The Portfolio Behaviour of the Household Sector in African Economies

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Abstract

We study the flow of funds and portfolio behaviour of the household sector in seven African economies over the period 1981-2004. We estimate a system of asset demand functions which are specified using the Almost Ideal Demand System (AIDS) framework. We acknowledge the distinctive features of each economy and thus estimate separately the financial assets for all seven economies using SUR estimation of a co-integrated model. We find the general model fits the data well for all the sample economies apart from Malawi, suggesting that a standard portfolio model, which highlights the distinctive features of each economy, can usefully be applied to study the portfolio behaviour in these economies. We also find that financial sector reforms have yet to produce noticeable financial deepening; specifically there is weak substitution and complimentarily effects among the assets with concentration on government bonds and bank loans, while there is no influence of the exchange rate on the demand for money.

Keywords: Flow of funds, household sector, portfolio modelling, Africa.

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1. Introduction

An important priority in flow of funds modelling for developing countries is to investigate patterns of intersectoral financial flows, focusing on a more disaggregated treatment of the portfolio choices of individual sectors such as households and companies (Green and Murinde, 2003). For example, Moore *et al.* (2005) investigate the flow of funds and portfolio behaviour of the banking sector in India. However, the study and similar studies on asset demand behaviour of households, such as Adam (1999), focus almost exclusively on individual economies and thus lack any meaningful formal comparative tool.

The main purpose of this paper is to collect sectoral flow of funds data and then build a model of portfolio behaviour of the household sector for African economies. The paper makes several major contributions to the literature. Firstly, arguably this is the first flow of funds model to be applied to the household sector, or any specific sector, for a group of African economies. We use annual data for 7 countries[1] covering the financial reform period of 1981-2004. The selection of the seven African countries was based on the fact that these were the only countries for which a consistent data set could be constructed for the given period for all the variables in a standard flow of funds model. However, excluding South Africa and Nigeria, the rest of the sample countries show similarities in terms of the liberalisation of the financial structure during the sample period. The differences between South Africa and Nigeria, on the one hand, and the rest of the countries, on the other, will be dealt with in the data section.

Secondly, our research uses the theoretical framework implicit in the functional form of the Almost Ideal Demand System (AIDS) proposed by Deaton and Muellbauer (1980). It is almost ideal because it provides an arbitrary first-order approximation of any demand system, satisfies the axioms of choice and aggregation and its functional form is consistent with the known household budget data. However, a serious limitation for this model is that there are no restrictions on its parameters to ensure non-negativity. As pointed out by Barr and Cuthbertson (1991), this approach is tractable yet allows one to test the basic axioms of rational choice.

Our third key contribution is that we use the Seemingly Unrelated Regression method (SUR), due to Zellner (1962), to estimate the model simultaneously for all sample countries. This allows us to detect any common features, as well as the distinctive ones, amongst the sample countries. The similarities and differences amongst the countries are identified through the coefficients in each equation of the model; the sign, the magnitude and the significance of these coefficients can tell us if there are common characteristics amongst the countries and to what level.

The reminder of the paper is organised as follows. Section 2 specifies the AIDS model. In section 3 we set out the data collection procedures and preliminarily analysis. Section 4 discusses the econometric methodology and the tests for cointegration. The results of unit root tests, cointegration and discussion of our econometric results are presented in Section 5. In Section 6, we compare our results with the existing empirical evidence. Section 7 concludes.

2. The AIDS Model

A demand model, based on a system of equations, is used to explain the allocation of a household's assets, given the level of expenditure among different products and services, subject to utility maximization or cost minimisation. Thus, a system of equations provides the elasticity of budget shares to changes in the relevant explanatory variables (Syriopoulos,

[1] Co^te d'voire, Kenya, Malawi, Nigeria, Rwanda, South Africa and Uganda.

2002). Of a variety of functional forms, the AIDS specification has been considered to represent household sector portfolio choices for the Sub-Saharan African countries.

To apply the model in our current study, the equations of the AIDS model, based on time series data, can be specified as follows:

$$w_{it} = \alpha_i + \sum\gamma_{ij}\, lnP_{jt} + b_i\, ln\,(x / P) + u_{it} \qquad i = 1, \ldots, n \qquad (1)$$

where w_{it} is the expenditure share for the *i*th good at time *t*, p_{jt} is the price of the *j*th good, x_t is defined here as the auxiliary variables such as total expenditure, *P* is the aggregate price index (for the group), and u_t is a normally distributed error with zero mean and constant variance. If prices are relatively collinear, a Stone index of the form $\ln P^* = \Sigma\, w_i \ln p_{jt}$ is suggested by Deaton and Muellbauer to be used in this case. Given that our explanatory variables are mainly interest rates on financial assets and those are usually highly collinear; this is a reasonable approach in the study (Moore *et al.*, 2005).

The system is based on the following theoretical demand assumptions:

$$\Sigma\alpha_i = 1,\ \Sigma\gamma_{ij} = 0,\ \Sigma\beta_i = 0 \qquad (2)$$

$$\Sigma\gamma_{ij} = 0 \qquad (3)$$

$$\gamma_{ij} = \gamma_{ji} \qquad (4)$$

The above constraints ensure respectively adding up (equation 2), which means all budget shares sum to unity; homogeneity (equation 3), which shows that portfolio shares are homogenous of degree zero in prices; and symmetry (equation 4), which indicates that households' choices are consistent.

With the simplification for the expression of P, equation (1) can be re-specified and redrafted as a system of equations in the following form to produce our general model:

$$ln\ CUR_{it} = \beta_1 + \beta_2\, ln\ pcur_{it} + \beta_3\, ln\ pdep_{it} + \beta_4\, ln\ pgd_{it} + \beta_5\, ln\ pcs_{it} + \beta_6\, ln\ pla_{it} + \beta_7\, ln\ h_{ktit} + \beta_8 \ln(x / P^*)_{it} + \beta_9\, ln(W/P^*)_{it} + u_{it} \qquad (5.A)$$

$$ln\ DDEP_{it} = \beta_{10} + \beta_{11}\, ln\ pcur_{it} + \beta_{12}\, ln\ pdep_{it} + \beta_{13}\, ln\ pgd_{it} + \beta_{14}\, ln\ pcs_{it} + \beta_{15}\, ln\ pla_{it} + \beta_{16}\, ln\ h_{ktit} + \beta_{17} \ln(x / P^{*\tau})_{it} + \beta_{18}\, ln(W^{\tau}/P^{*\tau})_{it} + e_{it} \qquad (5.B)$$

$$ln\ TDEP_{it} = \beta_{19} + \beta_{20}\, ln\ pcur_{it} + \beta_{21}\, ln\ pdep_{it} + \beta_{22}\, ln\ pgd_{it} + \beta_{23}\, ln\ pcs_{it} + \beta_{24}\, ln\ pla_{it} + \beta_{25}\, ln\ h_{ktit} + \beta_{26} \ln(x / P^{*\tau})_{it} + \beta_{27}\, ln(W^{\tau}/P^{*\tau})_{it} + \varepsilon_{it} \qquad (5.C)$$

$$ln\ GD_{it} = \beta_{28} + \beta_{29}\, ln\ pcur_{it} + \beta_{30}\, ln\ pdep_{it} + \beta_{31}\, ln\ pgd_{it} + \beta_{32}\, ln\ pcs_{it} + \beta_{33}\, ln\ pla_{it} + \beta_{34}\, ln\ h_{ktit} + \beta_{35} \ln(x / P^*)_{it} + \beta_{36}\, ln(W/P^*)_{it} + \nu_{it} \qquad (5.D)$$

