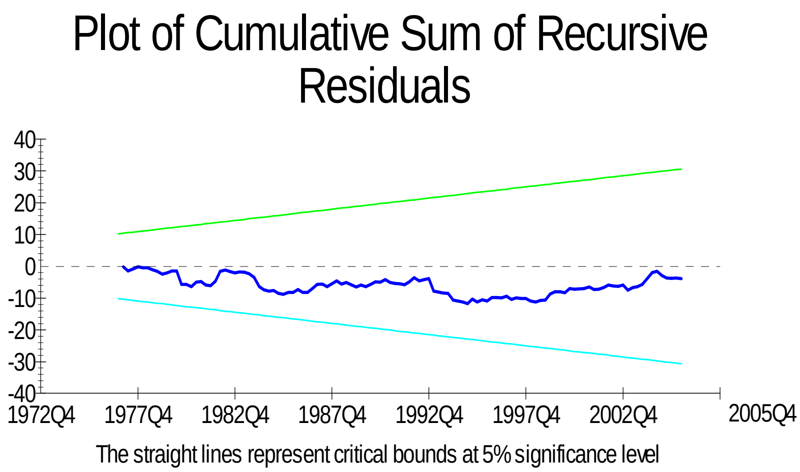


FIGURE 18: SIERA LEONE CUSUM AND CUSUMSQ



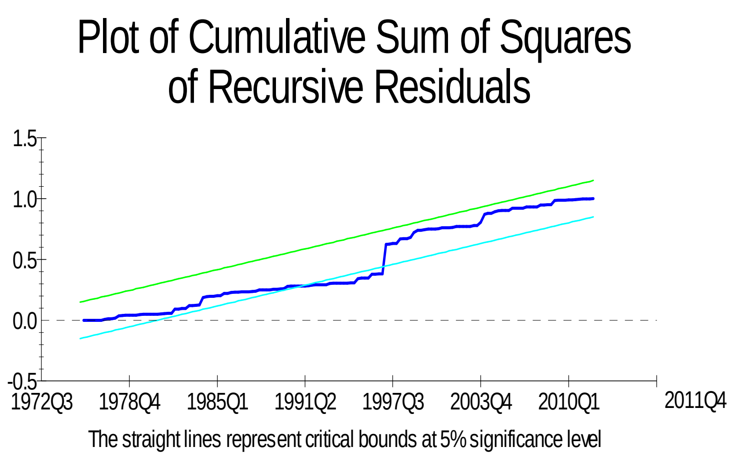
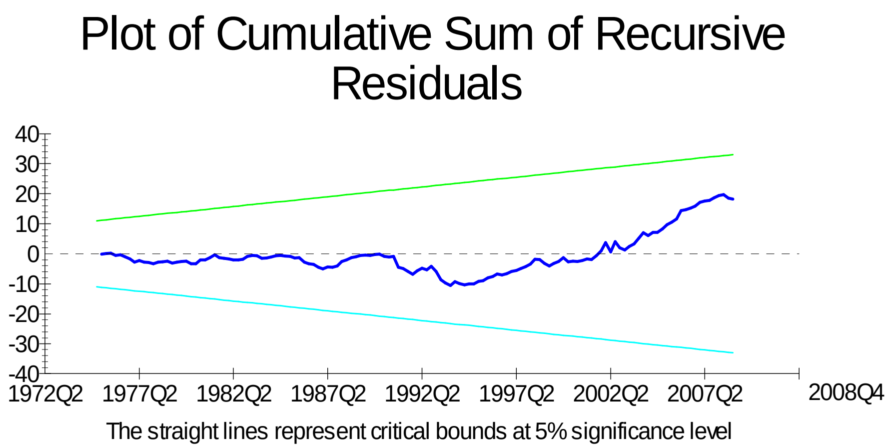


FIGURE 19: SOUTH AFRICA CUSUM AND CUSUMSQ



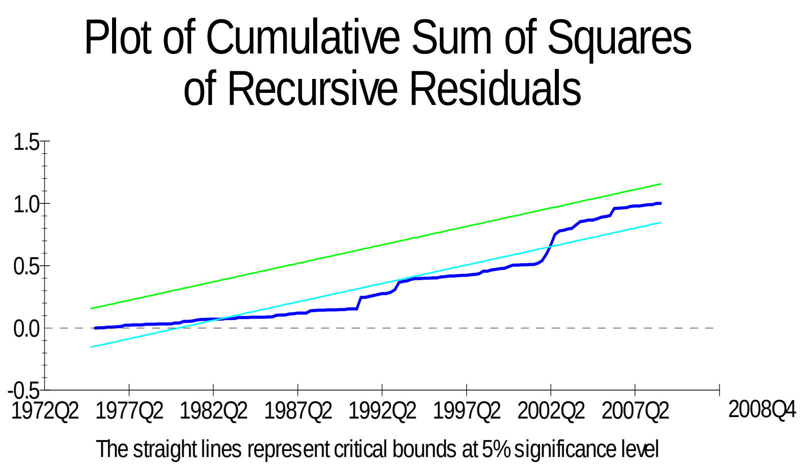
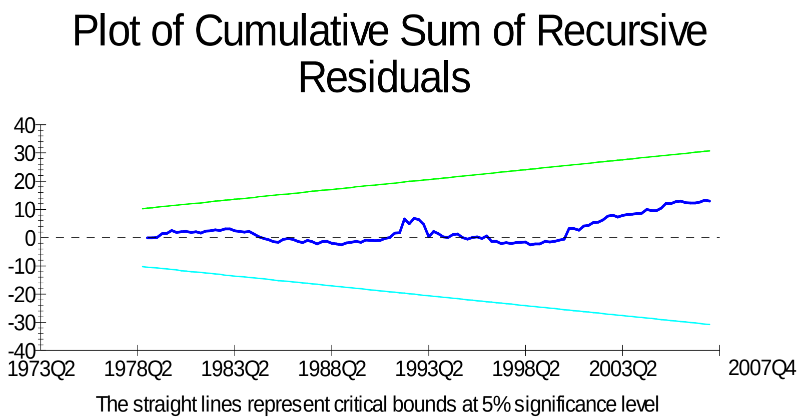


FIGURE 20: TANZANIA CUSUM AND CUSUMSQ



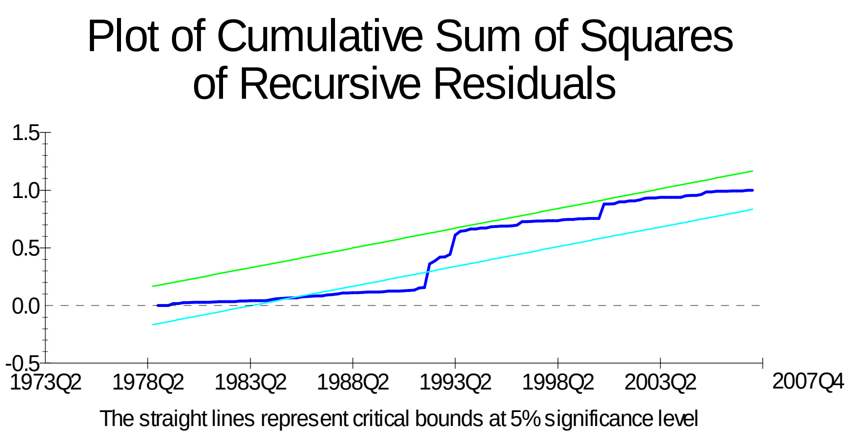
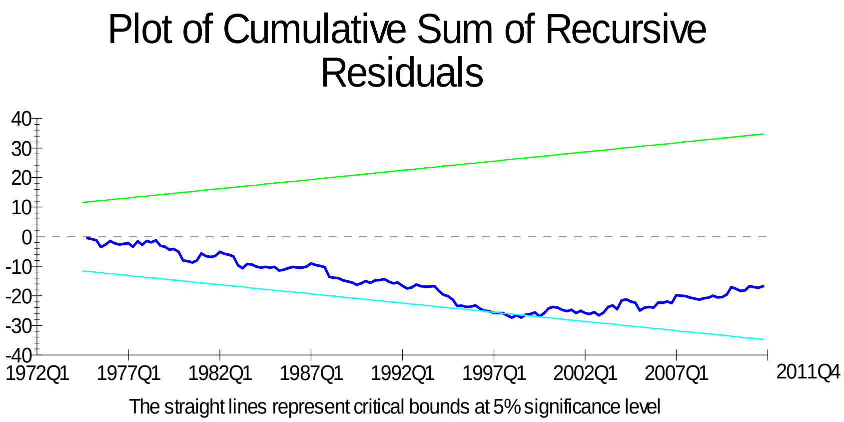
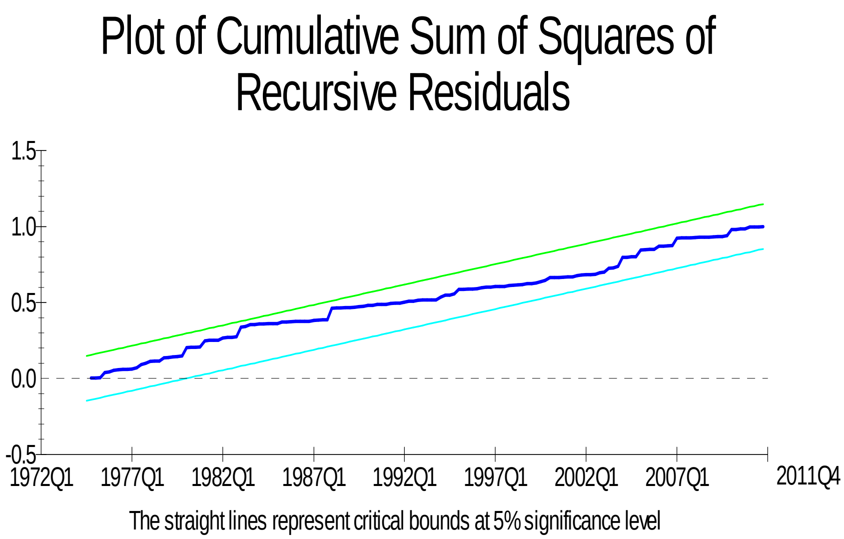


FIGURE 21: TOGO CUSUM AND CUSUMSQ





7.6 PESARAN CRITICAL VALUES

Critical value	Lower Bound Value	Upper Bound Value
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

At the 10% level of significance the upper bound critical value of the F test is 3.74

At the 5% level of significance is 4.01. This comes from Pesaran et al. (2001, Table CI-Case III, p. 300).

7.7 NOMINAL AND REAL EFFECTIVE EXCHANGE RATES

TABLE 2: Nominal Effective Exchange Rates

YEAR	BURKINA FASO	BURUNDI	CAMEROON	COTE D'IVOIRE	EGYPT	ETHIOPIA	GABON
1971 Q1	154.68	1183.23	176.11	118.19	1656.87	450.35	208.05
1971 Q2	152.79	1179.03	173.42	117.25	1644.10	449.34	204.94
1971 Q3	150.11	1282.27	170.41	114.96	1593.61	328.50	201.66
1971 Q4	150.93	1216.11	172.29	116.17	1544.55	341.80	202.42
1972 Q1	153.78	1203.08	176.90	118.96	1519.54	338.77	207.54
1972 Q2	154.16	1201.12	177.83	119.46	1517.49	339.47	208.17
1972 Q3	154.53	1205.58	178.44	119.74	1525.65	340.56	208.56
1972 Q4	151.92	1205.38	174.81	117.42	1526.82	341.00	204.35
1973 Q1	154.79	1222.20	180.52	120.58	1412.22	351.84	209.08
1973 Q2	157.79	1166.30	184.01	124.55	1332.31	340.34	213.51
1973 Q3	155.10	1153.88	179.75	120.96	1325.65	336.85	209.07
1973 Q4	152.37	1213.91	176.01	117.35	1401.08	349.13	205.10
1974 Q1	147.22	1192.81	168.43	112.71	1523.85	344.74	198.28
1974 Q2	148.04	1190.12	169.19	113.84	1528.78	345.44	199.22
1974 Q3	151.48	1205.91	173.74	117.25	1556.82	349.32	203.93
1974 Q4	153.43	1167.70	176.13	120.29	1509.47	343.10	206.81
1975 Q1	155.70	1137.80	179.46	122.91	1476.74	336.17	209.94
1975 Q2	160.72	1142.53	186.37	127.77	1487.30	338.89	216.80
1975 Q3	156.83	1209.35	181.84	123.00	1581.98	353.76	211.28
1975 Q4	157.34	1206.34	182.29	123.68	1574.20	352.83	212.08
1976 Q1	153.95	1207.06	178.63	120.65	1583.25	356.24	207.94
1976 Q2	153.28	1063.09	178.22	119.99	1595.46	358.55	207.36
1976 Q3	147.81	1047.05	170.67	114.86	1568.49	355.98	199.96
1976 Q4	146.42	1037.81	167.80	113.60	1556.38	354.49	197.47
1977 Q1	146.35	1037.72	168.38	112.99	1555.34	354.16	197.21
1977 Q2	146.11	1028.40	168.52	112.80	1542.19	352.19	196.94
1977 Q3	146.48	1023.43	169.00	113.33	1541.48	351.53	197.17
1977 Q4	144.97	982.01	167.58	112.03	1472.13	340.60	195.07
1978 Q1	144.67	955.41	167.79	111.77	1438.24	335.05	194.45
1978 Q2	145.65	955.77	170.83	112.55	1436.23	334.23	196.26
1978 Q3	145.08	915.01	170.11	111.75	1380.82	322.99	195.13
1978 Q4	146.12	897.89	171.07	113.27	1354.25	319.48	196.35

