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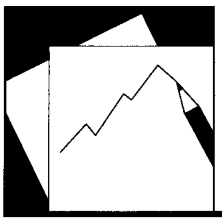

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The Gambia: Demand for Broad Money and Implications for Monetary Policy Conduct

Subramanian S. Sriram

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The Gambia: Demand for Broad Money and Implications for Monetary Policy Conduct

Prepared by Subramanian S. Sriram[1]

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Abstract

This paper evaluates the demand for broad money (M2) in The Gambia for January 1988–June 2007. There appears to be a long-run relationship for demand for real M2, but the relationship is not stable. Exogenous output shocks, financial innovation, changes in income velocity, and inadequate data quality contribute to the instability. The authorities may need to apply the monetary targeting regime flexibly in the overall objective of preserving price stability. A possible option for The Gambia is to become an inflation targeter lite.

JEL Classification Numbers: E41, E44, G2

Keywords: Broad money, cointegration, error-correction, inflation targeter lite, inflation targeting, M2, monetary policy, money demand, sub-Saharan Africa, The Gambia

Author's E-Mail Address: ssriram@imf.org

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Contents Page

Appendices

I. INTRODUCTION

Demand for money plays a major role in macroeconomic analysis, especially in selecting appropriate monetary policy. Consequently, considerable theoretical and empirical work has been undertaken worldwide to analyze the determinants and stability of money demand (see Sriram, 2001, and Knell and Stix, 2004). This paper estimates the long-run demand for M2 in The Gambia from 1988 through June 2007 and evaluates factors that adjust in response to temporary disequilibrium.[2] The analysis and findings should help improve the country's monetary policy design because the Central Bank of The Gambia (CBG) has been following a monetary targeting regime using broad money—defined as M2—as the intermediate target and reserve money as the operating target.[3] So far little work has been done to evaluate the stability and long-run determinants of demand for broad money in The Gambia. The one previous study focused on demand for M1 alone.[4]

The extensive literature underscores the importance to meaningful results of selecting relevant opportunity cost variables in formulating demand for money. These variables should be selected based on macroeconomic characteristics (open or closed economy) and performance (especially inflation) and financial system characteristics. The financial system data indicate, among other things, (1) whether there are alternative assets available to hold money, (2) how liquid the money and capital markets are, (3) whether interest rates are controlled by the authorities or determined by market forces, and (4) how fast financial innovation is taking place.

This paper first discusses country characteristics, macroeconomic performance, and financial sector development before proceeding to model and estimate the demand for real M2 in The

[2] The country experienced significant exchange rate appreciation during the third quarter of 2007, partly due to change in market sentiments as discussed in IMF, 2008a. This paper focuses on the analysis up until June 2007, and hence, unless otherwise explicitly stated, discussion on macroeconomic developments pertains up to June 2007 only.

[3] Monetary policy is signaled by the Monetary Policy Committee (MPC), which meets every other month and sets the rediscount rate (the rate the CBG applies to buy back treasury bills from holders under certain conditions). The CBG uses sales or retiring of treasury bills as the primary tool to keep actual growth of reserve money in line with the target. It uses the short-term liquidity forecasting framework to determine how much treasury bills to issue or to mature each week.

[4] Ceesay (2000) found that demand for real M1 was stable during 1973–97 and was explained by real GDP, real interest rates, and investment rate. Coefficients of the explanatory variables were significant. The scale variable (real GDP) had a positive sign as anticipated, but with a coefficient of 1.58, significantly higher than what most other studies have shown (see Sriram, 2001), though not uncommon for developing countries due to underdeveloped financial sectors as well as possible omission of relevant explanatory variables in the model. Real interest rates exerted a negative relationship, but, contrary to the anticipated positive relationship, the investment rate had a negative influence on demand for real M1.

Gambia. The estimation is made using cointegration and error-correction approaches and monthly observations.

There appears to be a long-run relationship for demand for broad money in real terms, explained by real GDP, interest rates on deposits at the commercial banks, yields on treasury bill, and expected inflation; but the relationship is not stable. Therefore, the use of broad money as the intermediate target has its limitations in The Gambia. However, developments in broad money can be used as one of the information variables to help design monetary policy generally.

II. Country Characteristics, Macroeconomic Performance, and Financial Sector Development

A. Country Characteristics

The Gambia is the smallest country in continental Africa in terms of area. It has a population of about 1.6 million, which has been growing at an annual rate of 2.3 percent. With a per capita gross national income of $320 in 2007, it is one of the poorest countries in the world[5]—with a score of 0.502, The Gambia ranks 155 out of 177 countries (and 94 out of 108 developing countries) in the 2007/2008 UN Human Development Index (see United Nations Development Programme, 2007). Nearly 60 percent of the population live in poverty (see Republic of The Gambia, 2006). About 80 percent of the population depends on agriculture, which is dominated by groundnuts. However, because its productivity is low, the agricultural sector contributes only about one-fifth of real GDP. The service sector, which accounts for over 50 percent of real GDP, has been the major contributor to economic growth.

B. Macroeconomic Performance

The performance of The Gambia's economy has been uneven. In 1988–2007, real GDP growth averaged 4.5 percent and inflation 6.6 percent a year, although both varied significantly from year to year (see Figures 1 and 2). Exogenous, political, and policy-induced shocks are the main reasons for uneven performance. Since 1984 The Gambia has been in seven different IMF programs, the most recent signed in February 2007 for a three-year Poverty Reduction and Growth Facility arrangement of SDR 14 million.[6]

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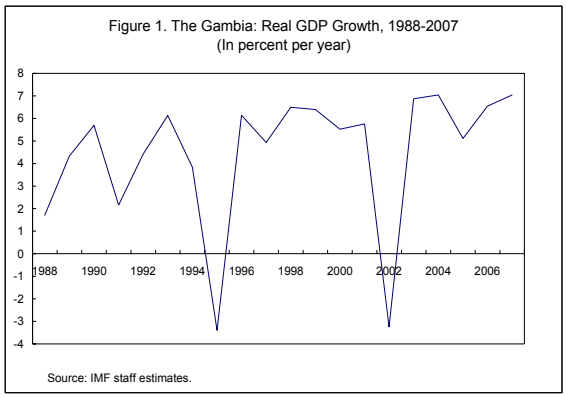
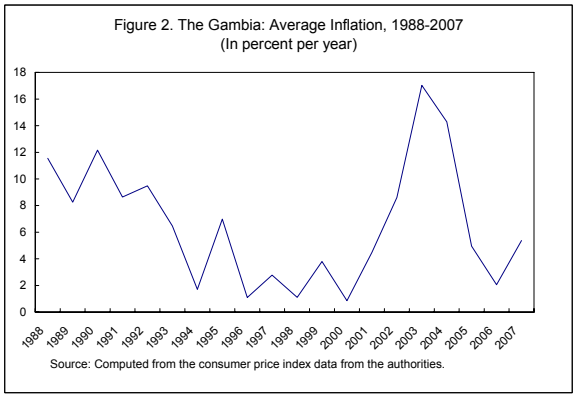
[5] See the World Bank (http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS).

[6] See IMF website (http://www.imf.org/external/np/fin/tad/extarr2.aspx?memberKey1=330&date1key=2007-11-30). The seven programs do not include staff-monitored programs, the most recent of which was for six months, October 2005–March 2006.

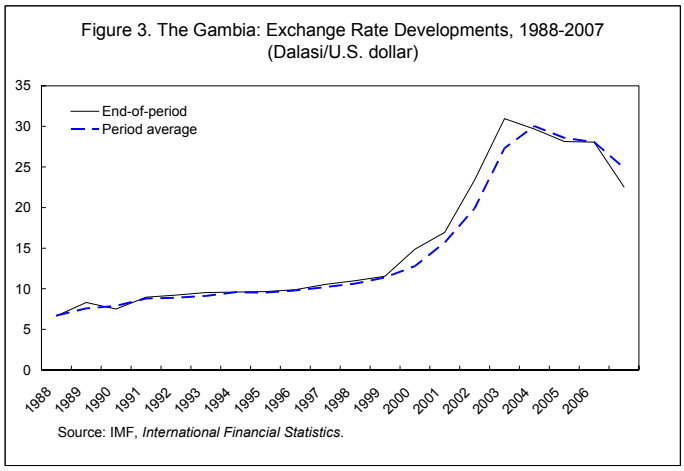




The Gambia experienced a severe economic crisis in the mid-1980s primarily due to the cumulative effects of two decades of unsustainable macroeconomic policies, an overvalued exchange rate, price controls, and overexpansion of the public sector, exacerbated by droughts and terms of trade deterioration. To restore stability the authorities implemented a comprehensive adjustment program—the Economic Recovery Program (ERP)—in June 1985; it was followed by the Program for Sustained Development in 1990. Through 1993 these reforms led to significant improvements in economic performance despite continued poor rainfall and low world groundnut prices (see World Bank, 2003). However, between 1993 and 1996 the economy was set back by a series of adverse shocks: reinforced border and transit controls in Senegal, the suspension of convertibility of CFA francs outside the CFA zone, the 50 percent devaluation of the CFA franc in 1994, and a fall-off in foreign aid and tourism after the 1994 military coup.

The country enjoyed a period of growth in 1998–2001 when political stability was established after elections in 1997 and 2001, and the authorities renewed their commitment to improving economic policies. Though very bad weather led to a 3 percent decline of real GDP in 2002, growth in real GDP rebounded in 2003; but fiscal slippages, an accommodating monetary policy, and international reserves that had been falling since 2001 fueled an abrupt depreciation of the dalasi (55 percent in nominal effective terms) and a surge in inflation (from less than 1 percent in 2000 to 21 percent in August 2003). In response, in 2004 the authorities began to tighten their monetary and fiscal policies. As a result, inflation fell to just 0.4 percent year-on-year in December 2006. Output grew at an annual average of 6.4 percent for 2003–06. In December 2007, The Gambia became the 23rd country to reach the completion point under the Enhanced Heavily Indebted Poor Countries (HIPC) Initiative.[7] Although it is expected to receive the equivalent of $514 million in nominal debt relief from the HIPC and Multilateral Debt Relief initiatives, the country is still at high risk of debt distress.

[7] See IMF, 2008a.



The Gambia is an open economy. Since January 1986, it has adhered to a managed floating exchange rate regime. Until that point the dalasi was pegged to the pound sterling at a rate of D5 = £1. On January 20, 1986, an interbank market for foreign exchange was introduced; since then the exchange rate has been determined by market forces. Effective June 30, 2002, the IMF reclassified The Gambia's exchange rate arrangement from independently floating to a managed float with no predetermined path. Its exchange system is free of restrictions on the making of payments and transfers for current international transactions. After relative stability in 1988–99, the exchange rate depreciated rapidly in 2000–03 due to lax fiscal and monetary policies; however, since 2004 it has been appreciating in response to prudent macroeconomic policies. Figure 3 presents the exchange rate movements in The Gambia during 1988–2007.