$$ln\ CS_{it} = \beta_{37} + \beta_{38}\, ln\ pcur_{it} + \beta_{39}\, ln\ pdep_{it} + \beta_{40}\, ln\ pgd_{it} + \beta_{41}\, ln\ pcs_{it} + \beta_{42}\, ln\ pla_{it} + \beta_{43}\, ln\ h_{ktit} + \beta_{44} \ln(x / P^*)_{it} + \beta_{45}\, ln(W/P^*)_{it} + \upsilon_{it} \qquad (5.E)$$

$$ln\ LA_{it} = \beta_{46} + \beta_{47}\, ln\ pcur_{it} + \beta_{48}\, ln\ pdep_{it} + \beta_{49}\, ln\ pgd_{it} + \beta_{50}\, ln\ pcs_{it} + \beta_{51}\, ln\ pla_{it} + \beta_{52}\, ln\ h_{ktit} + \beta_{53} \ln(x / P^*)_{it} + \beta_{54}\, ln(W/P^*)_{it} + \omega_{it} \qquad (5.F)$$

where the dependent variables represent the logarithm of the six financial assets namely Currency (*ln* CUR), Demand Deposit (*ln* DDEP), Time Deposit (*ln* TDEP), Government Deposit (*ln* GD), Company Securities (*ln* CS) and Bank Loans (*ln* LA). Each one of the six financial asset equations of the system includes eight independent variables (common to all equations), that is, *ln* pcur is the log price of currency measured as discount rate, *ln* pdep is the log price of deposit measured as deposit rate, *ln* pgd is the log price of government deposit measured as treasury bill rate, *ln* pcs is the log price of company securities measured as the rate of growth in company securities, *ln* pla is the log price of loans measured as lending rate, *ln* h is the log of other auxiliary variables such as real exchange rate, *ln* EXP is the log of expenditure measured as household consumption expenditure, *ln* (W/P*) is the log of net worth over consumer price index where net worth is equal to the summation of all financial assets in the model (CURR + DDEP + TDEP + GD + CS – LA). The economic interpretation of the coefficients in the system is straightforward. The independent term represents the percentage of expenditure on each financial instrument when the explanatory variables are in their year-base values. β_2, β_3, β_4, β_5, and β_6 represent the impact on the logarithm of currency, due to a 1 per cent change in the prices of currency, deposit, government deposit, company

security and bank loans. Also, β_{11}, β_{12}, β_{13}, β_{14} and β_{15} represent the impact on the logarithm of demand deposits, due to 1 per cent change in the same prices of the second equation in the model. Since we have six equations, $\beta_{20...}\beta_{24}$; $\beta_{29...}\beta_{33}$; $\beta_{38...}\beta_{42}$ and $\beta_{47...}\beta_{51}$ represent the impact on the logarithm of time deposit, government deposit, company security and bank loans respectively, due to a 1 per cent change in the price of currency, deposit, government deposit, company security and bank loans. The coefficients $\beta_{7,}$ β_{16}, $\beta_{25,}$ $\beta_{34,}$ β_{43} and β_{52} represent the impact of auxiliary variables, in our model real exchange rate, on the logarithm of currency, demand deposit, time deposit, government deposit, company security and bank loans respectively. The $\beta_{8,}$ $\beta_{17,}$ $\beta_{26,}$ $\beta_{35,}$ β_{44} and β_{53} coefficients represent the absolute change in the six financial assets budget share, given a 1 per cent change in real expenditure in each equation. Finally, the $\beta_{9,}$ $\beta_{18,}$ $\beta_{27,}$ $\beta_{36,}$ β_{45} and β_{54} coefficients represent the absolute change in all the financial assets in the model, due to a 1 per cent change in real wealth.

3. Data

3.1 Sources of Data and Sample Selection

In this paper our aim is to construct data for the household sector in the sample African countries. After assessing the availability and quality of flow of funds data and most importantly the period for which the data was available, we ended up with a sample of 7 countries (Co^te dvoire, Kenya, Malawi, Nigeria, Rwanda, South Africa and Uganda) for the period 1981 – 2004, which represents a period of financial sector reforms for which data are available.

Table 1 shows the simplified aggregate financial liabilities and assets for the household sector in the African region. The household sector includes income-earning and saving entities and non-corporate enterprises. Africa might be expected to have a high demand for the services of financial markets for several reasons. Firstly, because of the high-risk environment there is a need for risk-bearing; portfolio diversification, consumption-smoothing and insurance. Furthermore, much of the African capital stock is unusually long-lasting, such as trees crops and mines. Hence, it is expected to find securitization in order to increase liquidity (Collier and Gunning, 1999). Furthermore, Smith *et al.*, (2002) reported that although the most important emerging markets exist in Latin America and Asia, a number of new stock markets in Africa have been established in previous years. Indeed, it seems that the financial sector reform programs in Africa are not said to be finished unless they involve the establishment of a new stock market or the rehabilitation of an old one.

The seven countries we ended up with provide a relatively good data set in comparison to the other countries in the African region. However, some variables are missing from those required in the model. Therefore, we use proxy variables and measurements for all the variables that are not available directly in the IFS Yearbooks.

Table 1 about here

3.2 Preliminary Data Analysis

To conduct the preliminary analysis, we divided the sample countries into four groups. The first group includes all the sample countries, while the second category includes the same group of countries excluding South Africa. The third scenario presents the sample countries excluding Nigeria and the last group shows all the sample countries excluding South Africa and Nigeria. The reason that we divided our sample countries into four categories is because the regional averages conceal large differences in performance among countries. For example, South Africa dominates other African stock markets in terms of both size and sophistication. With the exception of South Africa, African stock markets are extremely small by world

standards (Smith *et al.,* 2002). Moreover, if Nigeria and South Africa (two countries that account for approximately one-half of the region's GDP) are excluded, it becomes clear that there has been a significantly stronger improvement in the remainder of sub-Saharan Africa.[2]

Time deposits and currency were, on average, the major components in household financial assets over the sample period on the aggregate level for the first three categories. As for the last category, which includes all the sample countries apart from Nigeria and South Africa; time deposits and bank loans are the two major components. People in LDCs generally accumulate most of their financial savings in the form of money (or time deposits) due to the lack of availability of other financial assets (Siddiki, 2000). It is clear from the results of the four categories that bank loans are a very important source of funds on the aggregate level. The formal financial system in most of Africa is coterminous with the banking system (Ikhide, 1996). This means that the channelling of funds is mostly achieved through the banking system that stands as a major significant source of funds. Furthermore, the results show government debt as one of the major components. Active markets for short-term government debt now exist in much of sub-Saharan Africa (Buffie, 2003). The share of company securities is low as would be expected. This is due to the fact that many of the financial markets in Africa are new and very small (Smith *et al.*, 2002)[3].