1979 Q1	145.48	915.05	169.66	112.60	768.71	323.33	195.60
1979 Q2	145.89	918.72	169.63	112.92	768.31	323.20	196.11
1979 Q3	147.74	901.74	171.54	115.26	753.70	319.13	198.69
1979 Q4	150.30	905.58	173.83	117.89	758.20	320.16	201.95
1980 Q1	146.98	945.00	169.80	114.10	801.56	331.06	196.86
1980 Q2	147.83	897.62	172.57	115.74	757.14	318.87	198.55
1980 Q3	146.85	904.06	171.35	114.22	764.63	320.75	196.66
1980 Q4	144.42	930.77	168.58	110.90	790.79	328.07	192.86
1981 Q1	141.99	972.82	165.00	107.78	829.44	339.80	189.45
1981 Q2	138.41	1044.95	160.02	103.63	895.24	360.16	184.62
1981 Q3	140.00	1039.79	162.30	106.26	893.76	360.82	187.21
1981 Q4	136.92	1035.92	158.04	102.69	883.51	359.39	182.52
1982 Q1	137.35	1106.11	157.98	101.87	937.78	375.81	182.76
1982 Q2	133.39	1135.23	151.59	97.53	961.14	383.64	176.92
1982 Q3	132.25	1162.90	149.80	96.41	982.69	390.03	175.67
1982 Q4	133.33	1126.68	152.73	97.72	955.68	382.55	177.53
1983 Q1	130.49	1154.29	148.46	94.79	982.65	391.87	173.52
1983 Q2	129.53	1182.97	146.88	93.31	1006.76	398.37	171.88
1983 Q3	128.35	1213.49	145.49	91.83	1031.36	406.71	170.30
1983 Q4	127.38	950.05	144.27	90.58	1051.35	413.69	168.84
1984 Q1	128.35	947.74	145.52	91.52	1025.35	407.64	170.07
1984 Q2	127.73	951.19	144.25	90.48	1073.21	421.31	168.96
1984 Q3	126.52	971.96	142.74	89.09	1133.60	440.52	167.43
1984 Q4	126.52	978.27	143.11	89.86	1166.04	451.13	167.61
1985 Q1	127.26	977.99	143.84	90.54	1160.88	449.22	168.25
1985 Q2	127.40	984.46	144.17	90.82	1152.67	447.09	168.29
1985 Q3	129.81	973.08	148.29	93.81	1065.92	422.86	171.46
1985 Q4	131.04	962.22	150.30	95.44	1016.59	409.47	172.84
1986 Q1	131.44	963.13	151.43	96.08	976.21	398.32	173.21
1986 Q2	130.14	976.85	149.83	95.28	950.22	393.86	171.31
1986 Q3	130.54	818.58	150.82	96.24	915.49	384.72	171.96
1986 Q4	131.08	785.39	151.36	97.86	900.55	381.19	172.60
1987 Q1	131.95	749.90	153.08	99.59	860.57	369.89	173.74
1987 Q2	131.67	751.58	152.43	98.83	864.94	371.57	173.25
1987 Q3	131.22	753.41	152.18	98.76	863.13	371.23	172.94
1987 Q4	133.37	774.53	155.71	101.54	796.25	351.69	175.33
1988 Q1	131.72	688.61	153.22	99.65	811.35	356.31	173.36
1988 Q2	130.38	649.37	151.28	97.76	851.95	369.96	171.69
1988 Q3	129.32	619.18	149.67	96.65	867.14	374.82	170.32
1988 Q4	129.96	626.56	150.54	97.69	834.85	365.98	170.88

1989 Q1	129.46	623.56	149.73	97.74	863.60	375.28	170.30
1989 Q2	129.29	615.09	149.09	97.35	886.08	382.80	170.15
1989 Q3	130.14	615.07	150.85	98.73	549.71	376.46	171.30
1989 Q4	132.68	535.94	154.51	102.51	528.63	367.69	174.81
1990 Q1	134.27	523.73	155.81	104.45	529.56	367.69	176.31
1990 Q2	134.13	530.76	155.84	104.47	522.71	364.53	175.99
1990 Q3	135.58	541.57	159.08	106.47	276.47	356.37	177.49
1990 Q4	135.80	539.67	158.88	107.20	271.90	352.62	177.11
1991 Q1	133.13	546.38	155.45	103.04	183.39	369.67	173.55
1991 Q2	131.78	553.39	154.27	102.17	182.15	378.75	172.15
1991 Q3	134.37	467.28	157.97	105.26	173.71	372.86	174.02
1991 Q4	137.07	472.80	161.76	108.55	164.26	362.63	176.52
1992 Q1	135.57	471.87	159.98	110.60	171.84	372.45	175.03
1992 Q2	137.82	436.76	163.55	113.87	164.88	362.98	177.30
1992 Q3	141.87	430.83	169.80	119.38	161.95	360.61	181.81
1992 Q4	137.85	402.77	164.34	113.41	175.36	157.39	177.92
1993 Q1	139.59	410.20	167.73	117.46	177.00	160.88	179.10
1993 Q2	138.14	424.13	165.17	113.69	177.99	162.10	176.84
1993 Q3	138.76	421.94	165.68	113.79	177.26	162.18	177.20
1993 Q4	138.45	394.69	165.13	113.23	182.36	165.32	177.11
1994 Q1	86.22	396.87	83.36	57.81	177.60	162.83	92.19
1994 Q2	86.83	397.94	84.40	58.73	173.18	141.80	92.81
1994 Q3	87.42	394.18	85.31	59.63	170.35	141.76	93.46
1994 Q4	87.37	390.36	85.14	59.45	171.18	134.10	93.27
1995 Q1	89.30	396.60	88.51	62.20	165.32	131.84	95.50
1995 Q2	88.92	394.13	87.92	61.67	163.48	124.79	94.93
1995 Q3	89.49	370.40	88.13	62.16	165.48	125.44	95.24
1995 Q4	90.13	346.21	88.61	62.61	165.95	125.65	95.62
1996 Q1	89.77	346.83	87.82	61.97	167.91	126.23	95.23
1996 Q2	89.64	312.21	87.31	61.60	169.54	126.50	94.86
1996 Q3	89.76	308.97	87.31	61.68	169.79	126.03	94.79
1996 Q4	89.84	308.19	87.03	61.54	171.41	125.63	94.59
1997 Q1	88.91	302.00	85.66	59.99	179.51	125.03	93.75
1997 Q2	87.89	302.33	84.20	58.52	181.44	122.79	92.45
1997 Q3	88.61	303.22	85.67	60.85	185.58	124.58	93.33
1997 Q4	89.71	261.25	88.86	64.52	196.37	128.64	94.12
1998 Q1	89.02	259.47	87.17	61.94	195.63	126.91	93.11
1998 Q2	90.19	250.43	89.28	64.02	196.20	126.24	93.74
1998 Q3	91.85	213.30	91.10	65.77	188.92	119.55	95.37
1998 Q4	91.23	206.39	89.77	64.26	185.76	114.58	94.61

1999 Q1	88.35	199.29	86.87	76.25	189.74	110.56	90.84
1999 Q2	88.24	201.74	86.66	76.00	194.26	109.51	90.66
1999 Q3	98.12	197.98	102.66	87.78	249.05	121.65	102.89
1999 Q4	87.70	177.02	85.26	74.94	193.86	109.49	89.11
2000 Q1	87.51	175.25	84.20	73.59	198.20	110.95	88.49
2000 Q2	90.75	179.40	88.15	76.23	202.72	113.00	93.35
2000 Q3	87.97	149.12	83.38	71.80	203.86	114.66	88.70
2000 Q4	93.58	155.89	91.78	79.71	199.37	116.11	96.87
2001 Q1	92.24	159.39	89.47	78.23	212.80	119.44	92.82
2001 Q2	88.58	147.44	84.27	73.72	192.88	114.96	88.20
2001 Q3	92.25	143.32	89.44	78.33	177.53	113.40	92.97
2001 Q4	91.08	142.08	87.43	77.31	165.84	113.66	91.62
2002 Q1	91.23	164.39	87.61	77.45	166.83	114.38	91.13
2002 Q2	96.98	139.38	95.70	86.13	159.68	111.24	98.73
2002 Q3	93.91	109.94	90.89	84.55	155.49	108.95	93.27
2002 Q4	96.62	108.46	94.61	88.46	152.48	107.49	96.80
2003 Q1	95.90	103.88	93.87	89.31	115.79	105.16	95.24
2003 Q2	96.26	102.83	94.27	91.25	106.20	102.48	95.39
2003 Q3	97.24	101.32	95.90	92.42	103.74	101.89	97.07
2003 Q4	100.01	99.38	100.05	99.97	100.06	99.76	100.06
2004 Q1	95.75	97.60	93.37	93.82	97.47	97.54	93.47
2004 Q2	97.12	98.76	95.70	94.89	99.04	99.17	95.42
2004 Q3	95.89	97.81	85.11	94.23	94.18	97.76	94.96
2004 Q4	74.41	69.84	48.42	74.49	64.53	79.99	50.25
2005 Q1	72.82	67.95	46.35	71.34	68.06	80.21	47.74
2005 Q2	70.74	72.17	44.32	67.63	69.50	80.77	46.00
2005 Q3	70.71	75.79	44.43	66.72	70.22	81.03	46.19
2005 Q4	70.34	79.04	43.89	65.72	70.99	81.43	45.89
2006 Q1	70.95	77.64	44.26	66.50	70.24	80.84	46.52
2006 Q2	72.71	77.19	46.18	69.67	69.21	80.51	48.00
2006 Q3	72.74	75.16	46.08	69.50	69.43	80.60	47.88
2006 Q4	68.26	78.28	46.81	71.16	68.83	74.31	41.24
2007 Q1	68.46	75.00	47.11	71.60	68.79	73.52	41.45
2007 Q2	68.17	71.51	46.81	71.85	68.24	71.04	41.62
2007 Q3	69.18	69.49	48.30	74.17	68.55	70.33	42.59
2007 Q4	70.23	67.50	49.28	74.02	68.77	68.80	43.19
2008 Q1	72.96	64.45	52.86	78.92	69.00	66.66	45.21
2008 Q2	73.84	63.53	53.09	79.46	70.86	66.78	44.99
2008 Q3	72.15	65.29	50.31	73.73	71.50	68.21	42.47
2008 Q4	73.64	64.85	52.64	77.99	74.31	68.34	43.90

2009 Q1	74.01	65.85	52.00	79.84	74.23	62.33	42.97
2009 Q2	75.28	64.64	52.02	82.40	71.55	59.32	43.14
2009 Q3	75.74	63.86	52.71	84.55	71.01	53.03	43.53
2009 Q4	74.43	63.99	51.28	83.06	70.81	52.28	42.72
2010 Q1	72.00	64.61	48.33	77.86	71.28	49.34	41.32
2010 Q2	69.24	65.86	45.41	71.82	70.26	49.49	39.10
2010 Q3	72.36	65.70	48.92	78.57	68.32	40.12	41.60
2010 Q4	71.28	65.13	47.26	76.20	66.18	39.58	40.16
2011 Q1	73.82	65.36	50.04	81.56	63.90	39.03	42.15
2011 Q2	74.27	66.11	50.36	82.69	63.23	38.53	42.19
2011 Q3	72.99	66.50	49.00	79.61	64.77	39.12	40.63
2011 Q4	72.36	60.37	48.17	77.74	64.51	39.42	39.83
2012 Q1	74.57	58.56	49.22	79.55	64.20	38.64	40.97
2012 Q2	74.58	57.40	47.83	76.15	64.74	38.73	39.52
2012 Q3	88.91	55.95	48.49	76.99	63.87	37.65	40.38
2012 Q4	88.77	53.64	49.44	78.81	62.55	37.44	41.01