C. Financial Sector Development[8]

The Gambian financial system is small. As of 2006, apart from the CBG the financial system consists of 8 commercial banks (including one Islamic bank),[9] the post office savings bank, 11 insurance companies, 68 savings and credit associations, 38 foreign exchange bureaus, and several money transfer agents. The commercial banks overwhelmingly dominate the financial sector, accounting for 97 percent of total sector assets.

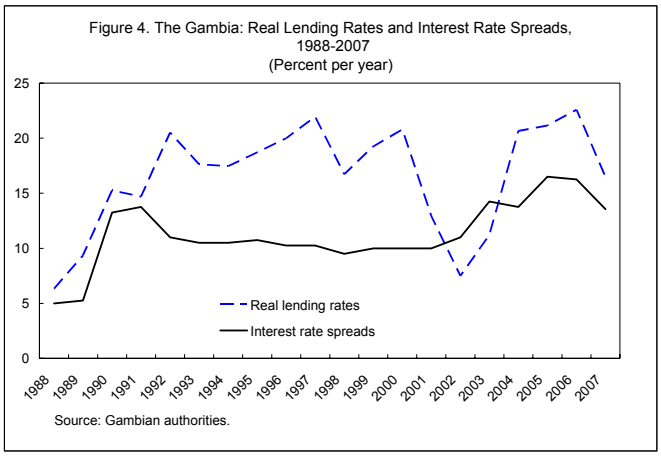
Commercial banking is highly concentrated: the largest two banks (Standard Chartered Bank and Trust Bank Limited) collect 71 percent of deposits, extend 58 percent of loans, and hold 66 percent of assets. Nearly 15 percent of bank deposits are denominated in foreign currency (see IMF, 2007b, Table 29). All the commercial banks are privately owned. Foreign participation is high: 100 percent for two banks and between 70 percent and 90 percent for three others.

Despite the dominance of the banking system, financial intermediation is low; the loans-to-deposits ratio is only about 40 percent. This is due not to any interest rate controls (interest rates have been deregulated since 1985) but to a variety of other factors—high lending rates,

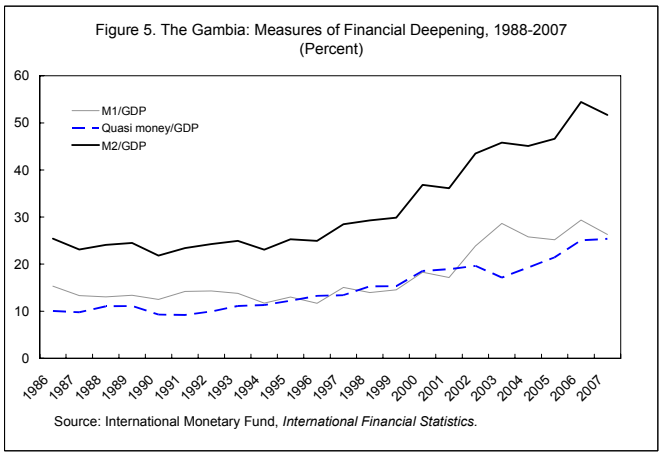
[8] Appendix I lists major developments in The Gambian financial sector since the mid-1980s.

[9] The banks are Access Bank, Arab Gambia Islamic Bank, First International Bank, Guaranty Trust Bank, International Bank for Commerce and Industry, International Commercial Bank, Standard Chartered Bank, and Trust Bank.

the attractiveness of government securities to banks because of low risk and high yields, and a weak legal environment (in particular, lack of an effective commercial court to enforce contracts). These factors also partly explain why real lending rates and interest spreads at commercial banks have been high (see Figure 4).



The financial sector has been gradually deepening. The ratio of M2/GDP has more than doubled, from 25 percent in 1986 to 52 percent in 2007 (see Figure 5). Growth has been particularly steep since 2000 primarily due to strong capital inflows; a crack-down on informal exchange markets that were diverting funds from formal banking channels; financial innovation (e.g., allowing residents to have foreign currency deposits); and increasing banking sector activity (in terms of both numbers of banks and branches). Among 44 sub-Saharan African countries, The Gambia ranked sixth in terms of M2/GDP in 2007.[10]



The Gambia also has a government debt securities market. The CBG first began issuing treasury bills in 1986 for liquidity management purposes. However, since the mid-1990s, the treasury bills have also been issued to meet the financing requirements of the government. Nearly 50 percent of outstanding treasury bills are held by the commercial banks, although in the past public corporations held most of them.[11] Individuals are also allowed to buy them. Treasury bills are reasonably liquid; they can be rediscounted by the primary dealers or the CBG.[12]

[10] See IMF (2008c), Table SA12. The five countries ahead of The Gambia (in order) are Mauritius, Eritrea, Seychelles, South Africa, and Cape Verde.

[11] See IMF (2007b), Table 30.

[12] For treasury bills to be rediscounted, they must satisfy some restrictions, the main one being that the CBG will accept only those bills that are at 80 percent of maturity. Beginning April 2006 a primary dealership system has been introduced, through which individuals can purchase treasury bills. It consists of commercial banks and

(continued…)

Banks depend on the CBG for rediscounting treasury bills to meet their urgent liquidity needs. Until 2004 the CBG rediscount rate was a 3 percent premium over the yield on treasury bills. However, since its inception in July 2004, the Monetary Policy Committee (MPC) has been announcing the rediscount rate (independent of current yields on the treasury bills) after its bimonthly meetings to signal to market participants the direction of monetary policy. Many banks use the rate to set their prime lending rates.

Private debt securities are not common. There is no stock market, but there is a small and growing foreign exchange market in which commercial banks and foreign exchange bureaus are the main players. Until 2003 there was an active parallel market but transactions in it are now few. Interbank activity on overnight borrowing and foreign exchange transactions is negligible, although it has been growing slowly in recent years.

Financial innovation is taking place, but slowly. In 2002 banks began to accept foreign-currency deposits. Since 2007 they have also been providing automated teller services. There has been no restriction on foreigners buying government debt. In fact The Gambia opened up its financial sector to investors in the late 1980s as part of its ERP to promote development of a more competitive banking system and more efficient financial markets. There was some foreigner interest in government securities in 2003–04 when yields reached 31 percent, but outside interest waned as yields fell to 10–15 percent.

III. Present Monetary Policy Framework

The CBG is operating its monetary policy under a monetary targeting regime. In this framework, broad money (M2) is the intermediate target and reserve money is the operating target.[13] In implementing this framework, the CBG continuously monitors on a weekly basis the net domestic assets of the CBG (which must be kept below a specified ceiling) and the net foreign assets (which must be maintained above a designated floor). The authorities signal the policy stance by announcing the rediscount rate during the bimonthly meetings of the MPC. The existing framework also assumes a stable demand for money and money multiplier.

The primary objective of monetary policy is price stability as stipulated in the CBG Act 2005 (see CBG, 2005) and the MPC's terms of reference (see CBG, 2004). The CBG also has other objectives such as (1) achieving and maintaining exchange stability, and (2) having a sound and vibrant financial system to encourage and promote sustainable economic development. However, the overarching objective of the CBG is to preserve price stability.

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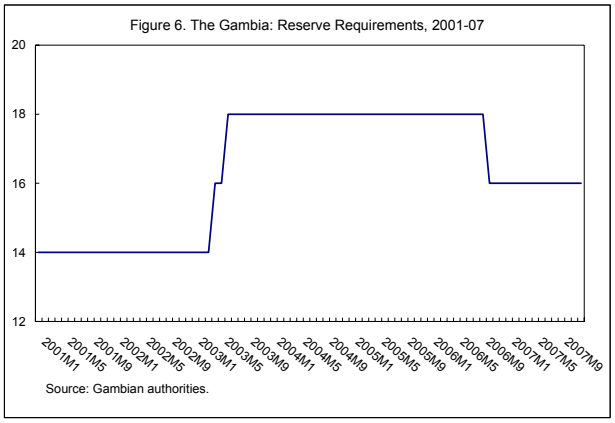
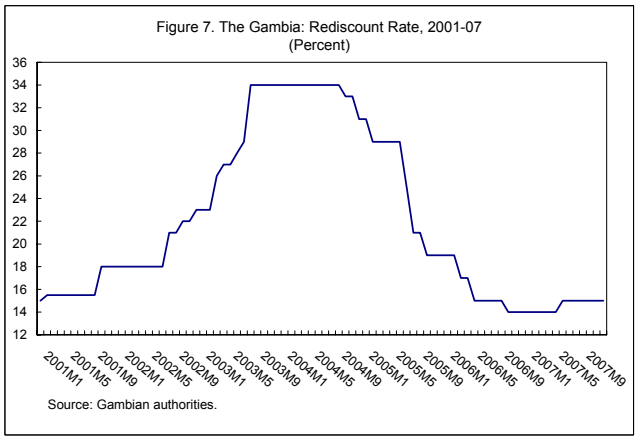
a nonbank named DataBank Securities. These dealers can also rediscount the bills. Previously individuals were buying treasury bills directly from the CBG.

[13] M2 is defined as currency in circulation outside banks plus demand, savings, and time deposits at the commercial banks (held by the public). Deposits include both dalasi and foreign-currency denominated.

The authorities use a short-term liquidity forecasting framework to guide their decision on the extent of liquidity to be injected/mopped to attain their operating target. In the weekly exercise, the CBG considers the main factors that will increase or decrease liquidity of the banking sector during the forecasting period. These factors include the government's cash flows for outlays and expenditures, issuance or maturing of the treasury bills, and/or purchases/sales of foreign exchange. These factors are combined with the deviation of actual from the targeted reserve money to derive a measure of liquidity overhang/underhang. The authorities then take decision on the amount and the maturity composition of treasury bills to be issued or retired to close the liquidity gap.

In the current monetary policy framework, open market operations conducted using the treasury bills are the main policy instrument in The Gambia. The CBG also has other instruments to influence the liquidity conditions in the market. They include reserve requirements, rediscount window, and purchases/sales of foreign exchange. The reserve requirement was 14 percent as of end-2007 (see Figure 6). It is uniformly applied for all types of deposits, including those denominated in domestic and foreign currencies. The commercial banks are required to hold 20 percent of the required reserves in the form of cash and 80 percent as dalasi deposits at the CBG. The reserves are unremunerated and must be held in dalasis (against both the domestic and foreign-currency denominated deposit liabilities). The reserves are calculated on a lagged averaging system, with a one-week lag and a one-week maintenance period. The reserve requirement is relatively high, about double for countries in the West African region (see Worrell and others, 2008), and in comparison with several countries in the world (see Appendix II).