At the country level, the preliminarily discussion of the data suggests that the shares of financial assets are highly varied among the countries and they look as normally distributed around a mean and exhibit a large standard deviation[4]. This is attributed to the huge differences in performance among countries. For example, a group of countries experienced an increase in annual per capita GDP growth. By contrast, several countries experienced falls in their real per capita incomes, in some cases because of armed conflicts and the attendant economic disruptions. Although, of these differences, the preliminarily results show common factors among some countries. For example, currency and bank loans were the two major assets for Co^te dvoire, Nigeria and Rwanda, with Nigeria, having the highest share of those two assets in comparison to the other countries in the sample. This is because the number of banks increased very rapidly in Nigeria, for example, from under ten to 119 (Collier and Gunning, 1999). The high share of bank loans in Co^te dvoire and Nigeria may be due to the excessive and unwise loans that were given during certain periods especially when one considers that the lending practices of the managers of publicly owned banks were inadequately supervised in Africa, permitting corrupt lending (Collier and Gunning, 1999). This proved in the share of nonperforming loans in total banking system loans that reached 50 per cent or more in Co^te dvoire, while it was almost as high in Nigeria where 45 per cent of bank loans outstanding were non-performing at the end of 1992 (Daumont *et al.*, 2004). As for Rwanda, the provision of financial services is highly dominated by six commercial banks[5], which explains the observation that bank loans are considered as major components in the financial assets alongside currency. Currency and time deposits are the major components for Malawi, South Africa and Uganda. As for South Africa, the share of time deposits is the highest in comparison to the other two countries. This is because of the interest rate incentives provided in order to bring inflation down to lower levels, as South Africa experienced high and accelerating inflation during the 1980s. The high share of currency and time deposits in Uganda is attributed to the issues that the consumer saves by holding money, domestic bank deposits and foreign currency. The reason that money is the major component in financial assets is because money is required for transaction purposes, but the demand for money is

[2] Adjustment and Growth in Sub-Saharan Africa: The Unfinished Agenda, March 1999, Volum 36, IMF.
[3] We report here the analysis for all the sample countries group.
[4] We checked the significance of the differences quantitatively and we found that they are statistically significant for all the variables.
[5] IMF Country Report No. 05/309.

sensitive to changes in the inflation rate (Feltenstein and Sarangi, 2005). Let us turn finally to Kenya, where, unlike the other two groups of countries in the sample, time deposits and bank loans are the major components. The ratio of total loans to all borrowers in Kenya is twice as high as in Tanzania and Uganda, but while the country's large domestic banks are big lenders the quality of their portfolio is very poor with high ratios of non-performing loans[6] .

War and civil unrest have happened in Africa frequently during the previous periods. These forms of political instability are often a source of macroeconomic instability. Thus, the conflict as well as the economic instability that it brings can be expected to have harmful consequences for the domestic as well as foreign investment environment. The high volatility of expenditure as measured by the standard deviation indicated that the instability factors played pivotal role in determining the level of household expenditure during the sample period. Table 2 indicates also that currency has high volatility as would be expected. The disastrous events which happened in Africa often bring other evils with them, including currency crashes and high inflation. While bouts of high inflation and all too frequent currency crashes are not unique to Africa, the level of demand for currency should be of high volatility. Furthermore, Table 2 shows that return on securities has the lowest volatility which may due to the low demand by households and the negligible flow of funds into equity markets in the sample countries.

Table 2 about here

The situation at the country level is not far from that one at the aggregate level; the volatility of expenditure is the highest for all the sample countries apart from Nigeria and Rwanda where the standard deviation of loans is the highest for these two countries. Local banks in Nigeria were highly vulnerable. The financial position of local banks deteriorated rapidly in 1992, and at the end of the year, eight local banks were among the 16 insolvent banks (the other eight were state government banks) (Daumont *et al.*, 2004). Economic and political instabilities in the African countries have probably a strong impact on the amount of spending and the allocation of this spending as well. Uganda, for example, suffered from all the political and economic ills: wars, high inflation and frequent collapses in its currency (Rogoff and Reinhart, 2003). Even at the end of the war, the critical changes still exist as more and more countries began, in the late 1980s and early 1990s, to implement comprehensive adjustment and reform programs to face the deep crisis. All these types of changes clouded the investment environment in Africa with uncertainty and impose the wait and see stance on the behaviour of their residences regarding the domestic demand for financial assets.

4. Testing and Estimating Methods

We follow Moore *et al.* (2005) in that we focus on an estimation of the equilibrium relationships and test basic theoretical restrictions. However, we extend Moore's *et al.* (2005) paper by proposing methods capable of investigating equilibrium relationships for a group of countries rather than individual ones; we use testing and estimating methods that deal with the specification of each of the sample countries. In other words, we propose empirical techniques capable of testing asset demand equations for seven different countries simultaneously.

Before using the econometric techniques to analyse the long-run relationship between a set of economic variables and to avoid possible spurious regression, it is necessary to distinguish stationary from non-stationary variables. The first step undertaken would be to establish the order of integration of variables used in the model. This is accomplished by

[6] The Economist, Vol. 13 Issue 29, p5-5.

applying firstly the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests on each of the series in the AIDS model equations, standard unit root tests.

The existence of long-run relationships is examined using cointegration tests and for this purpose we employ the single equation technique (Engle and Granger, 1987). This is very restrictive when analysing the properties of a multivariate model such as a demand system (Moore *et al.*, 2005). Checking our EG results using an estimation methodology that can be used to test for more than one equilibrium relationship among a set of variables, in this case Johansen (1995), was not possible due to limited data availability. Banerjee *et al.*, (1993) show that if there is a single cointegrating vector, the EG method is asymptotically equivalent to the Johansen method. Dickey *et al.*, (1994) found that irrespective of the number of cointegrating vectors, the estimated vectors derived from the EG approach were numerically very close to those derived from the Johansen approach. Therefore, we have feel some confidence in the EG results as a basis for the estimation of the model. We tested for cointegration of each equation for each country used in the model.

To obtain consistent and efficient estimates of the structural coefficients and to account for contemporaneous error covariance in the empirical tests, the Seemingly Unrelated Regression method (SUR) [*Zellner, 1962]* is employed. The SUR model proposed by Zellner (1962) consists of a set of standard linear regression equations in which the errors are correlated across equations (Bartels and Fiebig, 1991). The empirical model assumes that all equations are linear in the logarithm of all variables. To estimate the model, each financial asset is estimated separately for all seven countries simultaneously using the Zellner's procedure. That is, to estimate any of the financial asset equations in the model (say the *i*th), we follow Green and Murinde (1993) by stacking the 24 observations for Co^te dvoire, Kenya, Malawi, Nigeria, Rwanda, South Africa and Uganda one on top of the other, thus giving on average 168 observations for each of the variables in the system. Accordingly, the results can be written in vector-matrix notation as:

$$\begin{bmatrix} yCi \\ yKi \\ yMi \\ yNi \\ yRi \\ ySi \\ yUi \end{bmatrix} = \begin{bmatrix} ZCi & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & ZKi & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & ZMi & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & ZNi & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & ZRi & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & ZSi & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & ZUi \end{bmatrix} \begin{bmatrix} BCi \\ BKi \\ BMi \\ BNi \\ BRi \\ BSi \\ BUi \end{bmatrix} + \begin{bmatrix} ECi \\ EKi \\ EMi \\ ENi \\ ERi \\ ESi \\ EUi \end{bmatrix} \quad (6)$$

where, using the notation C(= country) = C,K,M,N,R,S,U

y_{ci} is an N x 1 vector of dependent variables, and

Z_{ci} is an N x M matrix of right-hand side variables,

with M being the number of right-hand side variables in i,

B_{ci} is an M x 1 vector of coefficients, and

ϵ_{ci} is an N x 1 vector of regression errors.