Table 2 continued.							
YEAR	**GHANA**	**KENYA**	**MADAGASCAR**	**MAURITIUS**	**MOROCCO**	**NIGER**	**NIGERIA**
1971 Q1	959154.04	1294.18	1748.05	1208.56	309.63	60.85	17175.84
1971 Q2	956029.65	1284.58	1722.08	1356.43	308.39	60.11	17241.16
1971 Q3	932803.27	1237.18	1702.22	1384.10	300.28	60.17	16740.10
1971 Q4	496444.60	1184.42	1724.10	1404.80	301.42	62.17	17653.80
1972 Q1	696884.80	1161.71	1767.27	1431.47	164.01	64.21	17430.11
1972 Q2	696311.24	1165.87	1790.57	1102.15	164.68	65.60	17582.31
1972 Q3	698907.83	1635.55	1785.59	1092.30	165.10	65.73	17743.42
1972 Q4	699787.70	1174.71	1760.16	1061.33	161.77	65.06	17789.74
1973 Q1	706765.53	1064.00	1794.21	1097.72	165.31	69.53	16723.79
1973 Q2	653533.11	1053.69	1847.14	1127.77	164.11	73.69	15819.50
1973 Q3	662904.91	1054.54	1805.60	1058.11	161.33	72.19	15869.30
1973 Q4	719658.95	1112.22	1752.69	1031.51	159.05	67.95	16813.80
1974 Q1	716910.79	1049.16	1683.95	1059.23	156.14	64.76	16485.92
1974 Q2	715374.23	1057.72	1699.98	1057.55	155.21	65.21	17493.16
1974 Q3	720432.93	1083.18	1731.49	1033.59	156.66	67.27	17780.43
1974 Q4	686320.68	1055.34	1759.36	1032.59	157.27	70.40	17302.17
1975 Q1	661773.32	1030.40	1795.65	1052.88	157.62	72.27	16946.54
1975 Q2	655738.84	1044.41	1874.69	962.53	163.63	76.98	17338.39
1975 Q3	716910.57	1102.58	1833.04	909.91	162.79	73.16	18088.31
1975 Q4	711540.37	950.80	1838.80	900.70	163.26	73.73	17914.75
1976 Q1	725237.09	939.88	1793.38	891.90	160.80	71.31	18172.16
1976 Q2	734018.69	940.14	1781.46	886.97	160.84	70.55	18414.16
1976 Q3	734830.69	934.75	1719.60	893.68	158.61	67.36	18223.62
1976 Q4	732240.94	939.70	1701.25	899.98	158.10	66.80	17977.89
1977 Q1	730549.95	925.64	1701.60	898.74	158.09	66.71	17970.53
1977 Q2	722373.60	915.00	1707.49	901.46	158.11	67.16	17306.59
1977 Q3	720966.98	904.88	1708.43	898.84	159.41	67.02	17280.02
1977 Q4	684337.32	888.24	1701.95	930.28	159.91	67.62	16492.67
1978 Q1	664651.41	874.46	1713.95	943.62	159.89	69.37	16897.26
1978 Q2	561715.19	860.71	1738.60	944.44	160.35	70.14	16435.35
1978 Q3	263786.71	841.79	1737.12	968.86	160.91	70.94	15825.45
1978 Q4	256334.27	850.89	1752.62	982.71	160.77	73.61	15313.64
1979 Q1	262326.83	862.04	1730.38	972.38	160.88	71.86	15933.84
1979 Q2	262183.28	868.19	1728.55	973.67	161.55	71.58	16679.85
1979 Q3	254447.54	876.33	1758.35	989.10	162.85	74.01	17037.92
1979 Q4	253716.75	892.68	1805.86	762.53	163.95	75.00	17425.63
1980 Q1	275787.58	892.58	1737.93	736.24	161.64	69.73	18238.40

1980 Q2	253925.03	868.43	1771.44	765.23	163.02	73.22	18095.97
1980 Q3	258259.65	861.64	1744.44	761.29	159.27	71.59	18559.96
1980 Q4	271747.81	849.89	1687.42	747.10	153.86	68.40	18841.27
1981 Q1	292124.49	812.56	1624.03	725.12	150.21	64.80	18990.21
1981 Q2	327280.68	828.92	1543.45	696.83	145.97	60.09	18220.00
1981 Q3	323109.89	707.96	1587.33	578.28	148.88	64.36	17787.91
1981 Q4	324911.43	698.25	1538.52	585.39	148.85	62.56	18412.36
1982 Q1	352972.54	718.42	1519.17	569.47	144.97	60.23	18520.86
1982 Q2	372868.81	722.50	1324.14	563.02	145.58	56.77	18977.44
1982 Q3	386710.92	734.35	1329.21	558.89	148.36	55.25	19196.40
1982 Q4	368217.18	613.71	1337.57	572.35	145.69	57.30	19353.59
1983 Q1	388392.80	618.55	1264.89	556.22	146.43	54.56	18855.19
1983 Q2	403365.77	616.95	1275.55	546.59	146.86	52.87	18516.37
1983 Q3	418439.83	606.17	1142.85	526.82	133.17	51.42	18813.36
1983 Q4	39595.17	611.35	1149.23	506.29	134.09	50.74	19288.63
1984 Q1	32674.79	606.11	1000.26	508.36	126.46	52.67	18916.40
1984 Q2	34721.28	598.99	969.32	478.79	125.54	51.31	19393.60
1984 Q3	33925.25	612.72	997.17	449.97	127.55	50.32	20455.12
1984 Q4	27008.26	601.58	979.44	430.50	128.69	53.06	20190.51
1985 Q1	26645.32	583.14	930.85	424.95	125.55	53.71	18305.53
1985 Q2	24883.60	574.17	938.60	424.87	116.23	54.29	17842.27
1985 Q3	20669.07	509.43	931.59	446.23	110.04	60.37	16062.32
1985 Q4	18403.79	500.05	875.40	454.00	108.36	64.25	14115.74
1986 Q1	11627.47	469.48	839.17	467.13	106.33	65.41	13413.50
1986 Q2	11316.52	460.90	849.19	478.47	106.10	67.67	11101.11
1986 Q3	10747.23	451.29	682.18	482.93	104.24	69.64	7992.99
1986 Q4	10525.38	451.67	652.68	483.63	104.12	71.63	3805.90
1987 Q1	5933.99	428.01	604.25	494.80	102.22	74.34	2987.19
1987 Q2	6001.70	419.53	353.92	482.01	102.58	73.57	3210.99
1987 Q3	5131.13	408.40	354.20	467.02	102.55	73.89	2840.98
1987 Q4	4538.33	379.07	355.43	505.59	99.27	80.23	2664.85
1988 Q1	4483.67	374.64	358.78	484.66	100.34	78.14	2590.70
1988 Q2	4748.36	373.16	339.52	451.42	102.49	76.27	2727.25
1988 Q3	4066.12	371.79	318.24	443.33	103.45	75.44	2571.84
1988 Q4	3823.67	355.02	313.67	454.46	101.87	78.61	2166.35
1989 Q1	3525.86	355.44	313.65	423.30	103.15	77.67	1582.93
1989 Q2	3537.96	340.97	314.31	411.87	104.20	78.15	1730.17
1989 Q3	3267.87	320.54	313.97	410.34	103.39	80.86	1646.12
1989 Q4	2840.15	317.51	310.90	422.08	101.37	86.88	1531.80
1990 Q1	2747.32	301.86	308.65	420.89	101.45	89.26	1466.76

1990 Q2	2558.91	294.12	309.24	409.62	91.97	90.68	1443.21
1990 Q3	2350.85	279.30	304.49	427.72	92.49	96.38	1383.09
1990 Q4	2252.97	266.13	300.83	436.42	92.99	97.91	1202.16
1991 Q1	2384.03	259.16	268.15	405.21	92.46	92.39	1318.38
1991 Q2	2458.05	247.98	259.40	382.99	92.74	91.99	1151.55
1991 Q3	2243.77	239.82	252.73	406.05	93.03	106.80	1190.47
1991 Q4	2008.55	234.51	246.81	435.24	93.34	114.85	1135.27
1992 Q1	2053.18	229.33	245.87	407.55	91.23	109.38	629.01
1992 Q2	1884.43	204.04	246.31	426.43	91.33	116.44	607.94
1992 Q3	1551.86	193.48	250.34	431.98	92.23	124.37	561.97
1992 Q4	1612.00	193.73	251.49	385.63	92.48	112.06	608.36
1993 Q1	1398.59	155.39	258.11	388.85	93.29	123.58	492.74
1993 Q2	1432.63	108.73	260.58	381.65	94.19	120.21	566.10
1993 Q3	1228.45	105.43	262.91	377.39	95.20	121.33	569.09
1993 Q4	1089.52	106.36	261.89	362.48	95.82	117.45	583.54
1994 Q1	930.22	109.38	263.91	369.99	95.63	61.10	570.67
1994 Q2	890.46	124.06	144.08	380.16	95.68	63.68	558.08
1994 Q3	834.31	142.45	129.42	380.34	95.67	65.43	547.14
1994 Q4	784.67	153.41	124.88	373.90	96.02	64.76	549.14
1995 Q1	693.00	151.69	110.74	386.40	97.91	70.60	531.78
1995 Q2	651.11	120.33	103.98	387.31	96.62	70.50	528.33
1995 Q3	600.06	121.71	103.81	383.20	96.67	72.98	536.27
1995 Q4	538.77	122.15	137.59	379.99	96.33	74.60	539.95
1996 Q1	502.13	118.68	123.07	375.49	96.04	72.86	546.39
1996 Q2	487.42	122.45	119.96	375.04	96.18	73.16	554.13
1996 Q3	472.90	125.96	119.25	377.61	96.30	74.22	555.67
1996 Q4	469.38	128.94	115.36	378.82	96.93	74.09	556.34
1997 Q1	463.26	134.55	107.63	340.44	97.61	68.96	579.62
1997 Q2	443.95	134.86	104.11	329.98	97.40	66.62	586.07
1997 Q3	414.09	120.85	105.73	319.84	97.51	71.53	602.52
1997 Q4	417.03	123.97	111.25	321.09	99.43	79.08	656.37
1998 Q1	413.48	130.35	108.67	302.58	99.47	73.83	649.00
1998 Q2	413.65	133.99	115.82	302.90	99.89	80.61	664.43
1998 Q3	387.85	128.73	115.93	295.34	99.62	85.64	638.91
1998 Q4	384.00	122.11	109.47	290.63	99.22	84.27	622.37
1999 Q1	380.47	119.42	100.97	288.84	97.15	80.12	155.89
1999 Q2	387.76	108.74	92.23	289.30	94.91	77.75	149.70
1999 Q3	396.36	117.13	105.13	298.79	115.06	83.30	150.72
1999 Q4	276.14	107.13	96.01	287.64	95.30	76.46	144.98
2000 Q1	234.15	106.99	92.96	288.37	96.23	74.23	145.18