Direction of monetary policy is contemplated and agreed upon during the bimonthly MPC meeting. The MPC also decides on the level of rediscount rate during the meeting and announces it by a press release the following day. The press release also provides the rationale for the

MPC's decision.[14] The rediscount rate was 15 percent as of end-2007 (see Figure 7). Many banks adjust their prime lending rates according to the prevailing rediscount rate. The CBG also has another monetary instrument in the form of purchases/sales of foreign exchange. But, lately it does not use it for the sole purposes of influencing exchange rate or liquidity conditions in the market.

IV. Model Specification

A. General Framework

There are many theories about demand for money; they tend to emphasize transactions, speculative, precautionary, or utility motives that money satisfies. Though implicitly they address a broad range of hypotheses, interestingly, almost all of them share common elements (variables). In general, they elicit a relationship between the quantity of money demanded and a few important economic variables linking money to the real sector of the economy (see Judd and Scadding, 1982, p. 993). What separates these theories is that although they consider similar variables to explain the demand for money, they often differ in the role they assign to each. Consequently, the one clear fact that emerges from the literature is that the empirical work is motivated by a blend of theories.

The empirical work generally begins with the following specification of the functional relationship for long-term demand for money:

$$\frac{M}{P} = f(S, OC) \qquad (1)$$

where the demand for real balances *M/P* is a function of the chosen scale variable (*S*), representing economic activity, and the opportunity cost of holding money (*OC)*. *M* stands for the monetary aggregate in nominal terms and *P* for the price.

The opportunity cost of holding money consists of both its own rate and alternative returns on money. The own rate of money represents the return money yields when it is held in the form of current deposits used mainly for transactions. Failure to include the own rate of money often leads to breakdown of the estimated money demand function, especially during periods of financial innovation (see Ericsson, 1998). Alternative returns represent yields on instruments that are close substitutes for money that are foregone by holding money. They include returns on domestic financial and real assets; in an open economy, they may also include yields on foreign assets. Based on the currency substitution literature, yields on

[14] These press releases are available on the CBG website (www.cbg.gm).

foreign assets are generally represented by foreign interest rates and expectations for depreciation of the domestic currency.[15]

The choices for domestic alternatives to money (e.g., government securities, commercial paper, corporate bonds, certificates of deposits, and return on equities) will vary from country to country depending on the nature and depth of the financial markets. The expected rate of inflation is typically used to represent the yield on real assets. Where there is hyper-inflation, where interest rates are controlled by the government, and where the financial sector is not well developed, only the expected rate of inflation is used because it better represents the alternative return on money. However, in countries that are experiencing moderate inflation where alternative financial assets are available, both expected rate of inflation and the yield on one or more alternative financial assets are included in the money demand function. The rationale is that yields on alternative financial assets may not fully incorporate the expected inflation rate.

Money demand functions are usually estimated in log linear form with monetary aggregates and scale variables entering in logarithms, but other variables are specified either in logarithms or in levels.[16] Coefficients of variables specified in logarithms directly indicate elasticities; those in levels, semi-elasticities.

B. Model Specification for Long-Run Demand for Real M2 in The Gambia

Functional relationship

The facts are that (1) The Gambia is a small open economy, (2) it has had a managed floating exchange rate regime since 1986, (3) the financial sector is dominated by the banking system and is relatively free of interest rate controls, (4) an alternative financial asset exists in the form of treasury bills, and (5) inflation is usually moderate (except for rates of 15 percent to 22 percent during some periods in 1988, 1990, 1992, and 2003–04). Therefore, the following functional model is specified to estimate demand for real M2:

$$\frac{M}{P} = f(S, rDD, rTB, e(\text{inf}), e(xrd), rUSTB) \qquad (2)$$

[15] The literature on direct currency substitution refers to the portfolio shifts between domestic and foreign money, which is influenced by the expected change in the exchange rate. The indirect currency substitution literature suggests that the foreign interest rate is a focus variable, especially if foreign securities are a relevant investment alternative.

[16] Refer to Sriram (2000) for economic and statistical reasons underlying the selection of variables either in levels or in logarithms.

where *M* stands for M2 in nominal term (millions of dalasi); *P* for the consumer price index (CPI) (with 2000 = 100); *S*, scale variable, represented by real GDP (millions of dalasi in 2000 prices); *rDD*, interest rates on short-term deposits (annual percentage rate), representing the own rate of money; and a host of alternative returns of money. The alternative returns include *rTB*, yield on treasury bills (annual percentage rate), representing yield on alternative domestic assets; *e(inf)*, expected inflation, representing yield on real assets; and variables to represent return on foreign assets; *e(xrd),* expected rate of depreciation of the dalasi against the U.S. dollar; and *rUSTB*, foreign interest rates, represented by yield on three-month U.S. treasury bills.

Justification on selection of variables

The specific variables have been carefully selected. Appendix III discusses the exact specification of each variable, including data sources, methodological issues, and data caveats. Justifications for the variables selected are as follows:

Scale variable

The only variable for which data are available (and on an annual basis only) in The Gambia is real GDP. Where monthly data on real GDP are not available, researchers have interpolated annual real GDP into higher frequencies (quarterly or monthly) using higher-frequency proxy output or production variables. Unfortunately, this is not an option for The Gambia because there are no reliable high-frequency data on economic activity (for example, industrial production index, manufacturing index). Therefore, annual real GDP data are used for all months in a given year.[17]

Opportunity cost of holding money

Own rate of money

In The Gambia, banks offer a variety of deposits—with savings and demand deposits each accounting for about 40 percent, and time deposits for about 20 percent of total deposits. Except for the current account, all other deposit accounts earn interest. Yield on the short-term deposit account that provides both transactions and store-of-value function is taken as a proxy for the own rate of money.

[17] An attempt was made to use monthly data on number of tourist arrivals in place of real GDP to estimate demand for real M2. Unfortunately, it failed to be explanatory.

Alternative returns on money

- In The Gambia, nearly 50 percent of treasury bills outstanding are held by nonbanks, including many individuals. Therefore, yields on treasury bills are taken as the alternative return on domestic financial assets.

- The expected rate of inflation enters into the functional relationship for at least two reasons: (1) it provides a proxy on return on real assets; and (2) in a country that has been experiencing moderate inflation, the nominal return on financial assets does not fully incorporate inflationary developments. In this paper, following Honohan (1994), actual inflation is used as a proxy for expected inflation. Expected inflation is calculated as actual inflation as a percent year-on-year using the CPI with the base period of 2000 = 100.

- Since the U.S. dollar accounts for more than 60 percent of foreign exchange transactions and The Gambia is an open economy with relatively few restrictions on capital movements, the functional relationship also includes expected depreciation of the dalasi against the U.S. dollar and yields on three-month U.S. treasury bills as alternative returns on money. Since the selection of the foreign exchange variable is an empirical issue (see Sriram, 2000, pp. 182–83), a number of other variables (such as nominal effective exchange rates and yields at the three-month London Interbank Offered Rate [LIBOR]) are also attempted. Actual spot exchange rates are used to calculate the expected rate of depreciation, following Levantakis (1993), because for all practical purposes forward markets do not exist.

Expected signs of coefficients

The scale variable represents transactions or wealth effects. In both cases, it is positively related to demand for money. The coefficient of the variable representing the own rate of money is expected to be positive, because the higher the return on money, the lower the incentive to hold alternative assets; and the higher the returns on alternative assets, the lower the incentive to hold money. Therefore, yields on alternative returns are negatively correlated with holdings of real money.

Expected inflation generally affects demand for money negatively. When inflation is rising agents prefer to hold real assets as inflation hedges rather than holding money. However, there is a possibility that an increase in the rate of inflation may lead to a positive relationship with demand for money because when inflation is expected to rise, agents increase holdings of money in the expectation that their planned nominal expenditures go up

(see Jusoh, 1987).[18] Positive relationship has been found in studies on transition economies and on Algeria (see Bakhouche, 2006). Therefore, the sign of the coefficient of the expected inflation variable becomes an empirical issue, though both theoretical and empirical studies overwhelmingly expect a negative relationship.

An increase in foreign interest rates can potentially induce residents to increase their holdings of foreign assets by drawing down domestic money holdings. Hence, foreign interest rates are expected to exert negative influence on the domestic money demand (see Arize, 1992). The expected exchange rate depreciation will also have a negative relationship with real M2. An increase in expected depreciation implies that the expected returns from holding foreign money increases. Therefore, agents would substitute domestic currency for foreign money. However, Tan (1997) envisages the possibility of obtaining both negative and positive relationships for the expected exchange rate depreciation. The impact can be negative if the domestic currency depreciation leads the public to anticipate further depreciation, prompting them to demand more foreign currency. On the other hand, the impact can be positive if a depreciation heightens expectation that the domestic currency will rebound, thus inducing people to hold more domestic money.

V. Estimation of Long-Run Demand for Real M2

Further to the discussion on the functional relationship and justification for the variables selected, the following equation is used to estimate long-run demand for real M2 in The Gambia:

$$LRBM = a_0 + a_1 LRGDPA + a_2 DDR + a_3 TBRA + a_4 INFA + a_5 DEPR + a_6 USTBR + \varepsilon \quad (3)$$

Where:
LRBM = ln (real M2), which is calculated as M2/CPI
LRGDPA = ln (real GDP)
DDR = Interest rate on short-term deposits
TBRA = Yield on the Gambian treasury bills
INFA = Expected inflation
DEPR = Expected depreciation of dalasi against the U.S. dollar
USTBR = Yield on three-month U.S. treasury bills.

The long-run relationship will be examined using cointegration techniques, but first the variables are tested for stationarity by applying unit root tests. PcGive 10 was used for the entire analysis.

[18] Klein (1977) provides explanation for a possible positive relationship between demand for real money and expected inflation. He contends that the quality of cash balances would deteriorate when inflation is unexpected; consequently, agents would be prompted to hold a larger quantity of money.

A. Unit Root Tests

The augmented Dickey-Fuller (ADF) test was applied to examine whether the variables to be used in the estimation have unit roots. The test is conducted by including both constant variables and a trend variable. Seasonal dummies are also used because the time series are not seasonally adjusted. The test began with 12 lagged difference terms in order to whiten the residuals; but the Akaike information criterion (AIC) is finally applied to choose the maximum number of lags. The results indicate that the variables *LRBM, LRGDPA, DDR, TBRA, CPI2000, INFA, DEPR, XRD$, NEER, LIBOR3M,* and *USTBR3M* are nonstationary. All variables are integrated to the order 1, that is I(1), confirmed by the fact that the first differences of all these variables are I(0). Table 1 presents the result of unit root tests. Appendix IV shows the graphs of the variables used.