Equation 6 can be written in obvious notation to express the estimated model as:

$y_{iC} = \beta_1 + \beta_2 X_{2Ct} + \beta_3 X_{3Ct} + \beta_4 X_{4Ct} + \beta_5 X_{5Ct} + \beta_6 X_{6Ct} + \beta_7 X_{7Ct} + \beta_8 X_{8Ct} + \beta_9 X_{9Ct} + u_{Ct}$ (7.A)

$y_{iK} = \beta_{10} + \beta_{11} X_{2Kt} + \beta_{12} X_{3Kt} + \beta_{13} X_{4Kt} + \beta_{14} X_{5Kt} + \beta_{15} X_{6Kt} + \beta_{16} X_{7Kt} + \beta_{17} X_{8Kt} + \beta_{18} X_{9Kt} + u_{Kt}$ (7.B)

$$y_{iM} = \beta_{19} + \beta_{20}X_{2Mt} + \beta_{21}X_{3Mt} + \beta_{22}X_{4Mt} + \beta_{23}X_{5Mt} + \beta_{24}X_{6Mt} + \beta_{25}X_{7Mt} + \beta_{26}X_{8Mt} + \beta_{27}X_{9Mt} + u_{Mt} \quad (7.C)$$

$$y_{iN} = \beta_{28} + \beta_{29}X_{2Nt} + \beta_{30}X_{3Nt} + \beta_{31}X_{4Nt} + \beta_{32}X_{5Nt} + \beta_{33}X_{6Nt} + \beta_{34}X_{7Nt} + \beta_{35}X_{8Nt} + \beta_{36}X_{9Nt} + u_{Nt} \quad (7.D)$$

$$y_{iR} = \beta_{37} + \beta_{38}X_{2Rt} + \beta_{39}X_{3Rt} + \beta_{40}X_{4Rt} + \beta_{41}X_{5Rt} + \beta_{42}X_{6Rt} + \beta_{43}X_{7Rt} + \beta_{44}X_{8Rt} + \beta_{45}X_{9Rt} + u_{Rt} \quad (7.E)$$

$$y_{iS} = \beta_{46} + \beta_{47}X_{2St} + \beta_{48}X_{3St} + \beta_{49}X_{4St} + \beta_{50}X_{5St} + \beta_{51}X_{6St} + \beta_{52}X_{7St} + \beta_{53}X_{8St} + \beta_{54}X_{9St} + u_{St} \quad (7.F)$$

$$y_{iU} = \beta_{55} + \beta_{56}X_{2Ut} + \beta_{57}X_{3Ut} + \beta_{58}X_{4Ut} + \beta_{59}X_{5Ut} + \beta_{60}X_{6Ut} + \beta_{61}X_{7Ut} + \beta_{62}X_{8Ut} + \beta_{63}X_{U9} + u_{Ut} \quad (7.G)$$

where y represents a financial asset in the AIDS model. The AIDS assets demand equations are estimated separately for all seven countries simultaneously using Zellner's procedure. In addition, we carried out tests for the equality of parameters across countries and we re-estimated the model imposing valid restrictions that offer a further increase in efficiency.

5. Estimation Results

5.1 Unit root tests

The first step in the analysis is simply to look at the univariate properties of the data. Theoretically a process is either I(0), I(1) or I(2) (Drine and Rault, 2003). We report the results of the conventional unit root tests at the country level. From these tables, it is clear that CURR, DEMD, TIMED, GD, CS and LA are I(1) for Co^te dvoire, Kenya, Malawi and Nigeria. For the other countries the results are more ambiguous, with the DF test rejecting a unit root and the ADF not rejecting. We adopt a cautious approach in this case; for example we treat CURR, DEMD, TIMED and CS for Uganda as being I(1).

5.2 Cointegration tests

The EG statistics are suggestive of cointegration in all the equations. However, we have not tested for cointegration in the GD equation for Uganda because the GD series is stationary at level. Accordingly, we proceed to estimate the model using SUR as already discussed[7].

5.3 Equation by Equation Estimates

To consider the specification of each country, we estimated the unrestricted version of the model for Co^te dvoire, Kenya, Malawi, Nigeria, Rwanda, South Africa and Uganda using the SUR method. In estimating the general model, the same divisions were followed obtaining the preliminarily results that estimate the model according to four scenarios; the first includes estimating the general model using the database of all sample countries, the second is without South Africa, the third without Nigeria and the forth scenario is estimating the general model without either South Africa or Nigeria. Moreover, we conducted an additional scenario and this time not according to size or economic and financial significance, but according to the pursued monetary strategy. Sub-Saharan African countries pursued two different strategies to deal with the internal and external imbalances; those in western and central African monetary union such as Co^te dvoire (CFA franc zone) maintain fixed exchange rate parity with the French franc as a nominal anchor to maintain fiscal discipline while most other African countries conduct external adjustment strategy. So, to reflect this strategy difference we prepared a fifth scenario in which we exclude Co^te dvoire. After comparing the results of the five scenarios, we found no changes in the sign of elasticities and few differences in their magnitude. Accordingly, we proceeded by considering only the results of the first scenario

[7] The results of unit root and cointegration tests are available with the author.

(all the sample countries). The results indicate that the general model fits the data well for most of the countries apart from Malawi; the poor results for Malawi might due to the setbacks in the reform program and other related issues. Although Malawi has made progress in liberalizing its economy and implementing structural reforms that were targeted at laying a sound basis for sustainable growth. However, external shocks and inconsistent implementation of monetary and fiscal policies disrupted their macroeconomic stabilization efforts. These difficulties were compounded by uncertainty about the timing of disbursements from donors who provide crucial support for the Malawi economy[8]. Moreover, our results indicate that some countries perform better than others in some equations[9]. For example, the general model fits the data well for both Kenya and Nigeria in the government deposit equation. This may be due to the issue that the local banks in Nigeria and Kenya were highly vulnerable (Daumont *et al.*, 2004).

The next step was to exhibit the most restricted version of the model that the data was able to accept. The acceptance or rejection of equality restrictions was tested by the application of an asymptotic test procedure, namely the Wald test, which utilizes the information incorporated in the log likelihood function and follows a χ^2 distribution. The results show that equality restrictions are accepted[10].

The Currency Equation

Real interest rate, wealth and expenditure elasticities of currency equations for the seven countries are shown in Table 3. Equality restrictions were accepted across two, three and even more countries showing some common factors among the countries, for example, coefficients on PCUR accepted an equality restriction for Kenya and Uganda being the two East African countries that show similar average rates of inflation between 1991 and 1997. The similarity in the average rates of inflation in the two countries reflects some similarities in the way that they have been conducting their economic policies (Mkenda, 2001).

Table 3 about here

As far as policy instruments are concerned, a rise in PCUR increases demand for currency in Kenya, Malawi, South Africa and Uganda, while a rise in PCUR decreases demand for currency in Co^te dvoire, Nigeria and Rwanda. However, considering the previous circumstances of the three countries, this is plausible. Rwanda suffered through war and genocide that ended in 1994, and Co^te dvoir and Nigeria suffered from macroeconomic instability and bank crises. The cross-elasticities suggest that a rise in R_1 leads investors to switch from DEP and CS to CUR in Kenya, while a rise in R_1 would lead investors to switch to risk-free assets (DEP and GD) in South Africa and to only one risk free asset (DEP) in Uganda. The sizes of the elasticities, which are between 0.01 and 0.16, suggest that there is a weak substitution effect among assets in these countries. Turning to wealth, we see that the wealth elasticities of CUR have significant and right positive signs in Co^te dvoire, Kenya, Rwanda and South Africa, with the elasticity of wealth for Kenya being the largest, giving evidence of the long-term attractiveness of currency in Kenya as compared to the other countries in the sample. Interestingly, the real exchange rate has no effect as the elasticities are zero for all countries.

The Demand Deposits Equation

[8] Malawi Letter of Intent, Memorandum of Economic Policies, and Technical Memorandum of Understanding, December 8, 2000, IMF.

[9] The results of the general model for all the countries are available with the author.

[10] All tables of equality restrictions are available with the author and upon request.

The own interest elasticities is wrongly signed in the demand deposit equations for all the sample countries apart from Uganda as shown in Table 4. These results suggest that investors do not consider demand deposits when they make decisions about how to allocate their savings. The substitution effect suggests that an increase in PDEP creates a switch from GD to DDEP in Uganda as the PGD is statistically significant. The size of elasticity, which is 0.06, suggests that there is a weak substitution effect between these two risk-free assets.