2000 Q2	187.96	105.53	103.15	287.39	104.57	76.50	148.14
2000 Q3	168.53	107.29	103.74	287.74	102.79	73.55	152.05
2000 Q4	161.41	110.96	110.11	275.50	108.98	79.96	144.95
2001 Q1	159.14	120.08	107.65	274.50	109.09	77.28	143.66
2001 Q2	158.10	112.76	108.87	264.91	92.89	74.75	144.96
2001 Q3	157.10	111.72	116.34	260.48	96.82	82.30	145.17
2001 Q4	154.99	116.45	116.88	259.62	99.62	85.42	144.11
2002 Q1	149.76	117.78	110.12	259.70	95.58	83.63	141.70
2002 Q2	136.43	110.91	105.12	230.69	100.98	91.97	130.58
2002 Q3	127.78	108.82	106.69	260.05	95.96	91.39	121.45
2002 Q4	121.36	108.35	107.54	260.21	98.37	92.44	117.73
2003 Q1	112.96	107.02	102.69	277.04	96.76	93.22	114.56
2003 Q2	106.74	107.78	105.50	257.24	96.23	94.96	109.70
2003 Q3	106.16	100.23	104.78	94.87	98.29	93.77	108.36
2003 Q4	100.08	100.00	100.00	100.98	100.00	100.00	98.87
2004 Q1	94.37	95.55	67.11	95.85	94.19	93.38	98.13
2004 Q2	97.00	95.25	58.77	94.01	96.24	96.15	101.17
2004 Q3	94.28	92.88	58.09	89.35	82.25	98.87	99.06
2004 Q4	37.73	80.55	42.83	69.07	48.78	96.69	79.11
2005 Q1	37.99	84.24	42.22	68.13	48.10	93.95	79.76
2005 Q2	39.09	84.48	41.53	68.40	46.84	89.63	81.65
2005 Q3	39.45	87.87	40.48	66.84	46.45	88.86	84.53
2005 Q4	39.81	90.79	39.21	66.66	46.02	88.15	85.25
2006 Q1	39.26	91.30	37.80	65.38	46.51	88.51	84.38
2006 Q2	38.49	87.94	39.11	66.26	48.97	95.59	83.30
2006 Q3	38.50	90.66	40.70	63.93	49.57	97.34	83.46
2006 Q4	37.55	88.29	41.92	58.18	46.15	94.50	75.00
2007 Q1	37.21	88.98	42.84	61.44	46.87	95.04	74.96
2007 Q2	36.72	91.24	44.51	60.32	46.79	92.32	73.91
2007 Q3	35.41	88.67	43.93	59.97	47.46	94.78	73.61
2007 Q4	33.76	94.11	43.90	65.57	48.57	97.14	77.83
2008 Q1	33.01	93.25	47.56	73.05	52.83	107.73	77.86
2008 Q2	31.36	91.89	50.68	71.78	52.71	111.73	78.96
2008 Q3	29.69	84.82	51.22	75.01	51.39	108.12	83.80
2008 Q4	29.48	83.53	48.99	70.89	52.86	111.00	80.21
2009 Q1	26.58	82.88	48.08	70.58	52.42	110.23	74.56
2009 Q2	23.58	81.26	45.05	66.64	50.52	107.07	69.16
2009 Q3	23.32	82.47	43.06	69.22	50.88	109.99	67.30
2009 Q4	23.66	81.33	43.16	68.26	50.31	106.25	66.23
2010 Q1	24.11	80.69	39.93	66.17	48.29	97.14	66.76

2010 Q2	24.68	77.22	38.29	65.82	46.11	91.02	68.72
2010 Q3	23.81	75.63	40.90	66.64	47.60	96.10	65.45
2010 Q4	22.63	74.99	37.83	65.16	46.51	92.85	65.14
2011 Q1	22.09	72.79	40.04	69.43	48.33	99.03	63.33
2011 Q2	21.67	66.79	41.10	68.86	48.99	101.08	62.55
2011 Q3	22.13	62.05	40.92	73.18	49.22	103.26	64.13
2011 Q4	22.19	74.17	38.57	76.15	48.35	104.33	64.57
2012 Q1	20.29	75.21	40.34	74.72	48.25	103.53	63.96
2012 Q2	18.70	76.01	40.28	74.60	47.88	105.18	65.94
2012 Q3	18.40	73.89	39.79	73.16	48.02	103.73	65.59
2012 Q4	5.81	74.74	39.07	74.64	29.05	108.76	65.82

2 continued.							
YEAR	**RWANDA**	**SENEGAL**	**SEYCHELLES**	**SIERRA LEONE**	**SOUTH AFRICA**	**TANZANIA**	**TOGO**
1971 Q1	385.71	149.74	130.36	219886.06	1444.30	34065	217.38
1971 Q2	380.10	147.13	128.73	229212.61	1397.47	33992	214.08
1971 Q3	368.48	138.87	129.08	228624.85	1337.84	36051	212.24
1971 Q4	390.36	146.18	126.92	228334.82	1212.78	35723	212.09
1972 Q1	384.99	149.80	128.05	234276.06	1083.88	8570	224.09
1972 Q2	384.53	150.63	85.14	220261.32	1038.51	8547	225.44
1972 Q3	387.14	151.13	84.35	219701.43	1044.67	8523	226.02
1972 Q4	387.23	148.31	82.12	214423.82	1003.23	8587	221.50
1973 Q1	403.50	152.64	78.41	209686.26	1013.59	7871	226.88
1973 Q2	378.60	156.70	78.99	203931.37	991.46	7508	241.03
1973 Q3	380.02	153.03	72.38	192968.04	992.39	7823	227.00
1973 Q4	402.80	149.21	71.96	197591.25	1059.90	8249	212.86
1974 Q1	350.65	143.74	73.68	199224.67	1027.37	7775	202.95
1974 Q2	350.09	144.60	73.56	198615.58	1042.10	7838	204.69
1974 Q3	349.93	148.27	71.91	196850.59	1017.24	8027	210.27
1974 Q4	346.43	151.02	70.69	190718.96	991.09	7864	218.67
1975 Q1	345.46	153.81	70.82	190344.53	995.08	7664	224.80
1975 Q2	345.29	159.93	65.20	176760.38	943.32	7821	236.49
1975 Q3	346.90	155.20	63.90	177855.82	830.51	8329	221.13
1975 Q4	349.05	155.82	63.09	175419.99	825.72	7197	222.72
1976 Q1	344.45	153.39	60.78	168368.79	821.79	7115	215.23
1976 Q2	344.48	153.35	56.89	159621.99	828.11	7121	213.90
1976 Q3	340.00	147.77	53.61	149577.88	810.61	7061	203.96
1976 Q4	336.40	145.91	54.36	150151.60	804.94	7091	200.51
1977 Q1	336.62	146.00	55.11	151975.16	800.61	7008	200.84
1977 Q2	336.23	146.11	55.02	151095.43	788.60	6978	201.87
1977 Q3	334.90	147.19	56.50	153398.51	782.28	6944	202.08
1977 Q4	333.64	145.69	59.85	158812.01	732.77	6857	203.82
1978 Q1	332.05	145.94	57.46	152361.57	709.82	6831	205.26
1978 Q2	334.40	147.63	57.46	152903.09	704.25	6783	209.29
1978 Q3	333.15	146.92	58.38	155515.49	667.25	6685	208.62
1978 Q4	331.09	147.98	59.27	146611.33	655.47	6747	212.30
1979 Q1	331.65	146.68	60.74	146153.72	688.96	6161	209.24
1979 Q2	332.26	146.69	63.43	145379.50	687.33	6182	209.92
1979 Q3	331.89	149.04	63.32	144907.88	689.65	6128	215.53
1979 Q4	332.13	151.45	61.11	144490.58	699.39	6214	219.88

1980 Q1	332.82	147.08	59.99	145401.59	761.96	6501	203.18
1980 Q2	332.52	148.87	61.21	144246.11	741.43	6077	214.67
1980 Q3	332.76	147.38	61.13	143828.23	762.16	6070	210.05
1980 Q4	334.88	144.12	60.96	146564.93	792.94	6162	200.24
1981 Q1	369.71	141.08	69.69	147126.10	778.09	6398	188.96
1981 Q2	373.48	137.17	69.80	152255.68	764.66	6822	174.69
1981 Q3	374.45	139.56	69.80	154010.56	710.38	6932	178.95
1981 Q4	376.68	135.09	70.38	153987.47	690.77	6818	171.85
1982 Q1	383.62	134.56	70.29	157179.78	671.46	6472	164.66
1982 Q2	384.70	129.70	70.58	159317.20	634.70	6532	153.34
1982 Q3	385.85	128.17	70.66	160985.89	647.99	6617	148.81
1982 Q4	392.03	130.86	72.41	163861.43	665.58	6501	155.14
1983 Q1	393.41	128.11	72.91	166156.46	672.85	6518	147.02
1983 Q2	398.93	126.59	74.01	168587.92	689.11	5310	142.16
1983 Q3	404.48	125.33	74.88	88429.75	696.89	5345	138.59
1983 Q4	409.48	124.23	75.58	90983.24	639.80	5386	135.54
1984 Q1	405.77	125.59	75.84	88849.75	615.13	5330	139.58
1984 Q2	413.02	124.81	76.06	94015.82	590.79	4031	134.64
1984 Q3	421.92	123.55	77.46	100965.25	508.07	4114	129.85
1984 Q4	426.99	123.76	78.24	105597.88	442.38	4210	128.67
1985 Q1	427.87	124.11	78.40	44637.44	458.27	4229	130.01
1985 Q2	427.77	124.50	79.41	45373.49	439.61	4291	131.19
1985 Q3	423.94	128.22	80.29	44540.40	306.63	4210	141.61
1985 Q4	420.07	129.91	80.64	44158.39	291.15	4143	147.70
1986 Q1	419.76	130.74	81.61	43412.32	337.37	4094	152.56
1986 Q2	424.12	129.40	83.76	17885.82	276.70	1605	154.42
1986 Q3	421.29	130.79	84.93	7457.63	295.88	1426	159.84
1986 Q4	418.21	131.86	84.78	5777.62	297.54	1226	162.05
1987 Q1	422.00	133.26	86.67	3806.68	304.66	1057	168.91
1987 Q2	423.62	132.65	86.42	5562.84	301.59	955	167.13
1987 Q3	425.97	132.24	85.96	8477.89	297.05	864.9	166.69
1987 Q4	438.71	134.81	89.39	7689.48	288.88	672.6	180.95
1988 Q1	440.05	132.61	89.22	6483.68	267.71	610.3	174.21
1988 Q2	439.85	131.14	88.11	5708.40	258.64	622.4	165.30
1988 Q3	442.19	129.83	88.01	5911.48	246.21	629.7	160.67
1988 Q4	448.98	130.28	88.53	4894.33	247.44	479.5	165.55
1989 Q1	448.19	130.08	87.74	4549.35	240.04	462.7	160.69
1989 Q2	447.21	130.12	86.65	3204.01	229.18	450	157.57
1989 Q3	451.68	131.32	86.60	3106.25	230.13	442.2	162.17
1989 Q4	447.48	135.02	87.28	2979.32	235.63	327.9	172.74

1990 Q1	446.70	136.44	85.41	1613.86	226.66	329.8	174.95
1990 Q2	450.90	136.21	85.90	1165.48	222.34	326	176.01
1990 Q3	461.13	138.16	87.88	1024.32	219.05	312.5	184.03
1990 Q4	281.09	138.16	88.54	953.64	215.02	309.4	185.62
1991 Q1	286.70	134.77	88.97	880.74	217.52	319.4	171.18
1991 Q2	292.17	134.01	89.16	819.48	212.83	294.5	165.58
1991 Q3	296.00	136.34	89.12	530.98	210.25	298	174.04
1991 Q4	297.12	139.17	90.64	429.97	204.01	283.8	184.65
1992 Q1	298.86	139.39	89.61	412.79	205.32	237.3	176.67
1992 Q2	261.06	141.85	91.01	373.56	203.00	223.2	186.41
1992 Q3	265.16	148.03	92.59	351.02	194.83	204.9	198.63
1992 Q4	268.59	143.88	92.77	388.64	196.51	213.6	181.20
1993 Q1	293.17	146.65	94.76	372.66	191.46	218.4	182.82
1993 Q2	330.78	144.40	97.43	377.58	183.55	199.9	177.54
1993 Q3	337.27	144.81	99.31	373.99	176.20	167.3	177.85
1993 Q4	334.14	144.70	98.66	379.10	184.55	168.4	174.27
1994 Q1	333.18	74.95	99.58	396.36	175.27	160.3	90.73
1994 Q2	322.08	75.71	100.63	384.33	162.38	148.7	93.20
1994 Q3	308.87	76.44	100.22	367.72	163.25	143.5	95.47
1994 Q4	302.08	76.41	100.07	359.74	165.05	143.6	94.78
1995 Q1	164.29	79.29	104.78	331.32	154.98	135	101.77
1995 Q2	150.07	78.67	104.52	283.75	151.71	123.6	101.46
1995 Q3	141.79	78.92	100.87	243.88	154.86	125.6	100.82
1995 Q4	148.46	79.34	100.46	229.30	156.22	142	101.33
1996 Q1	149.53	78.76	99.50	236.18	145.00	145.5	99.54
1996 Q2	148.58	78.31	100.29	250.26	134.84	128.9	97.82
1996 Q3	148.85	78.25	100.46	245.38	129.42	136.4	97.52
1996 Q4	150.49	77.71	100.51	250.13	126.15	135.7	96.27
1997 Q1	152.35	76.50	103.74	286.96	140.49	137.6	91.92
1997 Q2	157.91	75.11	104.75	295.21	137.81	132.1	89.08
1997 Q3	163.37	75.38	105.89	222.61	138.36	139.7	88.91
1997 Q4	164.77	75.69	106.81	188.41	140.84	147.2	88.51
1998 Q1	163.09	75.00	107.46	163.87	135.46	140.8	86.62
1998 Q2	161.33	75.70	107.86	177.59	117.82	152.7	87.35
1998 Q3	156.05	77.79	103.18	159.89	113.02	144.6	92.55
1998 Q4	155.84	77.43	100.49	160.44	110.43	139.7	92.35
1999 Q1	150.62	80.15	105.03	161.33	110.16	140.5	86.75
1999 Q2	161.52	79.26	105.70	150.52	115.97	133.7	85.15
1999 Q3	185.05	87.35	113.21	147.89	166.79	133.5	101.65
1999 Q4	157.48	77.92	106.72	119.11	113.21	123.1	83.23