Table 1. Unit Root Test Results

	Test Statistic	Lag		Test Statistic	Lag
LRBM	-1.439	1	*dLRBM*	-16.540	0 **
LRGDPA	-2.053	1	*dLRGDPA*	-14.450	0 **
DDR	-2.155	0	*dDDR*	-14.840	0 **
TBRA	-3.314	10	*dTBRA*	-9.685	0 **
CPI2000	-0.420	2	*dCPI2000*	-12.570	0 **
INFA	-2.675	0	*dINFA*	-13.560	0 **
XRD$	-2.140	8	*dXRD$*	-11.470	0 **
DEPR	-12.110	0 **	*dDEPR*	-23.740	0 **
NEER	-1.419	4	*dNEER*	-10.980	0 **
LIBOR3M	-2.983	7	*dLIBOR3M*	-10.040	0 **
USTBR3M	-3.384	8	*dUSTBR3M*	-9.562	0 **

Note: ** indicates the rejection of unit roots at 1 percent significance level.

B. Cointegration Tests

Since all the variables are I(1), the Johansen-Juselius multivariate cointegration technique (see Johansen, 1988, and Johansen and Juselius, 1990) is applied to examine the existence of a cointegration relationship between *LRBM* and its determinants as shown in equation 3 above (see Table 2). The model included a trend, constant, seasonal dummies, 12 lags, and a impulse dummy of *D200301* to account for many financial innovation measures introduced in January 2003 (see Appendix I). The AIC is applied to choose the maximum lag length.

Table 2. Cointegration and Weak-Exogeneity Tests

Cointegration test					
Eigenvalues	0.1760	0.1186	0.0621	0.0272	0.0226
Null hypotheses 1/	r = 0	r <= 1	r <= 2	r <= 3	r <= 4
λ trace 2/	101.6500 **	56.3600	26.8100	11.8100	5.3500
Adjusted for degrees of freedom	97.3000 **	53.9500	25.6700	11.3000	5.1200
P-values	0.0090	0.2580	0.7560	0.8530	0.5870
λ max 2/	45.2800 **	29.5500	15.0000	6.4600	5.3500
Adjusted for degrees of freedom	43.3500 **	28.2900	14.3600	6.1800	5.1200
P-values	0.0090	0.1390	0.6980	0.9360	0.5880

Standardized Eigenvectors β'

LRBM	*LRGDPA*	*DDR*	*TBRA*	*INFA*	*Trend*
1.000	-1.264	-0.402	0.223	-0.227	-0.022
-0.598	1.000	-0.071	0.008	0.010	-0.001
-2.537	59.665	1.000	0.161	-0.006	-0.165
-202.620	890.550	2.975	1.000	-1.010	-0.912
-4.380	-540.050	-8.227	5.938	1.000	1.930

Standardized Adjustment Coefficients α

	LRBM	*LRGDPA*	*DDR*	*TBRA*	*INFA*
Δ*LRBM*	-0.0066	0.0219	-0.0001	-0.0644	0.0298
Δ*LRGDPA*	0.0008	-0.0099	-0.0009	-0.0201	0.0142
Δ*DDR*	0.0134	1.4580	-0.0290	0.0002	-0.0004
Δ*TBRA*	-0.2828	0.1355	-0.0415	-0.0010	-0.0009
Δ*INFA*	0.2167	-6.2224	-0.1075	0.0008	-0.0040

Weak-exogeneity test 3/

Variables	Δ*LRBM*	Δ*LRGDPA*	Δ*DDR*	Δ*TBRA*	Δ*INFA*
$\alpha_1 = 0$	$\chi^2(1) = 6.4371$ [0.0112]*				
$\alpha_2 = 0$	$\chi^2(1) = 0.97973$ [0.3223]				
$\alpha_3 = 0$	$\chi^2(1) = 0.10742$ [0.7431]				
$\alpha_4 = 0$	$\chi^2(1) = 15.659$ [0.0001]**				
$\alpha_5 = 0$	$\chi^2(1) = 1.2776$ [0.2583]				
$\alpha_2 = 0$; α3 = 0; α5 = 0	$\chi^2(3) = 2.4117$ [0.4915]				

Note: The system includes 2 lags for each variable, a constant, trend, seasonal dummies, and the dummy variable *D2003m1* . The estimation period is 1988:1-2007:6 (234 observations).

1/ r stands for the number of ranks.

2/ ** indicates the significance at 1 percent level.

3/ ** and * indicate that the null hypothesis of weak-exogeneity is rejected at 1 percent and 5 percent significance level, respectively. The probability of getting any number exceeding the χ^2 value shown above is less than the figure presented within the squared brackets.

Of various formulations tested, only the one involving variables real M2, real GDP, interest rate on short-term deposits, yield on treasury bills, and expected inflation produced a cointegration relationship.[19]

Both trace and maximal eigenvalue tests rejected zero in favor of at least one cointegration vector.[20] The results are significant at the 1 percent level, even when the critical values are adjusted for degrees of freedom, as suggested by Osterwald-Lenum (1992). Based on the signs and magnitudes of the estimated coefficients, the unique cointegration vector can be interpreted as the long-run demand for real M2. The standard errors presented within parentheses indicate that all coefficients except *LRGDPA* are significant.

$$\underset{}{LRBM} = \underset{(0.0164)}{(0.0217 * t)} + \underset{(5.0664)}{(1.26 * LRGDPA)} + \underset{(0.1443)}{(0.40 * DDR)} - \underset{(0.0412)}{(0.22 * TBRA)} + \underset{(0.0357)}{(0.23 * INFA)} \quad (4)$$

Long-run income elasticity is 1.26, which is slightly higher than the quantity theory suggests for broad money. Long-run elasticity typically exceeds one for many countries where the financial systems are underdeveloped and monetization is faster than output growth.[21] The velocity in these cases shows a declining trend. In the case of The Gambia, velocity has been declining, from about 400 percent through the mid-1990s to about 300 percent in the late 1990s to about 200 percent since 2003.[22] Model misspecification, especially omitting

[19] Other formulations also evaluated the foreign influence by incorporating foreign interest rates (three-month U.S. dollar LIBOR and yields on three-month U.S. treasury bills) and expected depreciation of the dalasi against the U.S. dollar or using the nominal effective exchange rates. Unfortunately, these formulations produced multiple cointegrating vectors with coefficients carrying unrealistic values or wrong signs or produced a single cointegration vector that cannot be interpreted as demand for real M2 or generated no cointegrating vectors at all.

[20] Cointegration analysis was also conducted using annual and quarterly data. However, none of the formulations provided a reasonable relationship for demand for real M2. The analysis was also done using number of tourist arrivals and total production of agricultural crops in The Gambia in place of real GDP as these variables are correlated with the real GDP (with the correlation coefficient of 0.80 and 0.84, respectively, during 1988-2006). Unfortunately, no cointegration relationship that can be interpreted as the demand for real M2 could be found with coefficients having appropriate magnitude and/or correct signs. Therefore, the analysis is carried out with monthly data only.

[21] An attempt is also made to model a long-run relationship for demand for narrow money, defined as, M1, in real terms during the same period of current study. As current deposits earn zero interest in The Gambia, the model did not include a variable on own-rate of money; but incorporated various combinations of alternative return on money, including expected rate of inflation (interest rates on term deposits, yields on treasury bills, foreign interest rates, and expected depreciation of dalasi). However, no satisfactory results were derived.

[22] The trend is usually reversed as the economy becomes more sophisticated when financial market innovations make it possible to economize on holdings of money (see Tseng and Corker, 1991). Partly for this reason,

(continued…)

important opportunity cost variables, also leads to high income elasticity. The omitted opportunity cost variables could be highly correlated with money; and in such situations, the scale variable usually picks up the effects of these omitted variables.

Coefficients of both the own rate of money (*DDR*) and the alternative return (*TBRA*) carry expected signs, indicating that as the interest rate on demand deposits increases, so does demand for real M2; and as yields on treasury bills increase, demand for real M2 decreases.

Expected inflation turns out to be positively related to the demand for real M2. There may be two reasons for this:

- First, the financial sector is shallow and dominated by the banking sector (although there were only 41 bank branches plus nearly 70 savings and credit association in the entire country as of end-2007), and there are not many alternatives for money. For instance, equity market capitalization and the outstanding value of debt securities amount to more than 200 percent of GDP in industrial countries (and more than 300 percent in Japan and the United States) and about 126 percent for emerging markets as a group in 2006 (see IMF, 2007c); but, in The Gambia, the only alternative for money is treasury bills and the amount outstanding was valued at only 27 percent of GDP in 2007. Inflationary expectations also diverge among the population (depending on whether urban or rural; rich or poor; and the goods they buy); consequently for transactions and precautionary reasons agents may demand more money in real terms (in terms of percent increase) than the expected rise in inflation.[23]

- Second, data deficiency in CPI may also contribute for expected inflation not having a negative relationship with demand for money. The old CPI, which had 1974 weights and measured prices in the low-income area of Greater Banjul only, was not revised until 2007.

Interestingly, the foreign-influence variables seem not to be important in explaining demand for real M2 for The Gambia. When foreign interest rates (three-month LIBOR or yields on three-month U.S. treasury bills) or expected depreciation variables (depreciation of the dalasi against the U.S. dollar or measured using nominal effective exchange rates) were introduced, either the model failed to produce a cointegration relationship or produced multiple cointegrating vectors with coefficients having implausible values or carrying the wrong signs. Considering how open The Gambia's economy is, inflation may already reflect the

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income elasticity of demand for broad money comes close to one in many industrial countries (see Knell and Stix, 2004).

[23] The subsection on expected signs of coefficients discusses possible reasons for the positive relationship between demand for money and expected inflation, including some country examples.

effect of depreciation. Also, since this is a poor country, only a handful of domestic players will be able to exploit the arbitrage opportunities of investing in foreign securities.

The diagnostic tests (see Appendices V and VI) indicate that except for *DDR* and *TBRA*, the equations are free of error autocorrelation and heteroscedasticity. However, the normality tests are rejected for all the variables because of a handful of large outliers for each. The one-step residuals shown in Appendix VII confirm that in most cases these residuals are within ±2 standard errors around 0 for a given equation. Some of these outliers are associated with (1) shocks affecting output (*LRGDPA*) during 1995 and 2002; (2) drastic changes in the own rate of money (*DDR*) at some points in 1988, 1992, 1999, 2003, and 2005; and (3) a dramatic increase in yields on *TBRA* in 2002–04 after the authorities decided to quell inflationary pressures with a tight monetary policy. The chow tests shown in Appendix VIII magnify these outliers and show breaks in 1995, 2002, and 2005.