Table 4 about here

The Time Deposits Equation

Table 5 shows that the own price effects have the right sign in all the sample countries apart from Co^te dvoire. However, the own price effect is statistically insignificant in Malawi. The cross elasticities suggest that a rise in PDEP leads investors to switch from LA and GD to TDEP in Kenya, from CS and GD to TDEP in South Africa and from GD to TDEP in Nigeria and Uganda. The substitution effect is weak as suggested by the size of cross elasticities that are slightly above zero (between 0.02 and 0.03). The cross elasticities indicate that government bonds are an attractive "store of wealth" because of their relatively high and assured returns. In Africa, as governments lost the revenue implicit in financial repression, they borrowed on treasury bill markets, often at very high real interest rates (Nissanke and Aryeetey, 1998). With respect to expenditure, the elasticities for Kenya and Rwanda are statistically significant and positive, with the one for Rwanda exceeding unity. In so far as the reconstruction activities have taken place after the war in Rwanda, much consumption of the household is mainly devoted to business, therefore, it is natural to find that higher consumption is associated with a build-up of savings as this business generates more profits.

Table 5 about here

The Government Deposits Equation

Table 6 reports the government deposit equations of the household sector in all the sample countries apart from Uganda. The own interest rate elasticity on the holdings of GD is positive and statistically significant in Nigeria and Rwanda, while it is wrongly signed in Kenya, Malawi and South Africa. As for Co^te dvoire, it has the right sign but this is statistically insignificant. The cross-elasticities suggest that a rise in PGD leads investors to switch from TDEP and CUR to GD in Nigeria, while an increase in PGD creates a switch from CS and TDEP to GD in Rwanda. This suggests that there is a substitution effect among the risk-free assets in Nigeria, while in Rwanda the substitution effect is held among risk-free and non risk-free assets. This could be because the living standards and the household income in Nigeria are higher than in Rwanda and that the investor in Nigeria can substitute among a variety of assets where in Rwanda the options are limited. The size of elasticities suggests that there is a weak substitution effect between risk-free assets in Nigeria, while in Rwanda the substitution effects between the assets are strong as suggested by the size of elasticities, with the cross impact of PGD on CS being the largest that it exceeds unity.

Table 6 about here

The Company Securities Equation

The own interest elasticities in the company security equations are wrongly signed in all the sample countries apart from Kenya and South Africa, however, the interest elasticities are statistically insignificant as shown in Table 7. The negative relationship indicates that when there is an increase in share price, the households prefer to disinvest from shares. This could

be because the increase in returns from holding shares may bring, at the same time in the household, a perception of an increase in the riskiness of holding shares (Sen *et al,* 1996). This could be plausible given the vague awareness of the African household of stock market activities as most of these markets are newly established.

Table 7 about here

The Bank Loans Equation

Table 8 shows that the own price effects are wrongly signed in all the sample countries apart from Co^te dvoire, Rwanda and Uganda. However, the own price effect is statistically insignificant in Uganda. The negative relationship between LA and PLA may attribute to the lending practices of the managers of publicly owned banks that were inadequately supervised, allowing corrupt lending. As a result of this type of lending, publicly-owned banks have had very high default rates. Clearly, at these rates of default the repression of interest rates was a secondary phenomenon (Collier and Gunning, 1999). A fall in PLA increases the demand for loans, securities, government deposits and deposits in Co^te dvoire. The elastiticities of government deposit and securities are larger comparing them to the elasticity of deposits, with the cross impact of PLA on CS being the largest. The substitution effect with three assets suggests that more lending may go into stock market and government deposit markets than that going to deposits. The cross-elasticities suggest that a fall in PLA leads investors in Rwanda to increase their demand to loans, government deposits or deposits and currency. The size of elasticity for currency is the highest, this is consistent with the idea put forward that reconstruction activities that have taken place after the war, many loans would primarily go towards business. Accordingly, it is natural to find that higher borrowing is initially associated with a build-up of cash before disbursement of funds on a business project (Moore *et al.*, 2005). With respect to expenditure, the elasticity for Rwanda and Uganda is significant and much more than unity. This indicates that household consumption is extremely financed by bank loans and purchases of consumer durables and finances of business by means of loans are highly significant.

Table 8 about here

6. Comparison with other Studies

The short term and long term elasticities of the asset demand equations for Kenya can be compared with Adam's (1999) paper in which he presented a model of the private sector's demand for real and financial assets in Kenya during the period 1973 – 1990. The own price coefficient for currency has a positive significant sign which is not consistent with Adam's paper where the own price effect is negative and statistically significant. The justification put by Adam (1999) is that inflation played an important role and the evidence of flight from money provided by the model is strong, this is due to the coffee boom between 1976 and 1979. However, our model did not cover that period as our data covers the years 1981 to 2004. The confidence in the local currency has probably been restored during this period where the issue that contributes in having a positive own price effect. Moving to the government deposit equation, our results do not agree with the results of Adam (1999) that the own price effect is positive; however, the results for this equation are poor in Adam's (1999) paper due to the negligible holdings of government securities by the private sector. It is worth mentioning that African countries registered considerable progress improvements in their macroeconomic issues during recent years suggesting that investment in real capital might be increased. Our preliminarily results indicate that bank loan have a high share in a household's portfolio and

our final results do not indicate that these were loans directed to the stock market, or the government deposit market, signifying that these loans were directed to the real sector. In other words there is a substitution effect between financial stock and real capital.

7. Concluding Remarks

In this paper we estimated asset demand functions for seven African countries over the period 1981 – 2004, within a coherent theoretical framework provided by the AIDS model and the statistical framework of cointegration. Considering the differences in financial assets holdings among the sample countries, we divided the sample countries into four groups in conducting the preliminary analysis and five groups in estimating the model. The results show no significant changes among the groups; therefore, we proceeded by considering the group that included all the sample countries as a basis for our results.

The key results can be summarized as follows. Firstly, we found that asset demand equations can be modelled as a set of cointegration relationships for a group of countries and each equilibrium equation can therefore be estimated separately for all the sample countries simultaneously using the SUR estimating procedure. The general model fits the data well for most of the countries apart from Malawi, with some countries performing better than others in some equations. The model accepted a range of equality restrictions offering a further increase in efficiency. While there are undoubtedly some anomalies, we believe that the results justify the claim that our methodology is appropriate because it highlights the distinctive features of each of the seven economies.

The parameter estimates of the restricted model are of considerable interest. We found an interesting and plausible set of substitution and complimentary effects amongst the financial assets. These are mostly very small in magnitude, near to zero, indicating that the authorities in Africa can use the interest rate policy effectively as this will not be mitigated by weak substitution and complimentary effects. These weak effects may be due to the initial setbacks of the adjustment and reform programs that came to face the deep crises that hit most African countries in the 1980s. These programs did not succeed very well in liberalizing the interest rate regime and giving the market a greater role in Africa, as our results indicate.

Specifically, we found that the bank rate has a relatively minor effect on lending practices in most of the sample countries. Notwithstanding, the banks in Africa are big lenders and loans finance the investment activities of the households in Africa as the elasticity of expenditure in the bank loans equations is much more than unity for some countries. Africa's excessive lending has a high rate of non-performing loans and many banks in Africa are classified as technically insolvent. Furthermore, we found no effect for the exchange rate as the elasticities in most of the equations are zero in the currency equation. This indicates that the response of money demand to foreign factors in formulating monetary policy is not significant, meaning that Africa has not been open or has been much less open than other regions.