2000 Q1	154.52	76.99	106.30	124.24	109.07	125.5	80.78
2000 Q2	150.62	81.63	107.82	145.12	109.13	130	82.72
2000 Q3	145.79	77.20	106.17	144.66	104.65	134.2	77.26
2000 Q4	141.13	84.55	100.54	185.21	103.41	136.5	83.01
2001 Q1	146.38	80.63	99.42	174.21	116.09	133.7	83.60
2001 Q2	140.11	76.52	113.59	163.19	98.93	128	76.25
2001 Q3	137.57	81.03	116.12	153.25	86.95	127.6	81.11
2001 Q4	137.62	81.01	114.42	159.86	65.19	130.3	78.78
2002 Q1	136.86	79.91	113.83	158.03	70.25	120.7	78.63
2002 Q2	131.47	87.53	118.87	157.04	74.46	119.6	87.39
2002 Q3	125.31	83.92	115.92	150.99	70.90	116.4	84.59
2002 Q4	116.62	87.27	119.70	135.51	85.04	111.3	88.85
2003 Q1	113.85	86.82	110.57	126.36	90.37	103	90.26
2003 Q2	107.56	87.62	102.18	118.00	91.75	98.01	92.65
2003 Q3	105.21	89.24	103.05	108.86	98.94	96.74	94.42
2003 Q4	99.03	93.73	100.02	99.99	100.00	100.4	100.00
2004 Q1	98.24	87.81	97.88	93.55	101.23	86.78	95.37
2004 Q2	100.15	89.21	99.79	94.69	105.50	89.69	95.81
2004 Q3	101.64	86.62	90.94	90.45	100.51	93.84	96.13
2004 Q4	91.71	55.87	72.22	70.74	85.59	83.04	87.98
2005 Q1	92.90	53.81	73.16	73.01	76.55	79.61	84.13
2005 Q2	94.93	51.34	74.18	75.33	73.53	79.74	79.26
2005 Q3	95.03	51.03	74.24	74.54	77.57	79.25	79.21
2005 Q4	95.04	50.58	74.44	74.70	79.12	77.86	78.01
2006 Q1	95.28	51.48	73.87	73.19	79.75	72.99	79.79
2006 Q2	97.18	53.45	74.47	73.53	67.61	72.13	83.11
2006 Q3	97.80	53.39	75.27	74.63	62.41	71.97	82.70
2006 Q4	88.60	52.32	70.15	68.20	68.31	69.78	81.77
2007 Q1	88.59	52.74	66.43	68.41	64.99	70.78	82.59
2007 Q2	88.01	52.71	63.47	66.82	65.79	67.42	83.36
2007 Q3	88.13	54.13	55.08	65.30	66.57	67.86	87.05
2007 Q4	85.08	54.54	48.76	64.73	65.96	72.81	89.95
2008 Q1	86.09	58.29	49.31	67.06	53.85	67.44	96.25
2008 Q2	86.89	58.02	49.48	66.89	56.64	72.42	95.80
2008 Q3	90.56	54.59	49.35	70.74	55.86	78.72	88.40
2008 Q4	93.07	57.94	25.84	76.34	52.53	76.4	88.79
2009 Q1	93.70	58.08	27.07	75.91	53.47	77.36	85.70
2009 Q2	91.07	58.91	30.24	64.91	62.93	71.22	89.11
2009 Q3	90.43	60.24	39.02	58.00	63.42	69.83	91.85
2009 Q4	90.72	59.08	35.93	53.86	63.44	68.21	90.16

2010 Q1	91.69	56.40	34.54	54.48	64.54	67.63	85.44
2010 Q2	92.42	52.74	33.05	55.92	63.17	67.04	78.72
2010 Q3	91.93	57.11	32.36	50.51	66.69	59.59	86.42
2010 Q4	91.16	55.42	32.66	48.46	69.28	60.18	84.45
2011 Q1	91.87	58.73	32.46	46.55	67.14	58.62	89.39
2011 Q2	95.52	59.22	32.62	46.05	65.96	55.5	90.54
2011 Q3	100.62	57.21	32.86	48.71	57.11	58.26	85.38
2011 Q4	94.79	56.03	29.96	50.40	57.91	61.13	82.39
2012 Q1	93.48	57.37	28.84	49.25	61.00	59.35	85.02
2012 Q2	94.23	55.29	28.73	51.81	58.34	62.77	81.00
2012 Q3	93.44	56.11	31.57	50.94	56.48	60.95	83.00
2012 Q4	92.95	59.22	31.33	51.95	55.68	62.26	84.67

Table 3: Real Effective Exchange Rates

YEAR	BURKINA FASO	BURUNDI	CAMEROON	COTE D'IVOIRE	EGYPT	ETHIOPIA	GABON
1971 Q1	160.25	905.04	126.59	79.85	254.10	163.48	156.09
1971 Q2	166.40	953.94	123.85	78.26	269.23	173.11	158.08
1971 Q3	165.41	941.58	120.62	76.78	260.84	167.69	156.35
1971 Q4	168.23	874.59	123.71	76.77	251.01	166.38	155.38
1972 Q1	153.41	778.60	126.72	77.00	243.87	159.73	158.08
1972 Q2	167.09	808.73	127.67	77.80	240.07	154.10	156.50
1972 Q3	171.24	831.38	128.78	77.47	235.45	156.19	156.20
1972 Q4	153.96	757.09	125.81	75.47	234.44	153.07	152.23
1973 Q1	159.86	766.20	131.87	79.46	216.89	157.93	157.72
1973 Q2	164.43	761.87	133.63	87.20	197.66	162.96	163.24
1973 Q3	166.86	767.72	130.90	86.54	192.50	160.12	154.62
1973 Q4	161.08	774.50	127.74	78.71	208.06	156.83	146.03
1974 Q1	152.11	750.62	120.53	76.91	219.70	156.52	140.74
1974 Q2	156.84	786.38	121.23	78.82	216.22	154.60	148.49
1974 Q3	147.36	728.44	126.91	80.96	214.16	148.93	150.12
1974 Q4	142.68	677.54	129.76	83.07	206.66	144.02	150.94
1975 Q1	157.55	694.90	133.44	83.91	196.57	131.64	152.05
1975 Q2	181.85	765.32	138.90	85.27	196.88	135.44	180.25
1975 Q3	169.71	771.16	133.98	82.18	210.08	147.39	186.16
1975 Q4	150.98	696.96	135.23	82.98	212.47	146.02	190.68
1976 Q1	139.33	649.10	131.80	82.79	213.90	158.13	193.13
1976 Q2	135.44	552.48	130.41	82.42	217.88	174.61	191.09
1976 Q3	130.26	543.64	122.57	79.55	211.50	174.69	187.62
1976 Q4	126.57	534.58	120.39	79.52	208.99	179.53	186.71
1977 Q1	139.00	590.83	121.86	81.48	209.36	172.65	189.79
1977 Q2	159.92	705.37	122.11	95.39	210.82	174.90	191.29
1977 Q3	147.18	642.01	121.98	95.36	217.30	191.95	195.24
1977 Q4	142.83	582.45	121.11	90.13	204.73	185.22	196.15
1978 Q1	146.89	583.97	121.89	91.08	200.08	185.12	197.92
1978 Q2	153.55	614.15	125.09	97.44	207.63	186.96	199.46
1978 Q3	143.84	545.88	124.81	98.19	192.08	184.52	199.22
1978 Q4	149.42	553.47	126.19	101.85	188.37	183.19	200.05
1979 Q1	164.21	632.90	126.43	98.94	108.56	189.97	198.10
1979 Q2	157.15	623.39	125.67	103.56	106.49	195.63	196.13
1979 Q3	151.75	591.60	127.50	107.59	104.09	198.21	196.84
1979 Q4	150.73	577.00	130.87	103.29	104.52	188.58	201.85
1980 Q1	161.81	671.58	127.81	99.44	117.13	193.23	196.29

1980 Q2	157.62	618.81	130.55	107.41	113.47	186.46	201.88
1980 Q3	146.85	904.06	171.35	114.22	764.63	320.75	196.66
1980 Q4	144.42	930.77	168.58	110.90	790.79	328.07	192.86
1981 Q1	141.99	972.82	165.00	107.78	829.44	339.80	189.45
1981 Q2	138.41	1044.95	160.02	103.63	895.24	360.16	184.62
1981 Q3	140.00	1039.79	162.30	106.26	893.76	360.82	187.21
1981 Q4	136.92	1035.92	158.04	102.69	883.51	359.39	182.52
1982 Q1	137.35	1106.11	157.98	101.87	937.78	375.81	182.76
1982 Q2	133.39	1135.23	151.59	97.53	961.14	383.64	176.92
1982 Q3	132.25	1162.90	149.80	96.41	982.69	390.03	175.67
1982 Q4	133.33	1126.68	152.73	97.72	955.68	382.55	177.53
1983 Q1	130.49	1154.29	148.46	94.79	982.65	391.87	173.52
1983 Q2	129.53	1182.97	146.88	93.31	1006.76	398.37	171.88
1983 Q3	128.35	1213.49	145.49	91.83	1031.36	406.71	170.30
1983 Q4	127.38	950.05	144.27	90.58	1051.35	413.69	168.84
1984 Q1	128.35	947.74	145.52	91.52	1025.35	407.64	170.07
1984 Q2	127.73	951.19	144.25	90.48	1073.21	421.31	168.96
1984 Q3	126.52	971.96	142.74	89.09	1133.60	440.52	167.43
1984 Q4	126.52	978.27	143.11	89.86	1166.04	451.13	167.61
1985 Q1	127.26	977.99	143.84	90.54	1160.88	449.22	168.25
1985 Q2	127.40	984.46	144.17	90.82	1152.67	447.09	168.29
1985 Q3	129.81	973.08	148.29	93.81	1065.92	422.86	171.46
1985 Q4	131.04	962.22	150.30	95.44	1016.59	409.47	172.84
1986 Q1	131.44	963.13	151.43	96.08	976.21	398.32	173.21
1986 Q2	130.14	976.85	149.83	95.28	950.22	393.86	171.31
1986 Q3	130.54	818.58	150.82	96.24	915.49	384.72	171.96
1986 Q4	131.08	785.39	151.36	97.86	900.55	381.19	172.60
1987 Q1	131.95	749.90	153.08	99.59	860.57	369.89	173.74
1987 Q2	131.67	751.58	152.43	98.83	864.94	371.57	173.25
1987 Q3	131.22	753.41	152.18	98.76	863.13	371.23	172.94
1987 Q4	133.37	774.53	155.71	101.54	796.25	351.69	175.33
1988 Q1	131.72	688.61	153.22	99.65	811.35	356.31	173.36
1988 Q2	130.38	649.37	151.28	97.76	851.95	369.96	171.69
1988 Q3	129.32	619.18	149.67	96.65	867.14	374.82	170.32
1988 Q4	129.96	626.56	150.54	97.69	834.85	365.98	170.88
1989 Q1	129.46	623.56	149.73	97.74	863.60	375.28	170.30
1989 Q2	129.29	615.09	149.09	97.35	886.08	382.80	170.15
1989 Q3	130.14	615.07	150.85	98.73	549.71	376.46	171.30
1989 Q4	132.68	535.94	154.51	102.51	528.63	367.69	174.81
1990 Q1	134.27	523.73	155.81	104.45	529.56	367.69	176.31