The cointegration results need to be interpreted with caution. Attempts to account for the outliers by introducing dummy variables changed the coefficients of variables significantly or yielded no cointegration relationship. An attempt to redo the cointegration tests by introducing monthly data on tourist arrivals as a proxy for real GDP did not yield a cointegration relationship either.[24] Before drawing a firm conclusion about the stability of the model, we analyzed the behavior of the alpha coefficients.

Adjustments to restore long-run equilibrium in response to disequilibrium are indicated by the alpha coefficients. The first term in the alpha vector represents the direction and speed at which *DLRBM* responds to deviation from the equilibrium relationship. Similarly, the second term shows how fast and in what direction *DLRGDPA* adjusts to bring *LRBM* back to equilibrium. The alpha coefficient for *LRBM* is –0.00659; it represents the estimated feedback coefficient for the money equation. The negative coefficient implies that lagged excess holding of money induces a smaller amount during the current period. The negative sign for the coefficient is important because it indicates that the model is valid; any disruptions in the long-run relationship will be reduced in future periods.

The numerical value of –0.00659 for the alpha coefficient for the *LRBM* equation implies that adjustment toward equilibrium takes place by about 0.7 percent in the first month after disequilibrium. The adjustment is apparently slow in comparison to other countries (see Ericsson and Sharma, 1996) because there are so few alternatives for money in The Gambia. The alpha coefficients also show that most of the adjustments take place in the

[24] The Gambia is a favorite destination for tourists from some European countries. The reasons for choosing the number of tourist arrivals as a proxy are that (1) tourism contributes about 5–7 percent to real GDP, (2) there is a strong relationship with the economic activity as evidenced by a correlation coefficient of 0.80 with real GDP for 1988–2006, and (3) monthly data are available.

equations for *LRBM, DDR, TBRA,* and *INFA.* The standard errors indicate that the coefficients for *LRBM* and *TBRA* are significant.

The weak exogeneity tests also indicate that the adjustments are primarily carried through *LRBM* and *TBRA*. Other variables—*LRGDPA, DDR, INFA,* and the trend—are weakly exogenous; therefore, changes in money are not affecting these variables. It intuitively makes sense why *TBRA* is not weakly exogenous. As part of meeting the operational targets on reserve money, the authorities adjust the quantity of treasury bills supplied to the market. They also in a way signal to the market what will be the upper bound on yields from auctions by announcing the rediscount rate after each MPC meeting is concluded. Data show a correlation coefficient of 0.97 between yields on treasury bills and rediscount rate.

Although weak exogeneity was not rejected for *LRGDPA*, its coefficient moved around significantly while doing the similar tests for other variables. We also found earlier that the cointegration tests yielded insignificant coefficient for *LRGDPA*. Moreover, the parameter constancy tests indicate structural breaks and any attempts to correct for these breaks yielded no good alternative cointegration formulation. All these observations point to a conclusion that the long-run relationship for *LRBM* is not stable in The Gambia. Consequently, a short-run model is not carried out.

Although the study did not find a stable long-run relationship for demand for broad money in real terms, the analysis provides some valuable information on the effect of interest rates and inflation on demand for money. First, by the size and sign of the coefficients, interest rate on short-term deposits and yield on treasury bills give an indication to what extent demand for money can be influenced by changes in interest rates. Second, inflation appears to incorporate exchange rate developments. Therefore, monetary aggregates and explanatory variables have information content on the status of the economy. As these variables are important for understanding the transmission mechanism of monetary policy, improvements in data quality will aid in better conduct of monetary policy in The Gambia.[25]

VI. POLICY IMPLICATIONS

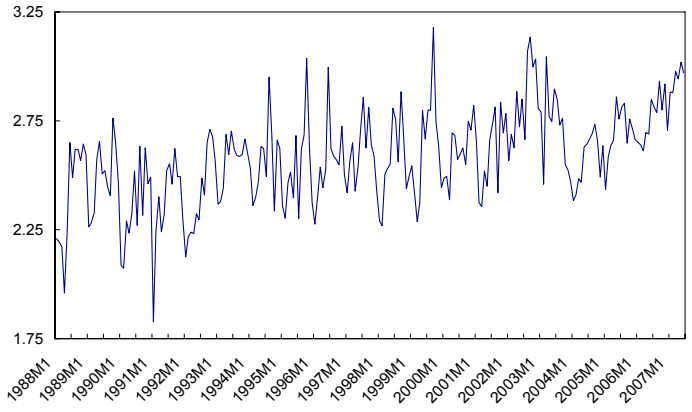
Monetary targeting is not necessarily an optimal choice to conduct monetary policy for countries even if the demand for money is stable (see Rudebusch and Svensson, 2002). In the case of The Gambia, as the demand for broad money in real terms is not stable, monetary targeting using broad money is clearly suboptimal. The situation is exasperated by the fact that the money multiplier has also been volatile (see Figure 8)[26] and there is no clear relationship between growth in broad money and inflation (see Figure 9). Limited work

[25] Refer to Bank for International Settlements (1998).

[26] Refer to Sriram (2008) for possible reasons behind the volatility of money multiplier in The Gambia.

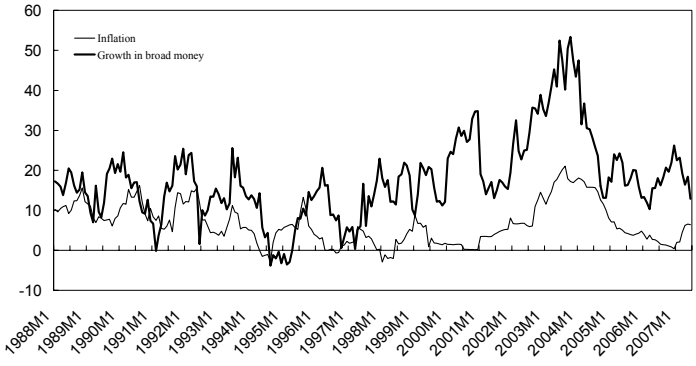
yields no conclusive results on possible channels of monetary transmission in The Gambia. As Worrell and others (2008) have pointed out, "monetary policy [in The Gambia] is conducted in an environment of uncertainty about the stability, persistence, and relative importance of the possible channels of monetary transmission."[27]

Figure 8. The Gambia: Money Multiplier, January 1988-June 2007



Source: IMF, *International Financial Statistics*.

Figure 9. The Gambia: Growth in Broad Money and Inflation, January 1988-June 2007
(Percent per annum)



Source: Computed from data provided by the authorities.

[27] Worrell and others (2008) were not able to explain the pronounced discrepancies between the direction and magnitude of changes in most monetary aggregates and changes in inflation by considering the wealth, credit, interest rate and exchange rate channels. They also indicated that the structure of the expectations was not known. Meanwhile, Jarju (2007) finds some evidence for exchange rate and credit channels as the transmission mechanism; however, results are not robust due to data limitations and shallow financial markets.

There are also limitations on other policy regimes. For instance, interest rate targeting is not a viable option as the financial markets are shallow. Exchange rate targeting may not be possible due to uncertainty in foreign exchange flows. And, a full-fledged inflation targeting is not feasible due to lack of well-developed analytical framework and data limitations.[28]

Given the uncertainty in conducting monetary policy and data and analytical limitations, the authorities could follow an eclectic approach. Since the primary objective of the monetary policy is to preserve price stability, The Gambia could use the monetary target flexibly to achieve its inflation objective. In fact, within SSA, 15 countries other than The Gambia have monetary aggregates as their intermediate targets, but have price stability as their primary objective (see Table 3). The IMF (2008b, p. 28) indicates that not all money targeters look at broad money and the intermediate target can be bypassed in practice. These so-called "inflation targeters" allow great flexibility for intermediate targets and emphasize achieving price stability directly. While a full-fledged inflation targeting is not possible to accomplish at this stage, The Gambia could be an "inflation targeter lite," a transitional regime aimed at buying time for the implementation of the structural reforms needed for a single credible nominal anchor (see Stone (2003)).[29]

Table 3. De Jure Monetary Policy Frameworks in Sub-Saharan Africa

Regimes	Policy Objectives	Intermediate	Operational Target	Main Instruments
Pegs (23)	Stability of the exchange rate regime (23) Price stability (23) Economic growth (12)	Private sector credit (1)	Exchange rate (23)	Open market operations Foreign exchange sales
Money targeting (18)	Price stability (all countries) External competitiveness (5) Exchange rate smoothing (12) Economic growth (9)	Monetary aggregates (16)	Reserve money (18)	Open market operations (17) Foreign exchange sales (18)
Inflation targeting (3)	Price stability (all countries) External competitiveness (1) Exchange rate smoothing (1)		Interest rates (3)	Open market operations (3) Foreign exchange sales (3)

Source: IMF, 2008b.

Improvements in analytical work will provide a sound basis for enhancing the monetary policy conduct in the country. Importance of improving the underlying analytical framework

[28] Refer to Schaechter and others (2000) on practical issues for adopting inflation targeting in emerging market countries. For inflation targeting to be successful, an arsenal of information variables is necessary (see San Jose, Slack, and Sriram, 2002).

[29] See IMF (2008b), Chapter II for facts supporting this argument.

in implementing monetary policy in low-income countries has been highlighted by IMF (2004). The CBG has been undertaking some analytical work, but further progress is needed in the areas of transmission mechanism of monetary policy, money demand, and forecasting inflation. As part of the preparation for the MPC meetings, the authorities prepare a comprehensive set of documents on international developments, balance of payments, fiscal outturn for the most recent period, monetary survey, inflation forecast, financial stability, and a business conditions survey. These reports are generally descriptive. The inflation forecast makes use of some simple trend analysis. The authorities should further invest their efforts to build an econometric model on determination of inflation and on forecasting inflation so that results from both models can be compared and used more efficiently.[30]

Improvements in data quality are also needed**.** The CBG, The Gambian Bureau of Statistics (GBoS), and other agencies have made some progress in the compilation of economic and financial statistics in The Gambia in the past few years. However, poor quality of some of data and complete lack of others hamper the analysis of economic developments. Substantial weakness remain in national accounts, balance of payments, and external debt. The IMF, World Bank, and other international agencies (e.g., U.K. Department for International Development—DfID) have been providing technical assistance to improve the data quality in these areas. Data on CPI have improved recently as the GBoS now compiles the national CPI.[31] The CBG has a good set of data on exchange rates, liquidity, reserves, monetary survey, treasury bills yields and outstanding. However, more pressing data needs relevant to conduct monetary policy are the following:

- *indicators of economic activity.* One of the serious drawbacks in The Gambia is a lack of high quality indicators of economic activity. The GDP data are available only on annual basis (with the base period of 1976/77); and the authorities are working on finalizing a new set of GDP data with the base period of 2004 based on the results from the 2004 Economic Census. There are no high frequency data on production, but there are some proxies available (such as number of tourist arrivals and volume of imports). Therefore, the authorities need to develop some high frequency indices (production or service-sector related) that will help in the analytical work. Also, they need some other indices (such as leading indicators of economic activity) that will provide the short-term direction of economic activity. [32] In that respect, the CBG may need to restart the project of compiling composite index of leading indicators, which has been on hold for the past few years.