Overall, we uncover some of the prolonged problems from which African countries suffer, but what is more important is that our paper shows these problems in several countries collectively. To facilitate solving such problems, to deepen the financial system and to better mobilize savings and enhance financial intermediation, policies should be designed to work in several directions at once; firstly, it is essential to strengthen the banking system through guaranteeing appropriate independence from the government for the central bank; more effective regulation and supervision of the banking system; recapitalization or liquidation of problem banks; and the fostering of a competitive commercial banking system. Secondly, a strong policy response to the severely underdeveloped financial markets in Africa is required. In the long run stock markets will increase the liquidity of the African capital stock and enable risk pooling in portfolios.

All in all, the period of our study for Africa covers the first stages of financial liberalization and at a time when the reform programmes gradually began to take hold in most countries as they addressed the macroeconomic problems. In the long run, financial reform might be expected to improve the allocation of investible funds as most of it is concentrated in the government bonds and bank loans that lead to changes elsewhere in the system.

The identification of a set of common variables that explain demand sensitivity for financial assets and the estimation of their quantitative impact can improve fund allocation decisions. In general, asset allocations explain a major part of the variability in portfolio returns. However, including other factors such as macroeconomic variables will probably have a strong impact on fund allocation decisions given that domestic demand remained subdued reflecting the wait-and-see stance of the residents in the face of uncertainties surrounding the economic prospects of the region.

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TABLE 1
HOUSEHOLD SECTOR LIABILITIES AND ASSETS

	Cote d'voir	Kenya	Malawi	Nigeria	Rwanda	South Africa	Uganda	All sample countries
				Mean share of wealth (%)				
CUR	57.9%	36.4%	32.3%	65.9%	48.8%	36.2%	51.8%	49.9%
DDEP	27.0%	21.4%	18.4%	33.5%	27.6%	32.4%	23.1%	29.9%
TDEP	28.3%	58.8%	30.0%	42.2%	34.7%	41.7%	34.5%	43.3%
GD	37.3%	29.5%	4.7%	22.6%	26.2%	8.3%	-1.6%	19.3%
CS	11.7%	1.6%	13.2%	0.07%	1.1%	1.1%	5.8%	0.6%
-LA	62.2%	47.7%	-1.4%	64.3%	38.4%	19.7%	13.6%	43.0%
W	100%	100%	100%	100%	100%	100%	100%	100%

Notes
CUR: Currency (Notes and coin), DDEP: Demand Deposit, TDEP: Time Deposit, GD: Government debt, CS: Company Securities, W: Net worth

TABLE 2
BASIC STAISTICAL ANALYSIS

	Cote d'lvoire			Kenya			Malawi			Nigeria		
	Mean	Median	St.Dev.	Mean	Median	St.Dev.	Mean	Median	St.Dev.	Mean	Median	St.Dev.
CUR	826.4	628.8	365.6	66377.1	52949.5	58941.8	4384.0	888.2	6701.4	292197.7	101847.7	401596.6
DDEP	385.0	314.1	141.9	38958.4	30142.6	36703.5	2501.9	502.5	3829.1	148348.7	46079.2	211799.6
T DEP	402.8	361.2	135.2	107152	57167.0	98712.0	4069.3	778.9	6092.1	187185.5	61934.8	266478.3
CD	532.0	471.1	241.4	53680.4	35273.1	41295.3	637.5	31.1	1939.3	100169.5	30826.8	159122.6
CS	166.4	142.8	80.9	3052.9	2796.1	2060.5	1794.4	243.6	3021.5	345.2	203.4	336.1
LA	887.4	905.9	82.0	87145.7	22593.6	99933.5	-198.0	154.8	1308.1	285231.1	79776.7	405332.5
PCUR	8.1	7.2	2.6	19.9	17.1	8.4	24.8	21.5	15.0	14.1	13.5	4.4
PDEP	5.1	4.3	1.7	10.8	11.2	4.2	18.9	13.9	9.0	12.7	13.1	4.2
PGD	7.9	6.6	3.4	15.6	13.8	8.9	23.5	17.0	12.8	15.6	14.8	3.6
PCS	0.0	0.0	0.2	0.1	0.1	0.3	0.4	0.2	0.6	0.6	0.1	1.6
PLA	14.8	14.5	1.1	20.4	18.6	7.2	31.5	25.6	13.9	18.2	19.9	6.1
EXP	4151.9	3975.0	560.3	553175.8	527785.3	115671.1	64719.8	59173.8	19111.9	2638.0	2484.8	610.4
REXC	549.5	544.8	124.1	82.5	83.0	13.1	51.6	46.8	16.1	71.3	86.4	36.3
W/P	17.7	18.1	7.0	3517.2	3433.5	470.7	219.6	203.7	90.7	11224.9	12167.2	3684.6

TABLE 3
SEEMINGLY UNRELATED REGRESSION
RESTRICTED MODEL - CURRENCY EQUATION

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa		Uganda	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	-0.041	-2.52(0.01)	-0.625	-4.35(0.00)	0.044	0.48(0.62)	-0.272	-0.98(0.33)	-0.790	-6.80(0.00)	0.067	0.72(0.47)	0.094	0.28(0.77)
C(2)	Δln (PCUR)	-0.048	-2.45(0.01)	0.010	8.58(0.00)	0.008	1.45(0.15)	-0.003	-0.36(0.71)	-0.026	-2.29(0.02)	0.032	2.27(0.02)	0.010	8.58(0.00)
C(3)	ln (PDEP)	-0.053	-6.43(0.00)	-0.053	-6.43(0.00)	-0.007	-0.38(0.70)	-0.007	-0.38(0.70)	-0.042	-4.05(0.00)	-0.028	-1.79(0.07)	0.124	4.24(0.00)
C(4)	Δln (PGD)	-0.096	-3.17(0.00)	0.012	3.17(0.00)	-0.010	-1.50(0.14)	0.044	1.37(0.17)	-0.010	-1.50(0.14)	-0.010	-1.50(0.14)	-0.051	-3.03(0.00)
C(5)	ln (PCS)	-0.094	-1.82(0.07)	-0.164	-5.81(0.00)	-0.008	-0.23(0.81)	-0.060	-1.80(0.07)	0.041	1.70(0.09)	0.019	0.22 (0.82)	0.039	2.66(0.01)
C(6)	Δln (PLA)	0.161	3.71(0.00)	0.045	5.87(0.00)	0.008	2.64(0.01)	-0.012	-0.78(0.43)	0.072	7.03(0.00)	-0.002	-0.12(0.90)	-0.002	-0.12(0.90)
C(7)	Δln (*W/P**)	0.194	4.62(0.00)	1.025	13.97(0.00)	0.022	0.23(0.81)	-0.190	-1.10(0.27)	0.552	5.64(0.00)	0.362	1.94(0.05)	0.051	0.29(0.77)
C(8)	ln EXP	-0.006	-0.05(0.95)	-0.158	-1.56(0.12)	0.178	0.91(0.36)	-0.033	-0.14(0.88)	1.553	2.92(0.00)	0.158	0.16(0.87)	0.734	1.19(0.23)
C(9)	ln REXC	0.000	3.21(0.00)	0.004	4.09(0.00)	0.004	1.53(0.13)	0.003	1.64(0.10)	0.000	-1.07(0.28)	0.005	0.52(0.60)	0.000	1.31(0.19)

Equations:

1. $\Delta \ln CUR_C = \beta_1 + \beta_{12}\Delta PCUR_{Ct} + \beta_3\Delta PDEP_{Ct} + \beta_4\Delta PGD_{Ct} + \beta_5 PCS_{Ct} + \beta_6\Delta PLA_{Ct} + \beta_7\Delta \ln(W/P)_{Ct} + \beta_8\Delta lnEXP_{Ct} + \beta_9\Delta REXC_{Ct} + u_{ct}$
2. $\Delta \ln CUR_K = \beta_{10} + \beta_{11}PCUR_{Kt} + \beta_{12}\Delta PDEP_{Kt} + \beta_{13}PGD_{Kt} + \beta_{14} PCS_{Kt} + \beta_{15}\Delta PLA_{Kt} + \beta_{16}\Delta \ln(W/P)_{Kt} + \beta_{17}\Delta lnEXP_{Kt} + \beta_{18}REXC_{Kt} + u_{Kt}$
3. $\Delta \ln CUR_M = \beta_{19} + \beta_{20}PCUR_{Mt} + \beta_{30}PDEP_{Mt} + \beta_{22}PGD_{Mt} + \beta_{23} PCS_{Mt} + \beta_{24}\Delta PLA_{Mt} + \beta_{25}\Delta \ln(W/P)_{Mt} + \beta_{26}\Delta lnEXP_{Mt} + \beta_{27}REXC_{Mt} + u_{Mt}$
4. $\Delta \ln CUR_N = \beta_{28} + \beta_{29}\Delta PCUR_{Nt} + \beta_{30}PDEP_{Nt} + \beta_{31}PGD_{Nt} + \beta_{32} PCS_{Nt} + \beta_{33}\Delta PLA_{Nt} + \beta_{34}\Delta \ln(W/P)_{Nt} + \beta_{35}\Delta lnEXP_{Nt} + \beta_{36}\Delta REXC_{Nt} + u_{Nt}$
5. $\Delta \ln CUR_R = \beta_{37} + \beta_{38}PCUR_{Rt} + \beta_{39}\Delta PDEP_{Rt} + \beta_{22}PGD_{Rt} + \beta_{41} PCS_{Rt} + \beta_{42}PLA_{Rt} + \beta_{43}\Delta \ln(W/P)_{Rt} + \beta_{44}\Delta lnEXP_{Rt} + \beta_{45}\Delta REXC_{Rt} + u_{Rt}$
6. $\Delta \ln CUR_S = \beta_{46} + \beta_{47}PCUR_{St} + \beta_{48}PDEP_{St} + \beta_{22}PGD_{St} + \beta_{50} PCS_{St} + \beta_{60}PLA_{St} + \beta_{52}\Delta \ln(W/P)_{St} + \beta_{53}\Delta lnEXP_{St} + \beta_{54}\Delta REXC_{St} + u_{St}$
7. $\Delta \ln CUR_U = \beta_{55} + \beta_2PCUR_{Ut} + \beta_{57}PDEP_{Ut} + \beta_{58}\Delta PGD_{Ut} + \beta_{59} PCS_{Ut} + \beta_{60}PLA_{Ut} + \beta_{61}\Delta \ln(W/P)_{Ut} + \beta_{62}\Delta lnEXP_{Ut} + \beta_{63}REXC_{Ut} + u_{Ut}$

Notes: lnPCUR: log Price of Currency measured as discount rate, lnPDEP: log Price of Deposit measured as deposit rate., lnGD: Price of Government Deposit measured as treasury bill rate, PCS: Price of Company Securities measured as the rate of growth in company securities which is equal to dividends on ordinary shares (dividend rate) plus last period's percentage change in the index of stock market. , lnPLA: log Price of Loans measured as lending rate, ln(W/P*): log of Net worth over consumer price index where Net worth is equal to the summation of all financial assets in the model (CURR + DDEP + TDEP + GD + CS – LA), lnEXP: log of Expenditure measured as household consumption expenditure, lnREXC: log of Real Exchange Rate measured as lnREXC where REXC is ep*/p, where e = the number of national units of currency per US, p* = US CPI, and p = Country CPI. The source of data on prices is the IFS issued by the IMF YEARBOOK.

TABLE 4
SEMINGLY UNRELATED REGRESSION

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa		Uganda	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	-0.043	-2.71(0.00)	-1.146	-2.90(0.00)	0.127	0.97(0.33)	-0.127	-0.50(0.61)	-0.453	-3.07(0.00)	0.161	1.29(0.20)	-0.507	-1.52(0.13)
C(2)	Δln (PCUR)	-0.038	-1.98(0.05)	0.006	2.13(0.03)	0.006	2.13(0.03)	-0.002	-0.26(0.79)	0.048	3.61(0.00)	0.034	3.23(0.00)	0.014	1.48(0.14)
C(3)	ln (PDEP)	-0.031	-1.55(0.12)	-0.079	-3.46(0.00)	-0.003	-0.35(0.72)	-0.031	-1.55(0.12)	-0.013	-0.58(0.56)	-0.031	-1.55(0.12)	0.131	4.96(0.00)
C(4)	Δln (PGD)	-0.103	-3.37(0.00)	0.025	2.23(0.02)	0.005	0.69(0.49)	0.029	1.80(0.07)	-0.017	-2.30(0.02)	-0.005	-0.22(0.82)	-0.066	-3.69(0.00)
C(5)	ln (PCS)	-0.083	-1.54(0.12)	-0.204	-2.68(0.00)	0.031	0.82(0.41)	-0.062	-1.78(0.07)	-0.034	-1.13(0.26)			0.011	0.73(0.46)
C(6)	Δln (PLA)	0.151	3.49(0.00)	0.072	3.40(0.00)	0.006	1.73(0.08)	-0.000	-0.02(0.98)			0.012	1.62(0.11)	0.025	1.12(0.26)
C(7)	Δln (*W/P**)	0.121	2.83(0.00)	0.519	2.69(0.00)	0.019	0.17(0.86)	-0.292	-1.76(0.08)	0.724	3.71(0.00)	0.509	2.52(0.01)	-0.065	-0.39(0.69)
C(8)	ln EXP	0.086	0.70(0.48)	0.226	0.85(0.39)	-0.302	-1.35(0.18)	-0.252	-1.06(0.29)	0.568	1.21(0.23)	-0.765	-0.93(0.35)	0.940	1.75(0.08)
C(9)	ln REXC	0.000	3.29(0.00)	0.009	3.02(0.00)	0.000	0.09(0.92)	0.004	2.16(0.03)	-0.001	-2.28(0.02)	0.008	0.82(0.41)	9.07E	0.60(0.54)

RESTRICTED MODEL – DEMAND DEPOSIT EQUATION

Notes: See Table 3.

TABLE 5
SEMINGLY UNRELATED REGRESSION
RESTRICTED MODEL – TIME DEPOSIT EQUATION

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa		Uganda	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	-0.049	-2.12(0.03)	0.701	5.04(0.00)	-0.032	-0.32(0.74)	0.049	0.98(0.32)	0.299	4.15(0.00)	0.368	5.11(0.00)	0.226	0.88(0.37)
C(2)	Δln (PCUR)	0.108	4.17(0.00)	0.005	5.01(0.00)	0.005	5.01(0.00)	-0.006	-1.21(0.22)	-0.019	-2.97(0.00)	-0.007	-1.19(0.23)	0.005	5.01(0.00)
C(3)	ln (PDEP)	-0.177	-3.67(0.00)	0.048	6.03(0.00)	0.001	0.33(0.73)	0.011	3.07(0.00)	0.047	4.48(0.00)	0.030	2.55(0.01)	0.039	3.57(0.00)
C(4)	Δln (PGD)	-0.269	-5.26(0.00)	-0.022	-5.74(0.00)	-0.022	-5.74(0.00)	-0.022	-5.74(0.00)	0.014	3.95(0.00)	-0.038	-2.92(0.00)	-0.022	-5.74(0.00)
C(5)	ln (PCS)	-0.185	-2.61(0.01)	0.236	8.80(0.00)	-0.035	-0.81(0.41)	0.028	2.60(0.01)	-0.011	-0.76(0.44)	-0.011	-0.76(0.44)	0.019	1.93(0.05)
C(6)	Δln (PLA)	0.320	3.59(0.00)	-0.034	-4.56(0.00)	0.008	2.08(0.04)	0.009	1.51(0.13)	0.008	2.08(0.04)	0.016	3.69(0.00)	0.005	0.30(0.76)
C(7)	Δln (*W/P**)	0.120	2.13(0.03)	0.158	2.25(0.00)	0.046	0.36(0.71)	0.141	2.78(0.00)	-0.090	-0.97(0.33)	-0.276	-2.34(0.06)	-0.053	-0.40(0.68)
C(8)	ln EXP	0.362	2.36(0.02)	0.547	5.75(0.00)	0.319	1.63(0.10)	0.110	1.41(0.16)	1.685	7.50(0.00)	-0.240	-0.51(0.60)	0.000	0.00(0.99)
C(9)	ln REXC	0.000	3.48(0.00)	-0.004	-4.25(0.00)	0.004	1.53(0.12)	-0.000	-0.23(0.81)	-0.000	-1.96(0.05)	-0.000	-0.02(0.98)	-7.50E	-0.67(0.49)

Notes: See Table 3.