1990 Q2	134.13	530.76	155.84	104.47	522.71	364.53	175.99
1990 Q3	135.58	541.57	159.08	106.47	276.47	356.37	177.49
1990 Q4	135.80	539.67	158.88	107.20	271.90	352.62	177.11
1991 Q1	133.13	546.38	155.45	103.04	183.39	369.67	173.55
1991 Q2	131.78	553.39	154.27	102.17	182.15	378.75	172.15
1991 Q3	134.37	467.28	157.97	105.26	173.71	372.86	174.02
1991 Q4	137.07	472.80	161.76	108.55	164.26	362.63	176.52
1992 Q1	135.57	471.87	159.98	110.60	171.84	372.45	175.03
1992 Q2	137.82	436.76	163.55	113.87	164.88	362.98	177.30
1992 Q3	141.87	430.83	169.80	119.38	161.95	360.61	181.81
1992 Q4	137.85	402.77	164.34	113.41	175.36	157.39	177.92
1993 Q1	139.59	410.20	167.73	117.46	177.00	160.88	179.10
1993 Q2	138.14	424.13	165.17	113.69	177.99	162.10	176.84
1993 Q3	138.76	421.94	165.68	113.79	177.26	162.18	177.20
1993 Q4	138.45	394.69	165.13	113.23	182.36	165.32	177.11
1994 Q1	86.22	396.87	83.36	57.81	177.60	162.83	92.19
1994 Q2	86.83	397.94	84.40	58.73	173.18	141.80	92.81
1994 Q3	87.42	394.18	85.31	59.63	170.35	141.76	93.46
1994 Q4	87.37	390.36	85.14	59.45	171.18	134.10	93.27
1995 Q1	89.30	396.60	88.51	62.20	165.32	131.84	95.50
1995 Q2	88.92	394.13	87.92	61.67	163.48	124.79	94.93
1995 Q3	89.49	370.40	88.13	62.16	165.48	125.44	95.24
1995 Q4	90.13	346.21	88.61	62.61	165.95	125.65	95.62
1996 Q1	89.77	346.83	87.82	61.97	167.91	126.23	95.23
1996 Q2	89.64	312.21	87.31	61.60	169.54	126.50	94.86
1996 Q3	89.76	308.97	87.31	61.68	169.79	126.03	94.79
1996 Q4	89.84	308.19	87.03	61.54	171.41	125.63	94.59
1997 Q1	88.91	302.00	85.66	59.99	179.51	125.03	93.75
1997 Q2	87.89	302.33	84.20	58.52	181.44	122.79	92.45
1997 Q3	88.61	303.22	85.67	60.85	185.58	124.58	93.33
1997 Q4	89.71	261.25	88.86	64.52	196.37	128.64	94.12
1998 Q1	89.02	259.47	87.17	61.94	195.63	126.91	93.11
1998 Q2	90.19	250.43	89.28	64.02	196.20	126.24	93.74
1998 Q3	91.85	213.30	91.10	65.77	188.92	119.55	95.37
1998 Q4	91.23	206.39	89.77	64.26	185.76	114.58	94.61
1999 Q1	88.35	199.29	86.87	76.25	189.74	110.56	90.84
1999 Q2	88.24	201.74	86.66	76.00	194.26	109.51	90.66
1999 Q3	98.12	197.98	102.66	87.78	249.05	121.65	102.89
1999 Q4	87.70	177.02	85.26	74.94	193.86	109.49	89.11
2000 Q1	87.51	175.25	84.20	73.59	198.20	110.95	88.49

2000 Q2	90.75	179.40	88.15	76.23	202.72	113.00	93.35
2000 Q3	87.97	149.12	83.38	71.80	203.86	114.66	88.70
2000 Q4	93.58	155.89	91.78	79.71	199.37	116.11	96.87
2001 Q1	92.24	159.39	89.47	78.23	212.80	119.44	92.82
2001 Q2	88.58	147.44	84.27	73.72	192.88	114.96	88.20
2001 Q3	92.25	143.32	89.44	78.33	177.53	113.40	92.97
2001 Q4	91.08	142.08	87.43	77.31	165.84	113.66	91.62
2002 Q1	91.23	164.39	87.61	77.45	166.83	114.38	91.13
2002 Q2	96.98	139.38	95.70	86.13	159.68	111.24	98.73
2002 Q3	93.91	109.94	90.89	84.55	155.49	108.95	93.27
2002 Q4	96.62	108.46	94.61	88.46	152.48	107.49	96.80
2003 Q1	95.90	103.88	93.87	89.31	115.79	105.16	95.24
2003 Q2	96.26	102.83	94.27	91.25	106.20	102.48	95.39
2003 Q3	97.24	101.32	95.90	92.42	103.74	101.89	97.07
2003 Q4	100.01	99.38	100.05	99.97	100.06	99.76	100.06
2004 Q1	95.75	97.60	93.37	93.82	97.47	97.54	93.47
2004 Q2	97.12	98.76	95.70	94.89	99.04	99.17	95.42
2004 Q3	95.89	97.81	85.11	94.23	94.18	97.76	94.96
2004 Q4	74.41	69.84	48.42	74.49	64.53	79.99	50.25
2005 Q1	72.82	67.95	46.35	71.34	68.06	80.21	47.74
2005 Q2	70.74	72.17	44.32	67.63	69.50	80.77	46.00
2005 Q3	70.71	75.79	44.43	66.72	70.22	81.03	46.19
2005 Q4	70.34	79.04	43.89	65.72	70.99	81.43	45.89
2006 Q1	70.95	77.64	44.26	66.50	70.24	80.84	46.52
2006 Q2	72.71	77.19	46.18	69.67	69.21	80.51	48.00
2006 Q3	72.74	75.16	46.08	69.50	69.43	80.60	47.88
2006 Q4	68.26	78.28	46.81	71.16	68.83	74.31	41.24
2007 Q1	68.46	75.00	47.11	71.60	68.79	73.52	41.45
2007 Q2	68.17	71.51	46.81	71.85	68.24	71.04	41.62
2007 Q3	69.18	69.49	48.30	74.17	68.55	70.33	42.59
2007 Q4	70.23	67.50	49.28	74.02	68.77	68.80	43.19
2008 Q1	72.96	64.45	52.86	78.92	69.00	66.66	45.21
2008 Q2	73.84	63.53	53.09	79.46	70.86	66.78	44.99
2008 Q3	72.15	65.29	50.31	73.73	71.50	68.21	42.47
2008 Q4	73.64	64.85	52.64	77.99	74.31	68.34	43.90
2009 Q1	74.01	65.85	52.00	79.84	74.23	62.33	42.97
2009 Q2	75.28	64.64	52.02	82.40	71.55	59.32	43.14
2009 Q3	75.74	63.86	52.71	84.55	71.01	53.03	43.53
2009 Q4	74.43	63.99	51.28	83.06	70.81	52.28	42.72
2010 Q1	72.00	64.61	48.33	77.86	71.28	49.34	41.32

2010 Q2	69.24	65.86	45.41	71.82	70.26	49.49	39.10
2010 Q3	72.36	65.70	48.92	78.57	68.32	40.12	41.60
2010 Q4	71.28	65.13	47.26	76.20	66.18	39.58	40.16
2011 Q1	73.82	65.36	50.04	81.56	63.90	39.03	42.15
2011 Q2	74.27	66.11	50.36	82.69	63.23	38.53	42.19
2011 Q3	72.99	66.50	49.00	79.61	64.77	39.12	40.63
2011 Q4	72.36	60.37	48.17	77.74	64.51	39.42	39.83
2012 Q1	74.57	58.56	49.22	79.55	64.20	38.64	40.97
2012 Q2	74.58	57.40	47.83	76.15	64.74	38.73	39.52
2012 Q3	88.91	55.95	48.49	76.99	63.87	37.65	40.38
2012 Q4	88.77	53.64	49.44	78.81	62.55	37.44	41.01

Table 3 continued.

YEAR	GHANA	KENYA	MADAGASCAR	MAURITIUS	MOROCCO	NIGER	NIGERIA
1971 Q1	232.08	102.88	195.12	129.35	150.54	81.91	95.37
1971 Q2	253.30	111.93	195.58	126.84	148.08	81.98	89.42
1971 Q3	247.60	113.22	196.27	126.81	144.23	83.01	84.74
1971 Q4	124.40	109.16	201.70	126.16	144.18	84.48	85.61
1972 Q1	183.05	106.97	210.32	129.69	151.29	88.07	93.58
1972 Q2	196.51	106.63	212.59	121.77	146.74	97.20	93.22
1972 Q3	183.40	107.87	210.95	120.10	143.43	94.71	95.55
1972 Q4	182.48	107.56	211.99	115.50	140.11	95.64	97.66
1973 Q1	191.30	97.24	217.17	113.80	142.97	98.20	107.94
1973 Q2	189.83	97.59	221.10	109.76	139.72	108.32	108.12
1973 Q3	206.25	103.49	217.64	104.64	138.04	105.69	108.17
1973 Q4	202.95	106.82	216.56	109.39	136.89	94.31	107.92
1974 Q1	215.18	99.61	219.39	113.95	141.13	86.15	99.82
1974 Q2	221.00	100.43	228.55	116.85	136.17	81.33	101.94
1974 Q3	225.52	103.14	234.17	114.78	134.33	83.20	96.59
1974 Q4	208.48	102.52	243.05	109.93	135.64	84.48	94.76
1975 Q1	207.91	103.06	250.66	113.48	133.89	86.94	95.22
1975 Q2	225.53	106.17	260.19	104.48	135.02	95.93	95.71
1975 Q3	266.79	113.28	259.41	107.20	133.13	97.69	100.07
1975 Q4	273.90	98.02	262.88	108.58	132.80	102.67	99.62
1976 Q1	312.14	98.35	265.21	112.36	133.85	105.80	100.96
1976 Q2	351.96	98.87	267.21	113.77	132.01	113.12	101.08
1976 Q3	416.00	98.48	265.65	112.74	129.70	114.58	88.06
1976 Q4	428.20	98.24	269.03	112.03	130.08	116.90	91.63
1977 Q1	495.37	98.32	270.84	112.88	134.07	118.93	100.11
1977 Q2	704.91	102.63	273.39	112.88	131.53	119.03	109.78
1977 Q3	925.89	104.21	275.66	113.02	134.93	130.33	104.97
1977 Q4	796.88	106.70	282.29	112.07	135.18	128.98	103.65
1978 Q1	890.99	109.56	286.60	114.83	137.89	133.66	105.51
1978 Q2	874.65	110.98	292.88	115.28	137.00	134.01	109.31
1978 Q3	441.00	110.45	297.25	113.33	136.44	139.45	97.19
1978 Q4	533.09	112.03	308.88	114.09	137.76	143.90	98.96
1979 Q1	648.82	113.01	312.50	115.57	138.58	136.62	99.39
1979 Q2	693.38	112.17	317.74	113.68	134.86	140.17	106.63
1979 Q3	519.45	112.53	329.55	115.10	134.04	144.09	104.28

1979 Q4	563.13	114.76	340.27	95.38	135.78	136.79	105.86
1980 Q1	701.69	118.07	342.80	106.30	133.62	125.13	109.93
1980 Q2	759.84	117.82	353.21	105.75	132.31	135.49	108.63
1980 Q3	831.52	117.03	361.53	107.78	129.65	132.24	107.66
1980 Q4	1021.25	117.96	369.70	109.82	127.40	124.75	111.63
1981 Q1	1452.39	111.84	377.10	111.32	124.32	118.22	105.82
1981 Q2	1956.70	114.08	386.19	113.12	121.09	116.71	106.42
1981 Q3	2088.60	98.19	402.52	94.84	125.02	145.83	107.01
1981 Q4	2333.05	101.61	411.21	97.51	124.98	124.88	110.98
1982 Q1	2324.08	110.61	425.57	101.23	124.25	125.86	114.89
1982 Q2	2460.73	113.99	394.56	102.62	122.40	122.20	114.93
1982 Q3	2661.24	117.13	410.98	101.90	123.93	118.09	113.12
1982 Q4	2781.41	100.26	418.14	101.97	121.93	118.08	113.38
1983 Q1	3780.08	103.24	415.33	103.54	121.70	103.30	110.60
1983 Q2	6064.72	103.66	432.90	101.86	120.42	98.66	116.17
1983 Q3	6450.62	103.95	396.51	97.92	110.78	95.66	120.52
1983 Q4	677.95	105.99	408.96	95.60	115.44	98.02	123.76
1984 Q1	634.34	107.14	360.80	96.41	109.34	102.06	130.28
1984 Q2	708.01	107.01	355.89	95.08	107.81	102.39	129.51
1984 Q3	616.36	111.12	377.37	94.10	111.55	105.75	651.77
1984 Q4	477.63	111.22	377.94	94.65	112.98	100.61	651.77
1985 Q1	515.20	112.67	362.06	94.14	109.17	99.41	589.93
1985 Q2	496.46	114.00	367.13	92.30	101.31	102.77	577.05
1985 Q3	413.09	104.85	362.20	95.72	96.91	121.83	556.85
1985 Q4	374.71	104.09	341.40	94.93	98.49	120.23	476.92
1986 Q1	260.70	95.36	328.47	93.45	98.10	111.68	445.26
1986 Q2	272.33	95.78	330.73	96.84	97.62	121.58	359.98
1986 Q3	259.99	94.81	267.60	94.27	95.95	129.72	272.08
1986 Q4	276.56	96.59	257.03	91.86	95.79	120.26	138.71
1987 Q1	176.32	93.70	238.17	91.15	93.55	116.23	112.96
1987 Q2	200.15	91.69	140.67	88.24	93.82	112.18	116.36
1987 Q3	175.59	90.22	144.31	83.43	93.43	114.93	102.74
1987 Q4	157.89	86.90	150.45	85.33	90.48	119.25	107.35
1988 Q1	173.52	86.79	157.27	83.45	91.31	118.70	99.54
1988 Q2	205.41	87.49	151.31	82.35	92.62	109.89	107.47
1988 Q3	176.78	89.77	142.52	86.62	92.66	107.71	118.81
1988 Q4	165.60	87.50	141.28	88.26	90.85	106.66	114.65
1989 Q1	165.81	88.76	143.73	86.35	91.05	104.58	77.21
1989 Q2	182.13	86.72	144.45	87.85	91.55	106.09	100.23
1989 Q3	169.80	83.56	145.29	86.28	91.89	111.82	119.53