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[30] Worrell and others (2008) have given some specific suggestions in improving the simple inflation model that the authorities currently have.

[31] The previous price index covered only the Banjul area and had the base period of 1974 = 100.

[32] See, for example, for the Organization for Economic Cooperation and Development (OECD), http://www.oecd.org/statisticsChannelList/0,3458,en_2825_500218_1_119656_1_1_1,00.html

- *commercial bank interest rates.* Currently, interest rate data are available only on a quarterly basis and that too in the form of a range from low to high for different types of deposits and loans. These rates vary by customer, type of instrument, and volume of transactions; but, the range rarely shows any variation. Discussions with the commercial banks during missions indicate that a majority of these loans and deposits are conducted at certain interest rates. It will be useful for the authorities to compile such representative rates so that they can clearly monitor the impact of the monetary policies on the interest rates.

VII. CONCLUSIONS

There appears to be a long-run relationship of certain determinants with demand for real M2 in The Gambia, but it is not stable. Demand is explainable by real GDP (scale variable), interest rates on short-term deposits (own rate of money), yields on treasury bills (alternative return on money), and expected inflation. The coefficient for the scale variable is not significant, but without it the model does not produce a cointegration relationship. Although The Gambia is an open economy, surprisingly demand for real M2 is determined by domestic factors alone; foreign interest rates or expected depreciation fail to yield a cointegration relationship.

Many factors contribute to the instability observed. Among them are (1) the changing velocity of M2, especially since the late 1990s; (2) political and weather-related shocks that affect output; (3) changes in government policies impacting money growth and inflation; and most importantly (4) lack of good quality data, especially on output, the consumer price index, and interest rates.

The instability of demand for real broad money is a point against the CBG using broad money as the sole intermediate target to achieve its ultimate objective. The Gambia may follow an eclectic approach by applying elements of inflation targeting and use monetary target flexibly. In this respect, it could consider an inflation targeting lite regime until a reliable nominal anchor is found. Further enhancements in analytical framework and improvements in data quality as discussed in the paper will greatly help the authorities in this endeavor.

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APPENDIX I. THE GAMBIA: FINANCIAL SECTOR DEVELOPMENTS, 1985–JUNE 2007

Date	Measures
Sept. 1985	Elimination of all interest rate controls, including subsidized lending rates for crop financing.
	Introduction of an auction system for the issuance of treasury bills.
	Introduction of an indirect system of monetary controls and determination of interest rates through open market operations.
	Elimination of all credit ceilings following the adoption of open market operations.
Jan. 1986	Adoption of floating exchange rate regime (until January 20, 1986, dalasi was pegged to the pound sterling at a rate of D5 = £1).
Jan. 1990	The Groundnut Producers' Marketing Board (GPMB)'s groundnut export monopoly was eliminated, after which a liberal trade system was maintained that was free of import quotas and other trade restrictions.
1990	The CBG began to issue its own securities (CBG bills), with the same features and using the same auction system as for the government securities.
Dec. 31, 1992	Enactment of the Central Bank of The Gambia Act 1992.
1993	Enactment of Financial Institutions Act 1993.
1994	Military coup (Mr. Yahya Jammeh deposed the elected president Mr. Dawda Jawara).
1996	Mr. Yahya Jammeh wins in the Presidential election for the first five-year term.
1998	Agreement with the Fund on a three-year arrangement under the Enhanced Structural Adjustment Facility (ESAF), which was subsequently converted into a Poverty Reduction Growth Facility (PRGF) arrangement.
Oct. 2001	Mr. Yahya Jammeh wins in the Presidential election for the second five-year term.
2001	Enactment of The Gambia Free Zones Act 2001.
2001	Enactment of The Gambia Investment Promotion Act 2001.
2001	Enactment of Insurance Bill 2001.
Jan. 2002	The ruling party, Alliance for Patriotic Reorientation and Construction (APRC), wins a majority in the legislative election, which is boycotted by the main opposition parties in protest at electoral irregularities.
2002	Enactment of Anti-Terrorism Act 2002.
Jul. 2002	Approval by the Fund Executive Board on a successor three-year PRGF arrangement.
Early 2002	Commercial banks are allowed to hold accounts in foreign currencies.
2003	Money laundering and insurance bills were passed into law. The former is the first of this kind that establishes a legal basis for preventing financial crime, while the latter formalizes a regulatory regime for insurance in The Gambia.
Jan. 2003	Foreign currency deposits of the commercial banks are subject to reserve requirements at the same rate as for the dalasi deposits and the reserves be held in dalasis.
Jan. 2003	The CBG begins to conduct treasury bill auctions on a weekly basis (until then, the auctions took place on a biweekly basis).
Mar. 2003	Increase in reserve requirements of commercial banks' deposits from 14 percent to 16 percent.
Jun. 2003	Increase in reserve requirements of commercial banks' deposits from 16 percent to 18 percent.
Jun. 2003	The National Assembly passed the Money Laundering Bill, which is intended to improve the regulation and monitoring of financial businesses.
Sept. 2003	The standing order of automatic transfer from sterilization account to treasury main account is discontinued.

Date	Measures
Oct. 2003	Mr. Jammeh launches "operational no compromise," a clampdown on corruption. Initial arrests include leading figures within the administration, such as Baba Jobe, the parliamentary leader of the APRC, and Yankuba Touray, the minister for culture and tourism.
Dec. 2003	Continental Bank failed
2004	The CBG announced an increase in the minimum capital requirement for commercial banks. All new banks will be required to meet the minimum capital requirement of D600 million (about $2 million) immediately. The existing banks are given time until March 2006 to meet the requirement.
Mar. 2004	The IMF announces that it is seeking the repayment of two disbursements made in July and December 2001, totaling $10 million because of the misreporting of foreign exchange reserves.
Jul. 26, 2004	First meeting of the Monetary Policy Committee.
Oct. 2004	The Central Bank of The Gambia (CBG) reduced the rediscount rate by 1 percentage point from 34 percent to 33 percent.
Dec. 2004	The CBG reduced the rediscount rate by 2 percentage points from 33 percent to 31 percent.
Jan. 2005	A memorandum of understanding for the formation of an opposition coalition, the National Alliance for Democracy and Development (NADD), is signed in Banjul.
2005	Enactment of Alternative Dispute Resolution Act 2005.
Feb. 2005	The CBG further reduced the rediscount rate by 2 percentage points from 31 percent to 29 percent.
Mar. 2005	A report by the Gambia's anti-corruption commission is presented to the president, which is followed by the arrest of a number of high-ranking officials and the dismissal of two senior cabinet ministers.
Jul. 2005	The CBG further reduced the rediscount rate by 4 percentage points from 29 percent to 25 percent.
Aug. 2005	The CBG further reduced the rediscount rate by 4 percentage points from 25 percent to 21 percent.
Sep. 2005	The CBG upgraded the electronic book-entry system to improve the efficiency of the treasury bill market.
Oct. 2005	The CBG further reduced the rediscount rate by 2 percentage points from 21 percent to 19 percent.
Feb. 2006	Following an inability to agree on a single coalition presidential candidate, the NADD opposition coalition begins to unravel. The UDP and NRP announce that they are leaving the coalition.
Mar. 2006	The CBG further reduced the rediscount rate by 2 percentage points from 19 percent to 17 percent.
Mar. 2006	All the banks met the minimum capital requirement of D60 million.
Apr. 2006	The CBG introduced a primary dealership system and shortened the settlement period from five days to one day after the treasury bill auction date.
May 2006	The CBG further reduced the rediscount rate by 2 percentage points from 17 percent to 15 percent.
Oct. 2006	Rediscount rate was reduced by 1 percentage point from 15 percent to 14 percent. Reserve requirements of commercial banks on their deposits were reduced by 2 percentage point from 18 percent to 16 percent.
2006	Mr. Yahya Jammeh wins in the Presidential election for the third five-year term.
Jun. 2007	The rediscount rate was increased by 1 percentage point from 14 percent to 15 percent.

APPENDIX II. RESERVE REQUIREMENTS IN VARIOUS COUNTRIES, 2008

Country	Reserve Requirements and Related Details
Afghanistan, Islamic Republic of	8%
Albania	10%
Algeria	8%
Armenia	8% (Armenian drams) and 12% (foreign currency)
Azerbaijan	10%
Belarus	4.5% (liabilities of individuals in Byelorussian ruble) and 8% (other liabilities)
Belize	10%
Bhutan	15%
Botswana	5%
Brazil	45% (demand deposits); 15% (time deposits); 20% (savings deposits); and up to 25% (interbank loans for leasing companies). Additional requirements: levying base—8% (demand deposits); 10% (savings deposits); and 8% (time deposits)
Bulgaria	12%
Burundi	3%
Cambodia	8%
Cape Verde	14%
Chile	9% (demand deposits) and 3.6% (time deposits)
China	16% (domestic currency) and 5% (foreign currency)
Costa Rica	15%
Croatia	17%
Czech Republic	2%
Dominican Republic	Local currency liabilities: 20% (commercial banks), 15% (mortgage banks), and 10% (other financial institutions) Foreign currency liabilities: 20% in U.S. dollars.
Eastern Caribbean Central Bank	6% of average deposit liabilities over a four-week period
Fiji	6%
Ghana	9%
Guyana	12%
Haiti	Gourde deposits: 30% (commercial banks) and 18.5% (savings and mortgage banks) Foreign currency deposits: 31% (commercial banks) and 19.5% (savings and mortgage banks)
Hungary	5%
Iceland	2%
India	8.25% (net demand and time liabilities)
Indonesia	Domestic currency: 5% + ratio depends on nominal third party fund and loan to deposit ratio Foreign currency: 3%
Iran, Islamic Republic of	17% (commercial banks) and 10% (specialized banks)
Israel	6% (up to one week), 3% (for one week to one year), and 0% (for more than one year).
Jamaica	9.0% (commercial banks and FIAs), 1.0% (for building societies which hold residential mortgages = 40.0% of prescribed liabilities), and 9.0% otherwise.