1989 Q4	151.70	85.82	144.29	88.20	90.81	114.68	113.80
1990 Q1	167.44	83.33	144.67	90.96	91.59	115.62	104.51
1990 Q2	172.77	84.76	144.84	87.24	82.33	113.94	102.68
1990 Q3	165.06	83.16	142.00	92.39	82.83	123.03	103.34
1990 Q4	159.00	83.71	141.48	95.05	84.31	117.20	88.59
1991 Q1	177.94	84.09	129.34	93.46	84.01	101.22	86.56
1991 Q2	192.03	82.80	126.25	88.70	86.78	100.27	77.75
1991 Q3	174.12	82.96	122.40	96.76	87.05	114.64	92.28
1991 Q4	154.15	82.85	120.67	99.59	87.25	120.69	93.78
1992 Q1	161.28	84.62	124.51	94.43	85.58	108.99	49.14
1992 Q2	155.09	85.14	122.01	97.16	86.80	111.04	55.99
1992 Q3	130.67	86.09	124.05	99.50	86.60	118.58	60.44
1992 Q4	136.52	86.60	129.13	93.14	88.05	101.59	67.02
1993 Q1	131.64	76.10	134.11	101.40	89.14	114.24	57.01
1993 Q2	143.29	61.78	134.54	102.03	90.93	109.26	74.25
1993 Q3	126.85	67.15	135.54	101.47	92.64	112.37	91.47
1993 Q4	114.14	71.79	138.84	97.76	93.22	102.83	102.71
1994 Q1	104.07	80.65	149.57	99.97	94.06	68.94	106.82
1994 Q2	105.21	94.74	81.51	102.38	94.69	81.09	114.72
1994 Q3	104.17	105.45	77.76	100.31	93.91	85.08	127.57
1994 Q4	105.73	109.52	82.30	98.53	95.41	82.92	148.18
1995 Q1	105.29	109.67	75.82	101.87	99.21	90.49	170.93
1995 Q2	117.02	86.95	74.24	100.98	98.42	90.10	189.14
1995 Q3	123.59	88.11	78.18	101.60	97.64	95.42	221.62
1995 Q4	120.62	88.74	107.65	102.01	96.64	93.90	248.27
1996 Q1	124.49	87.94	99.44	101.45	98.19	91.03	253.76
1996 Q2	131.68	92.51	97.53	102.72	98.17	92.90	269.74
1996 Q3	132.94	98.13	95.05	105.41	96.57	95.52	292.08
1996 Q4	137.10	100.84	93.02	105.98	97.82	89.61	314.68
1997 Q1	146.67	108.91	87.71	98.00	98.31	83.69	301.52
1997 Q2	152.55	114.02	83.76	95.78	98.08	81.19	313.31
1997 Q3	145.86	99.39	84.77	95.47	97.97	86.46	329.36
1997 Q4	140.28	112.14	91.36	100.25	101.20	92.73	342.99
1998 Q1	148.12	119.23	91.22	96.43	101.71	84.67	365.84
1998 Q2	163.58	121.76	96.88	102.09	102.10	95.78	367.51
1998 Q3	153.10	116.09	93.81	94.29	101.03	100.23	397.61
1998 Q4	149.04	105.78	89.75	91.54	101.18	92.61	396.37
1999 Q1	155.16	107.88	84.62	94.60	98.39	86.90	93.71
1999 Q2	167.98	100.88	78.87	96.46	95.88	84.62	95.37
1999 Q3	173.87	109.13	91.59	107.81	116.16	77.31	89.42

1999 Q4	120.69	101.42	86.90	97.06	96.67	80.93	84.74
2000 Q1	108.79	102.15	86.20	100.20	97.42	78.25	85.61
2000 Q2	95.93	104.27	94.64	101.11	106.00	81.57	93.58
2000 Q3	93.34	108.53	94.92	103.17	103.52	80.29	93.22
2000 Q4	96.96	114.06	102.90	102.00	111.26	83.91	95.55
2001 Q1	102.29	123.41	103.12	105.07	109.02	73.85	97.66
2001 Q2	108.84	117.74	103.44	99.87	92.15	81.18	107.94
2001 Q3	112.14	118.03	111.28	99.59	95.77	89.13	108.12
2001 Q4	112.98	123.43	115.51	102.91	98.85	91.56	108.17
2002 Q1	111.82	122.43	109.71	103.75	96.19	88.55	107.92
2002 Q2	105.75	115.02	115.14	100.52	101.57	97.10	99.82
2002 Q3	101.65	112.67	111.01	99.46	94.39	96.57	101.94
2002 Q4	99.12	112.94	111.29	97.63	97.53	94.22	96.59
2003 Q1	103.85	116.99	106.70	102.00	95.19	93.95	94.76
2003 Q2	106.05	126.45	109.21	92.78	94.44	95.32	95.22
2003 Q3	106.44	114.79	109.26	94.01	97.47	92.78	95.71
2003 Q4	100.08	111.67	100.01	97.76	100.00	97.09	100.07
2004 Q1	96.86	110.52	68.39	93.68	92.89	89.81	99.62
2004 Q2	103.92	112.93	61.99	91.28	94.44	92.94	100.96
2004 Q3	103.08	113.78	63.80	86.78	80.83	96.28	101.08
2004 Q4	58.73	101.67	50.53	67.06	41.68	114.98	88.06
2005 Q1	62.70	106.36	50.52	66.36	40.00	113.21	91.63
2005 Q2	67.82	110.10	48.51	66.34	38.35	113.33	100.11
2005 Q3	67.08	111.80	48.81	64.08	38.37	114.41	109.78
2005 Q4	66.51	115.70	48.54	63.43	38.60	107.01	104.97
2006 Q1	67.37	131.35	47.28	64.19	39.17	103.76	103.65
2006 Q2	68.93	124.86	48.80	64.78	40.27	110.80	105.51
2006 Q3	70.52	123.94	51.36	64.21	39.73	113.34	109.31
2006 Q4	69.00	125.52	54.32	58.46	37.60	105.50	97.19
2007 Q1	71.04	137.04	57.66	62.69	38.00	103.28	98.96
2007 Q2	72.99	139.09	58.77	62.09	37.78	100.46	99.39
2007 Q3	72.96	136.14	57.14	61.32	38.50	103.55	106.63
2007 Q4	72.06	147.83	58.25	68.30	38.96	107.83	104.28
2008 Q1	72.65	165.28	63.98	76.93	40.21	119.36	105.86
2008 Q2	76.74	169.04	66.37	75.52	40.04	125.86	109.93
2008 Q3	75.76	160.08	66.85	79.69	38.24	130.27	108.63
2008 Q4	74.24	162.39	66.33	74.29	40.06	128.58	107.66
2009 Q1	75.76	165.03	67.20	72.93	39.50	122.16	111.63
2009 Q2	75.87	162.29	62.18	67.99	38.98	116.95	105.82
2009 Q3	78.13	162.69	58.96	68.77	38.98	118.36	106.42

2009 Q4	78.19	160.87	60.59	66.55	37.72	114.18	107.01
2010 Q1	78.61	159.56	57.45	64.48	36.53	101.20	110.98
2010 Q2	79.59	153.02	55.33	63.98	34.80	95.29	114.89
2010 Q3	77.27	148.60	58.95	63.81	36.40	96.78	114.93
2010 Q4	74.99	148.62	55.81	62.57	35.47	94.43	113.12
2011 Q1	76.65	147.68	60.85	67.67	36.47	98.01	113.38
2011 Q2	80.04	141.83	61.56	67.15	35.85	100.56	110.60
2011 Q3	81.18	135.33	60.84	69.96	34.62	102.63	116.17
2011 Q4	78.72	165.94	57.92	72.35	33.94	101.34	120.52
2012 Q1	76.27	170.61	61.37	71.90	34.54	95.72	123.76
2012 Q2	76.18	172.70	61.25	70.15	33.50	97.27	130.28
2012 Q3	74.00	164.21	59.97	67.95	33.99	93.91	129.51
2012 Q4	48.63	167.09	59.00	66.25	31.67	96.71	122.69

Table 3 continued.							
YEAR	**RWANDA**	**SENEGAL**	**SEYCHELLES**	**SIERRA LEONE**	**SOUTHAFRICA**	**TANZANIA**	**TOGO**
1971 Q1	385.71	114.24	53.04	0.00	161.90	196.07	118.67
1971 Q2	380.10	107.57	53.86	0.00	162.78	185.81	121.82
1971 Q3	368.48	111.61	62.71	0.00	157.34	156.14	120.62
1971 Q4	390.36	110.12	59.80	0.00	142.95	145.51	123.83
1972 Q1	384.99	109.90	63.10	0.00	142.48	136.77	131.31
1972 Q2	384.53	110.28	59.27	0.00	142.80	141.86	129.74
1972 Q3	387.14	120.39	65.36	0.00	145.13	143.7	124.22
1972 Q4	387.23	116.35	62.52	0.00	140.08	145.14	117.96
1973 Q1	403.50	115.84	60.68	0.00	144.92	133.6	120.62
1973 Q2	378.60	125.80	64.67	0.00	143.00	126.24	133.42
1973 Q3	380.02	125.06	60.73	0.00	142.06	126.58	115.90
1973 Q4	402.80	118.97	54.32	0.00	149.30	129.81	104.59
1974 Q1	350.65	112.93	59.18	0.00	142.97	119.45	100.46
1974 Q2	350.09	111.37	60.88	0.00	143.78	127.83	106.02
1974 Q3	349.93	118.19	63.53	0.00	141.71	127.48	106.63
1974 Q4	346.43	131.62	62.09	0.00	140.41	150.77	111.44
1975 Q1	345.46	147.11	61.17	0.00	140.75	148.93	113.63
1975 Q2	345.29	148.12	55.75	0.00	133.47	153.47	118.87
1975 Q3	346.90	142.69	57.96	0.00	118.86	157.53	111.03
1975 Q4	349.05	144.89	57.92	0.00	118.69	138.56	109.53
1976 Q1	344.45	134.01	57.62	0.00	120.37	139.25	106.04
1976 Q2	344.48	129.67	52.76	0.00	123.01	141.4	105.60
1976 Q3	340.00	131.78	52.39	0.00	123.08	140.09	100.96
1976 Q4	336.40	131.67	52.67	0.00	121.99	139.27	97.51
1977 Q1	336.62	131.84	54.14	0.00	122.76	149.35	107.61
1977 Q2	336.23	125.46	54.45	0.00	123.22	142.5	118.26
1977 Q3	334.90	134.96	57.25	0.00	123.66	135.51	111.58
1977 Q4	333.64	133.10	57.46	0.00	118.37	139.36	107.40
1978 Q1	332.05	130.70	58.31	0.00	116.38	140.04	109.79
1978 Q2	334.40	125.94	59.19	0.00	116.46	138.06	113.70
1978 Q3	333.15	125.32	62.15	0.00	114.86	135.9	110.10
1978 Q4	331.09	130.80	59.69	0.00	114.22	146.79	109.56
1979 Q1	331.65	128.41	63.12	0.00	120.01	133.6	108.69
1979 Q2	332.26	125.51	65.85	0.00	119.21	132.49	112.94
1979 Q3	331.89	131.53	66.63	0.00	123.99	132.93	114.76
1979 Q4	332.13	130.63	63.61	0.00	125.23	139.55	118.12

1980 Q1	332.82	125.88	63.61	0.00	134.66	154.24	109.93
1980 Q2	332.52	127.30	65.59	0.00	133.12	151.62	117.96
1980 Q3	332.76	124.24	68.72	0.00	140.42	161.93	120.00
1980 Q4	334.88	119.71	67.24	0.00	150.65	172.63	114.65
1981 Q1	369.71	113.96	78.57	0.00	147.84	181.25	117.29
1981 Q2	373.48	108.83	78.90	0.00	144.97	194.92	114.40
1981 Q3	374.45	114.00	78.24	0.00	139.08	208.46	117.71
1981 Q4	376.68	112.28	75.79	0.00	138.60	214.26	108.49
1982 Q1	383.62	116.86	74.53	0.00	135.81	209.63	112.10
1982 Q2	384.70	112.66	74.87	0.00	131.59	217.7	107.79
1982 Q3	385.85	112.96	73.93	0.00	135.64	250.08	101.82
1982 Q4	392.03	116.54	75.37	0.00	144.31	251.59	106.24
1983 Q1	393.41	112.89	75.79	0.00	148.54	255.56	107.16
1983 Q2	398.93	111.00	75.70	0.00	154.24	219.36	109.69
1983 Q3	404.48	117.80	82.56	0.00	158.06	223.4	101.97
1983 Q4	409.48	116.60	82.22	0.00	146.60	247.08	94.61
1984 Q1	405.77	112.08	81.75	0.00	142.61	252.83	98.46
1984 Q2	413.02	115.10	81.85	0.00	140.30	202.32	97.17
1984 Q3	421.92	119.86	82.95	0.00	122.97	236.98	89.36
1984 Q4	426.99	121.22	83.57	0.00	109.57	265.61	85.28
1985 Q1	427.87	121.12	96.56	0.00	117.42	280.17	85.99
1985 Q2	427.77	125.55	96.46	0.00	116.88	288.22	88.43
1985 Q3	423.94	133.68	100.27	0.00	84.20	294.05	94.63
1985 Q4	420.07	138.93	98.83	0.00	83.24	328.58	98.12
1986 Q1	419.76	139.48	96.36	0.00	102.15	351.97	104.63
1986 Q2	424.12	137.82	100.60	0.00	86.74	137.3	107.99
1986 Q3	421.29	143.20	100.45	0.00	97.36	133.14	108.54
1986 Q4	418.21	155.52	100.24	0.00	103.57	127.03	107.75
1987 Q1	422.00	151.47	101.96	0.00	111.04	117.12	114.41
1987 Q2	423.62	146.49	101.17	0.00	112.42	105.35	114.01
1987 Q3	425.97	150.42	101.77	0.00	114.02	100.02	112.59
1987 Q4	438.71	152.86	105.86	0.00	115.09	87.34	119.72
1988 Q1	440.05	145.10	104.63	0.00	108.02	85.707	114.82
1988 Q2	439.85	135.47	103.70	0.00	105.37	86.793	111.93
1988 Q3	442.19	136.27	104.28	0.00	102.35	95.046	105.90
1988 Q4	448.98	138.21	103.50	0.00	106.53	76.929	107.74
1989 Q1	448.19	135.88	103.10	0.00	106.74	80.894	105.27
1989 Q2	447.21	130.45	99.69	0.00	103.23	78.387	102.55
1989 Q3	451.68	136.32	100.91	0.00	106.77	81.385	104.37
1989 Q4	447.48	141.16	101.12	0.00	112.23	63.929	107.30

1990 Q1	446.70	139.88	98.63	0.00	110.55	67.743	108.77
1990 Q2	450.90	138.47	98.78	0.00	110.61	65.552	114.00
1990 Q3	461.13	141.72	102.55	0.00	112.09	66.285	115.95
1990 Q4	281.09	145.52	101.26	0.00	113.87	68.402	111.65
1991 Q1	286.70	132.94	101.32	0.00	117.08	79.215	104.31
1991 Q2	292.17	132.27	84.74	0.00	118.33	68.05	100.57
1991 Q3	296.00	133.62	85.38	0.00	120.15	73.481	104.77
1991 Q4	297.12	137.62	86.01	0.00	120.76	73.954	109.02
1992 Q1	298.86	147.47	84.72	0.00	128.19	68.954	104.98
1992 Q2	261.06	144.82	86.94	0.00	128.06	60.869	112.53
1992 Q3	265.16	150.27	90.29	0.01	125.39	70.696	119.65
1992 Q4	268.59	141.78	88.19	0.02	126.37	76.189	109.10
1993 Q1	293.17	143.82	90.86	0.03	125.89	85.139	108.15
1993 Q2	330.78	131.21	92.28	0.04	121.97	83.696	105.31
1993 Q3	337.27	133.56	93.75	0.05	117.56	66.686	103.27
1993 Q4	334.14	129.88	91.91	0.06	123.47	72.214	100.91
1994 Q1	333.18	80.73	93.48	0.07	118.71	78.118	65.30
1994 Q2	322.08	84.22	94.65	0.09	110.57	77.292	73.67
1994 Q3	308.87	89.29	93.66	0.11	113.45	74.618	77.05
1994 Q4	302.08	89.34	92.88	0.15	115.82	81.362	83.62
1995 Q1	164.29	88.89	94.77	0.18	110.50	85.243	88.11
1995 Q2	150.07	87.10	93.64	0.19	109.12	77.698	89.68
1995 Q3	141.79	90.43	90.92	0.20	111.07	79.448	90.42
1995 Q4	148.46	91.15	89.22	0.27	112.55	94.119	92.21
1996 Q1	149.53	86.84	87.56	0.41	105.91	110.56	90.85
1996 Q2	148.58	85.63	87.39	0.72	99.29	96.791	89.75
1996 Q3	148.85	88.23	87.79	1.06	96.80	98.146	90.48
1996 Q4	150.49	87.31	87.23	1.30	96.05	100.2	89.93
1997 Q1	152.35	84.68	89.28	1.58	109.00	114.01	89.98
1997 Q2	157.91	81.65	89.78	1.63	108.19	110.63	88.98
1997 Q3	163.37	84.43	90.87	1.27	109.61	113.4	88.10
1997 Q4	164.77	85.89	91.89	1.25	112.04	121.28	87.74
1998 Q1	163.09	83.09	92.38	1.94	108.20	128.29	86.20
1998 Q2	161.33	82.69	93.33	9.48	94.75	138.28	88.66
1998 Q3	156.05	87.14	88.60	13.50	94.16	124.87	92.75
1998 Q4	155.84	86.03	87.67	19.32	93.47	120.79	88.88
1999 Q1	150.62	91.92	93.33	20.84	95.61	134.32	85.32
1999 Q2	161.52	89.47	94.65	31.71	100.40	126.58	84.03
1999 Q3	185.05	100.61	100.96	41.94	142.73	121.14	101.54
1999 Q4	157.48	90.56	98.93	52.01	98.55	112.12	83.45

2000 Q1	154.52	88.23	98.964	82.46	95.95	124.27	83.98
2000 Q2	150.62	91.1	100.48	83.769	97.35	126.64	85.23
2000 Q3	145.79	86.76	99.842	92.158	94.15	124.73	76.68
2000 Q4	141.13	94.64	95.306	122.2	93.55	128.07	80.89
2001 Q1	146.38	90.35	97.57	111.77	105.9	135.21	84.48
2001 Q2	140.11	84.14	109.84	102.74	90.71	126.94	79.35
2001 Q3	137.57	90.83	112.97	99.735	79.6	120.73	85.46
2001 Q4	137.62	92.02	109.13	115.51	59.91	124.64	81.31
2002 Q1	136.86	88.8	109.25	114.11	66.31	121.86	82.49
2002 Q2	131.47	95.65	112.58	114.19	72.02	120.87	94.09
2002 Q3	125.31	93.14	109.52	104.89	70.12	116.02	88.25
2002 Q4	116.62	96.59	112.09	103.06	86.2	112.67	91.61
2003 Q1	113.85	95.42	104.57	102.66	92.33	106.72	92.85
2003 Q2	107.56	94.04	97.345	102.36	93.68	101.85	97.05
2003 Q3	105.21	95.72	101.83	101.71	100.1	99.51	96.03
2003 Q4	99.03	99.33	100.07	100	99.41	97.506	100
2004 Q1	98.24	92.79	99.236	100.3	101.1	92.182	95.64
2004 Q2	100.15	92.86	100.06	101.37	105.4	94.732	97.49
2004 Q3	101.64	91.61	90.505	111.54	100.3	98.449	97.28
2004 Q4	91.71	64.26	77.64	111.72	84.99	88.956	89.4
2005 Q1	92.90	60.9	79.296	112.27	76.16	85.142	88.84
2005 Q2	94.93	57.68	79.903	113.67	73.28	85.375	85.42
2005 Q3	95.03	57.63	79.617	123.85	77.16	84.293	84.38
2005 Q4	95.04	57.73	78.075	143.96	78.85	83.942	82.86
2006 Q1	95.28	57.58	76.608	161.61	79.95	80.99	85.36
2006 Q2	97.18	58.63	77.378	166.3	67.84	81.512	89.9
2006 Q3	97.80	59.1	77.828	173.33	63.59	78.378	87.91
2006 Q4	88.60	58.76	72.799	156.12	70.05	77.641	100.2
2007 Q1	88.59	60.58	70.063	162.03	68.54	82.594	103.2
2007 Q2	88.01	60.25	68.127	157.19	70.3	78.832	104.1
2007 Q3	88.13	62.59	62.704	155.85	72.19	78.526	105.8
2007 Q4	85.08	64.12	60.833	160.58	72.5	84.699	107.8
2008 Q1	86.09	67.04	67.023	170.91	60.83	82.645	114.1
2008 Q2	86.89	66.57	68.37	171.6	64.47	88.442	116.5
2008 Q3	90.56	63.89	71.717	184.08	64.61	94.814	108.6
2008 Q4	93.07	66.76	54.8	200.4	61.68	94.905	107.1
2009 Q1	93.70	64.86	63.334	200.63	63.88	102.92	105.2
2009 Q2	91.07	63.96	67.75	172.18	75.86	93.611	108
2009 Q3	90.43	64.77	78.351	156.21	76.85	90.917	112.8
2009 Q4	90.72	63.68	73.293	145.93	76.78	88.991	109.7

2010 Q1	91.69	60.23	70.576	154.68	78.65	90.575	102.9
2010 Q2	92.42	55.7	66.095	161.7	77.19	89.905	93.68
2010 Q3	91.93	60.25	64.032	150.06	81.37	79.166	101
2010 Q4	91.16	59.09	65.306	144.99	84.24	79.55	98.94
2011 Q1	91.87	61.41	63.689	144.7	81.81	81.116	105.4
2011 Q2	95.52	61.5	64.772	149.31	80.77	78.906	107
2011 Q3	100.62	59.85	65.294	163.13	70.99	85.023	99.69
2011 Q4	94.79	58.85	61.382	172.49	71.52	91.427	94.57
2012 Q1	93.48	59.14	59.852	172.02	76.1	93.751	97.48
2012 Q2	94.23	56.33	61.203	184.24	72.97	99.351	93.31
2012 Q3	93.44	57.2	64.493	183.71	71.16	97.24	93.74
2012 Q4	92.95	60.84	64.325	196.21	70.82	100.54	88.14

CURRICULUM VITAE

Alice Kones

Place of birth: Narok, Kenya

Education:

B.A., University of Wisconsin-Milwaukee, May 2007

Major: Mathematics and Actuarial Science

Masters of Business Administration (MBA), University of Wisconsin—Milwaukee, May 2010
Major: Financial Management

Dissertation Title: Impact of Monetary Uncertainty and Economic Uncertainty on Money Demand in Africa

Awards and Honors:

Academic Opportunity Program (AOP)-Fellowship, Northwestern Mutual Actuarial Scholarship, Phi Beta Kappa and Phi Kappa Phi Honors Societies, Alice Leung Mathematics Scholarship, Sophomore Honors, UWM and National Dean's List.