Country	Reserve Requirements and Related Details
Jordan	8% (for both domestic and foreign currency deposits)
Kazakhstan	1.5% (domestic liabilities) and 2.5% (other liabilities)
Kenya	6%
Kyrgyz Republic	10%
Lao P.D.R.	Domestic currency deposits: 5% Foreign currency deposits: 10%
Lebanon	Domestic currency deposits: 15% (on term deposits) and 25% (on sight deposits) Foreign currency deposits: 15%
Lesotho	3%
Liberia	22%
Macedonia, FYR	10%
Madagascar	15%
Malawi	15.5%
Malaysia	4%
Maldives	25% (of the average local and foreign currency demand and time liabilities of the commercial bank)
Mauritius	4%
Mongolia	5.5%
Mozambique	9%
Nepal	5%
Oman	5% (total demand, time, and savings deposits)
Papua New Guinea	3%
Philippines	10%
Poland	3.5% or 0%
Qatar	4.75%
Romania	20% (for RON-denominated liabilities with residual maturity of up to 2 years and for RON-denominated liabilities with residual maturity of over 2 years with an early repayment clause); 0 % for RON liabilities with residual maturity of over 2 years, without an early repayment clause: and 40% (for FX-denominated liabilities irrespective of residual maturity and early repayment clauses)
Russia	5.5% (liability to banks nonresidents in foreign currency), 4.5% (liability to households in rubles), and 5% (liability to other residents in rubles and foreign currency)
Rwanda	5%
Samoa	4.5%
Saudi Arabia	13% (demand deposits) and 4% (savings and time deposits)
Serbia	Domestic currency deposits: 10%, 5%, 45% Foreign currency deposits: 45%, 40%, 20%, 100%
Seychelles	13%
Singapore	3% (qualifying liabilities denominated in domestic currency)
South Africa	2.5%
Sri Lanka	10%
Suriname	25% (domestic currency) and 33.3% (foreign currency)
Syria	5%
Tajikistan	9% (domestic currency) and 11% (foreign currency)
Tanzania	10%
Thailand	The Bank of Thailand (BOT) does not completely separate reserve requirements and liquidity reserve requirement, but BOT requires banks to maintain the liquidity reserve ratio of no less than 6% of the sum of the total deposit, short-term foreign

Country	Reserve Requirements and Related Details
	borrowing, and borrowing with embedded derivatives. The reserves compose of (1) current account deposits with BOT greater than equal to 0.8%; (2) cash at the central cash centers of the banks less than equal to 0.2%, and (1)+(2) greater than equal to 1%; (3) cash in hand + cash at the central cash centers of the banks for the amount in excess of (2) < 2.5%; and (4) eligible securities stipulated by BOT.
The Bahamas	5%
The Gambia	14%
Timor-Leste	13%
Tunisia	7.5% (sight deposits, deposit liabilities of less than 3 months, and deduced insufficiency in respecting the liquidity ratio), 1% (deposit liabilities with maturity between 3 months and 24 months, and 0% (deposit liabilities with maturities longer than 24 months)
Turkey	6% (domestic currency) and 11% (foreign currency liabilities)
Uganda	9.5%
United States	Marginal ratios of 0%, 3%, and 10%. Refer to http://www.federalreserve.gov/monetarypolicy/reservereq.htm
Uzbekistan	13%
Vanuatu	10%
Vietnam	Domestic currency deposits: 3% (less than 12 months) and 1% (12 months and over); U.S. dollar deposits: 7% (less than 12 months) and 3% (12 months and over)
Yemen	7% (for domestic currency) and 20% (for foreign currency)

Source: IMF, Monetary and Capital Markets Department.

APPENDIX III. DATA SPECIFICATIONS AND DATA SOURCES

M1. M1 includes currency outside banks plus demand deposits at commercial banks. The data sources are the CBG (as published in various issues of *Bulletin* as well as directly obtained from the authorities) and *International Financial Statistics (IFS)* (line 34).

M2. M2 is defined as M1 money plus quasi money, where quasi money includes savings deposits and time deposits. Broad money also includes deposits held by the residents in foreign currencies. The data sources are the CBG (as published in various issues of *Bulletin* as well as directly obtained from the authorities) and *IFS* (lines 34 plus 35).

Real GDP. The data source is the IMF's *World Economic Outlook (WEO)* database. The data are in 2000 prices. Data presented in *WEO* are IMF estimates.

Consumer price index (CPI). This series is derived by splicing the old CPI (for until August 2004) and the new CPI (from September 2004 onward) with the base of 2000 = 100. The data source for both series is The Gambian Bureau of Statistics (GBoS), transformed into an autonomous agency since June 2006 from then the national statistics agency of the Central Statistics Department (CSD). The old CPI measured price developments in the low-income population of the greater Banjul area (Banjul and Kombo St. Mary area), which had the 1976/77 weights with the base year of 1974 = 100. The GBoS began to publish a new nationwide CPI since January 2007 (based on the weights derived from the results of the integrated household survey conducted in 2003) with data from August 2004 onward with the base period of 2004 = 100. The new series measures price developments throughout the country.

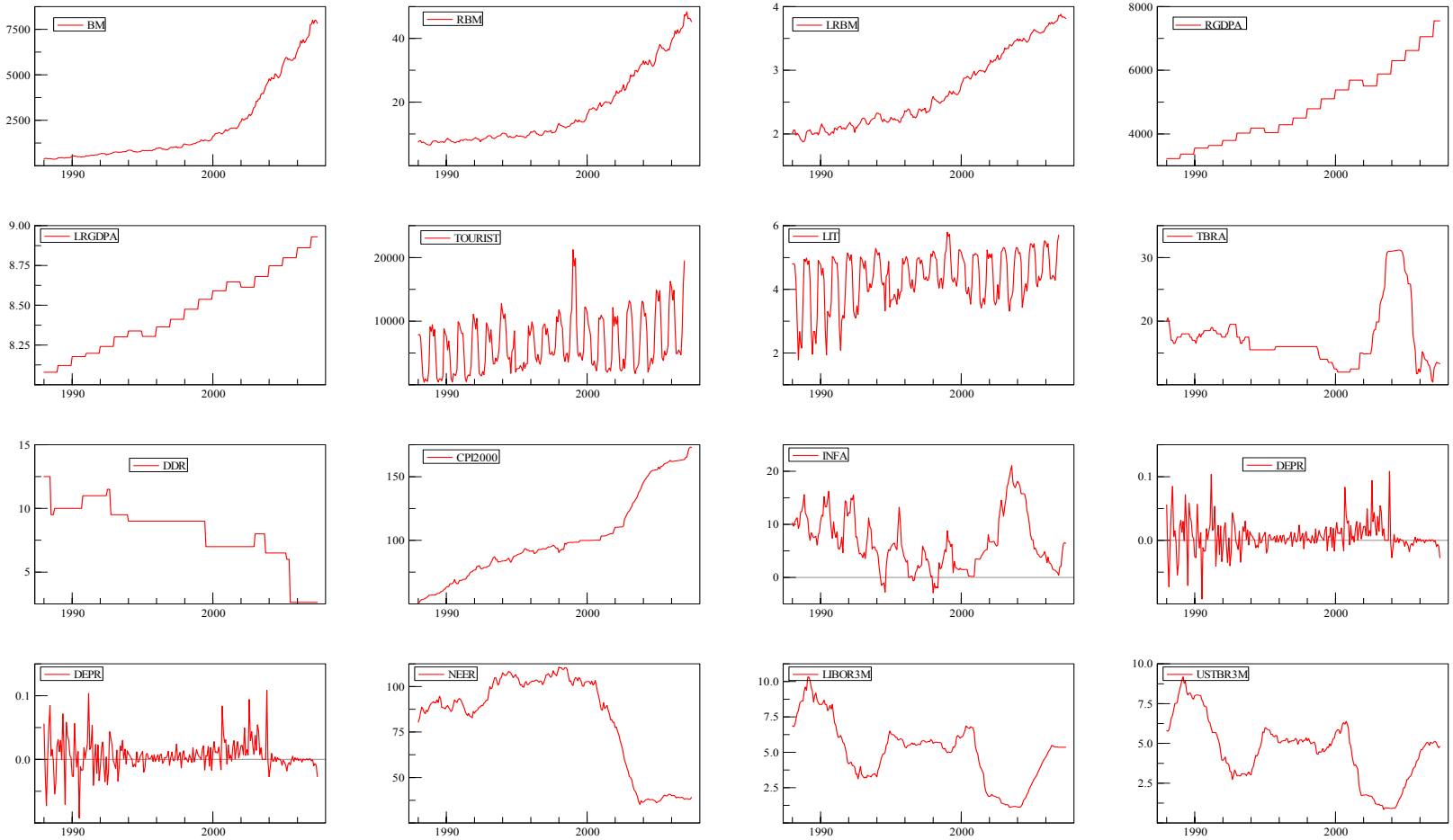
Yields on treasury bills. The CBG issues treasury bills of maturity 91-, 182-, and 364 - days. Until November 2002, these bills were auctioned on a biweekly basis; but, since December 2002, on a weekly basis. Data for until end-2001 represent yield on 91-day maturity bills issued during the last auction of a given month. Data for January 2002–December 2004 are simple averages of yields on three maturities during the last auction of each month; but from January 2005 onward, weighted average yields on different maturities issued throughout a given month. The yields are expressed in terms of percent per year. The data source is the CBG.

Interest rates on short-term deposits. The data source is the CBG (as published in various issues of *Bulletin* as well as directly obtained from the authorities). The data are available on a quarterly basis as a range of minimum to maximum offered by the banks. They are reported on a quarterly basis. The data used for the analysis are the mid rates of the range with the quarterly data repeated for the months within that quarter.

Exchange rates. The nominal exchange rate represents the official bilateral exchange rate of dalasi against the U.S. dollar at the end of each month. The data source is *IFS* and the CBG. The nominal effective exchange rate (NEER) index (with year 2000 = 100) series is from *IFS*.

Foreign interest rates. Yield on three-month generic U.S. treasury bills is used as the foreign interest rates. As an alternative, three-month U.S. dollar London Interbank Offered Rates is also employed.

APPENDIX IV. GRAPHICAL REPRESENTATION OF VARIOUS VARIABLES EMPLOYED

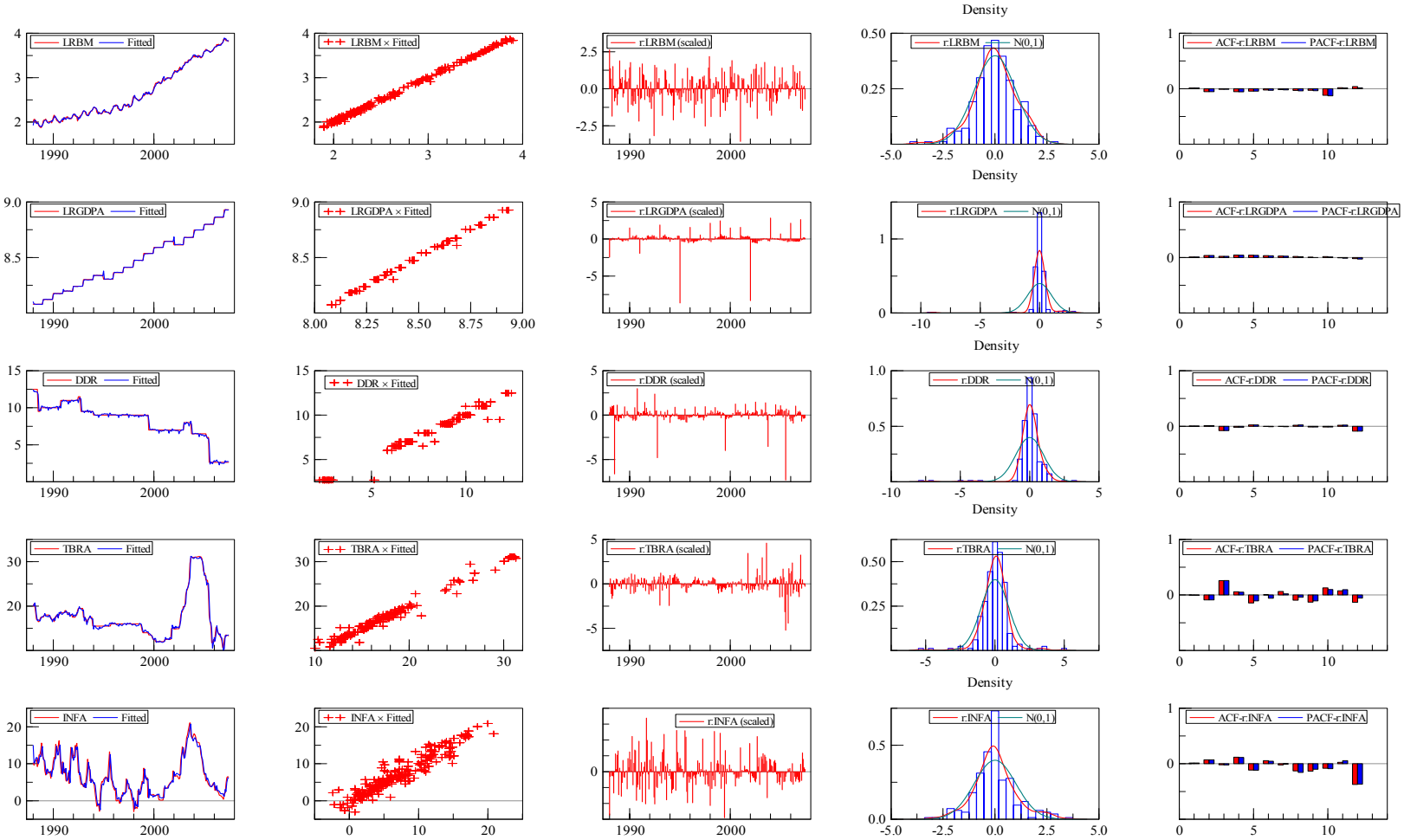


APPENDIX V. DIAGNOSTIC TEST RESULTS FOR THE COINTEGRATION RELATIONSHIP

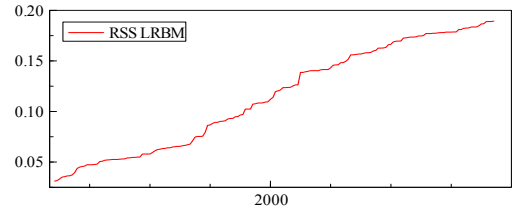
LRBM:	Portmanteau(12):	6.19082
LRGDPA:	Portmanteau(12):	2.16435
DDR:	Portmanteau(12):	3.75012
TBRA:	Portmanteau(12):	40.2648
INFA:	Portmanteau(12):	52.6368
LRBM:	AR 1-7 test:	F(7,203) = 0.77321 [0.6104]
LRGDPA:	AR 1-7 test:	F(7,203) = 0.73919 [0.6390]
DDR:	AR 1-7 test:	F(7,203) = 0.27878 [0.9617]
TBRA:	AR 1-7 test:	F(7,203) = 3.0798 [0.0042]**
INFA:	AR 1-7 test:	F(7,203) = 1.9433 [0.0645]
LRBM:	Normality test:	Chi^2(2) = 8.3805 [0.0151]*
LRGDPA:	Normality test:	Chi^2(2) = 1070.4 [0.0000]**
DDR:	Normality test:	Chi^2(2) = 588.96 [0.0000]**
TBRA:	Normality test:	Chi^2(2) = 217.02 [0.0000]**
INFA:	Normality test:	Chi^2(2) = 14.579 [0.0007]**
LRBM:	ARCH 1-7 test:	F(7,196) = 0.49023 [0.8410]
LRGDPA:	ARCH 1-7 test:	F(7,196) = 0.042916 [0.9999]
DDR:	ARCH 1-7 test:	F(7,196) = 0.065712 [0.9996]
TBRA:	ARCH 1-7 test:	F(7,196) = 4.1764 [0.0003]**
INFA:	ARCH 1-7 test:	F(7,196) = 1.5028 [0.1682]
LRBM:	hetero test:	F(22,187) = 0.95769 [0.5200]
LRGDPA:	hetero test:	F(22,187) = 0.37754 [0.9954]
DDR:	hetero test:	F(22,187) = 1.7472 [0.0250]*
TBRA:	hetero test:	F(22,187) = 2.5267 [0.0004]**
INFA:	hetero test:	F(22,187) = 1.3021 [0.1741]
LRBM:	hetero-X test:	F(76,133) = 0.59041 [0.9937]
LRGDPA:	hetero-X test:	F(76,133) = 0.34967 [1.0000]
DDR:	hetero-X test:	F(76,133) = 2.9877 [0.0000]**
TBRA:	hetero-X test:	F(76,133) = 1.5094 [0.0193]*
INFA:	hetero-X test:	F(76,133) = 0.72011 [0.9412]
Vector Portmanteau(12):		317.522
Vector AR 1-7 test:		F(175,853) = 1.1528 [0.1046]
Vector Normality test:		Chi^2(10) = 1810.5 [0.0000]**
Vector hetero test:		F(330,2199) = 1.0986 [0.1231]
Vector hetero-X test:		F(1140,1830) = 1.0972 [0.0402]*

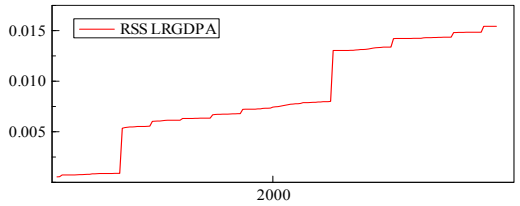
Note: ** and * indicate that the tests are significant at 1 percent and 5 percent level, respectively.

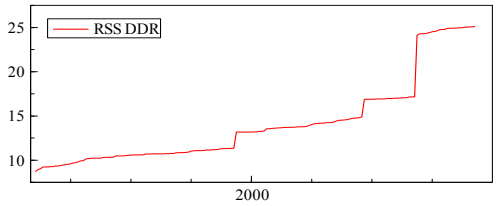
APPENDIX VI. GRAPHICAL PRESENTATION OF DIAGNOSTIC TEST RESULTS

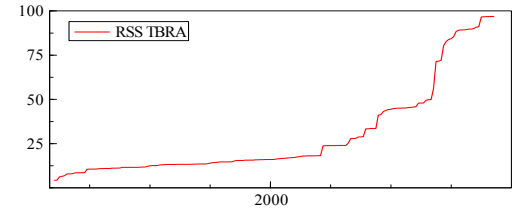


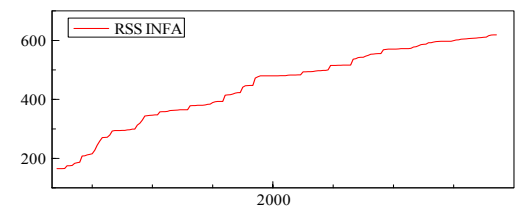
APPENDIX VII. PARAMETER CONSTANCY TESTS

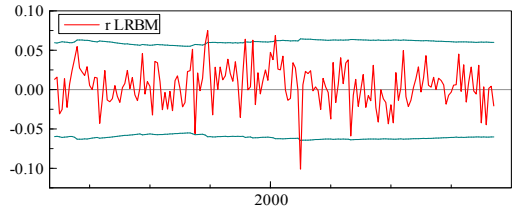


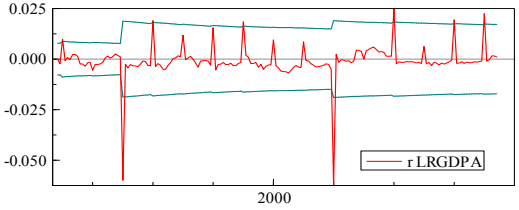


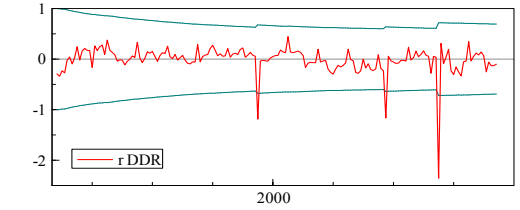


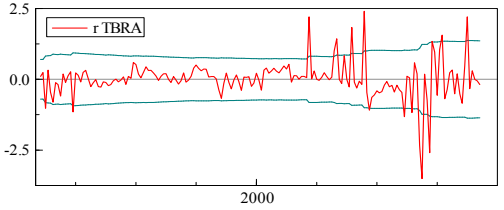


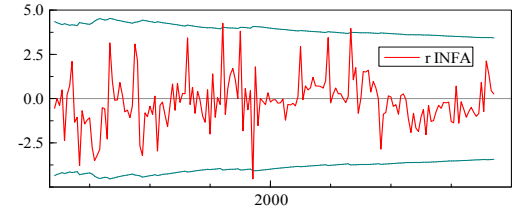












APPENDIX VIII. CHOW TESTS