TABLE 6
SEMINGLY UNRELATED REGRESSION
RESTRICTED MODEL – GOVERNMENT DEPOSIT EQUATION

Notes: See Table 3.

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	0.112	2.84(0.00)	2.059	5.18(0.00)	-9.302	-2.86(0.00)	0.473	0.73(0.46)	-2.188	-1.92(0.06)	0.636	1.40(0.16)
C(2)	Δln (PCUR)	0.066	1.53(0.13)	0.005	1.62(0.11)	-0.077	-0.49(0.62)	-0.268	-3.14(0.00)	0.134	1.03(0.30)	0.022	0.51(0.61)
C(3)	ln (PDEP)	0.267	3.12(0.00)	0.128	5.66(0.11)	0.638	2.64(0.01)	-0.007	-0.14(0.88)	-0.173	-1.61(0.11)	0.056	0.99(0.32)
C(4)	Δln (PGD)	0.029	0.36(0.77)	-0.051	-4.56(0.11)	-0.388	-1.62(0.11)	0.324	3.81(0.00)	0.324	3.81(0.00)	-0.103	-1.39(0.16)
C(5)	ln (PCS)	0.150	1.98(0.05)	0.150	1.98(0.05)	0.502	0.54(0.59)	0.097	0.67(0.50)	-1.250	-5.18(0.00)	-0.015	-0.05(0.95)
C(6)	Δln (PLA)	-0.408	-2.83(0.00)	-0.119	-5.73(0.00)	-0.006	-0.07(0.93)	0.266	2.69(0.00)	0.099	1.02(0.31)	-0.006	-0.27(0.78)
C(7)	Δln (*W/P**)	0.282	3.09(0.00)	1.443	7.29(0.00)	-3.816	-1.45(0.15)	1.943	2.87(0.00)	0.314	0.21(0.83)	0.476	0.90(0.36)
C(8)	ln EXP	-0.416	-1.48(0.14)	-0.931	-3.42(0.00)	3.205	0.56(0.57)	-0.296	-0.27(0.78)	-4.674	-1.04(0.30)	-6.831	-1.74(0.08)
C(9)	ln REXC	7.73E	0.19(0.84)	-0.014	-4.83(0.00)	0.143	1.85(0.07)	-0.009	-1.07(0.29)	0.029	4.08(0.00)	0.026	0.97(0.33)

TABLE 7
SEMINGLY UNRELATED REGRESSION
RESTRICTED MODEL – COMPANY SECURITY EQUATION

Notes: See Table 3.

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa		Uganda	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	-0.193	-7.00(0.00)	0.959	0.62(0.53)	0.717	1.71(0.09)	-0.816	-0.74(0.46)	-5.807	-14.00(0.00)	1.009	2.58(0.00)	-1.597	-3.03(0.00)
C(2)	Δln (PCUR)	-0.154	-5.36(0.00)	-0.001	-0.11(0.91)	0.041	3.09(0.00)	-0.128	-2.66(0.01)	0.395	10.61(0.00)	0.061	1.07(0.29)	0.041	3.09(0.00)
C(3)	ln (PDEP)	-0.374	-6.94(0.00)	0.166	1.89(0.06)	-0.069	-2.22(0.03)	-0.069	-2.22(0.03)	-0.108	-3.04(0.00)	-1.042	-6.89(0.00)	-0.017	-0.74(0.46)
C(4)	Δln (PGD)	-0.352	-5.83(0.00)	-0.041	-0.94(0.35)	0.051	1.98(0.05)	0.077	1.12(0.26)	0.134	5.93(0.00)	0.895	6.83(0.00)	0.051	1.98(0.05)
C(5)	ln (PCS)	-0.739	-9.03(0.00)	0.130	0.44(0.65)	-0.136	-1.15(0.25)	-0.410	-2.85(0.00)	-0.616	-6.81(0.00)	0.332	1.32(0.19)	-0.056	-2.19(0.03)
C(6)	Δln (PLA)	0.871	8.44(0.00)	-0.151	-1.87(0.06)	0.018	1.60(0.11)	0.171	2.45(0.01)	0.130	4.03(0.00)	0.171	2.45(0.01)	0.114	3.11(0.00)
C(7)	Δln (*W/P**)	0.682	11.18(0.00)	-0.405	-0.54(0.58)	1.384	4.02(0.00)	-0.783	-1.14(0.26)	0.457	1.19(0.23)	4.868	11.23(0.00)	-1.024	-4.23(0.00)
C(8)	ln EXP	-0.033	-0.17(0.00)	1.518	1.47(0.14)	-0.672	-0.94(0.35)	1.112	1.13(0.26)	6.764	4.15(0.00)	-9.580	-2.32(0.02)	3.608	4.29(0.00)
C(9)	ln REXC	0.000	2.74(0.00)	-0.003	-0.27(0.78)	-0.006	-0.65(0.51)	0.017	1.95(0.05)	0.000	0.39(0.69)	0.044	2.10(0.04)	-0.000	-1.78(0.08)

TABLE 8
SEMINGLY UNRELATED REGRESSION
RESTRICTED MODEL – BANK LOANS EQUATION

		Cote d'voir		Kenya		Malawi		Nigeria		Rwanda		South Africa		Uganda	
	Variables	Coff.	t-ratio (prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)	Coff.	t-ratio(prob)
C(1)	Constant	-0.026	-4.19(0.00)	1.732	2.76(0.00)	0.132	0.39(0.69)	-0.058	-0.50(0.61)	0.139	1.11(0.27)	-0.669	-0.68(0.49)	-0.600	-1.00(0.31)
C(2)	Δln (PCUR)	0.000	0.04(0.96)	-0.001	-0.206(0.83)	0.013	0.31(0.75)	-0.003	-0.31(0.75)	-0.130	-12.46(0.00)	-0.111	-1.16(0.24)	0.034	1.94(0.05)
C(3)	ln (PDEP)	-0.064	-4.94(0.00)	0.061	1.59(0.11)	-0.064	-4.94(0.00)	0.021	2.47(0.01)	-0.075	-7.01(0.00)	0.276	2.26(0.02)	0.193	3.58(0.00)
C(4)	Δln (PGD)	-0.122	-9.05(0.00)	-0.031	-1.74(0.08)	-0.015	-0.26(0.79)	-0.019	-3.15(0.00)	-0.019	-3.15(0.00)	-0.105	-0.66(0.51)	-0.133	-3.53(0.00)
C(5)	ln (PCS)	-0.144	-7.63(0.00)	0.548	4.08(0.00)	0.049	0.27(0.78)	-0.016	-0.63(0.52)	0.114	4.13(0.00)	-2.277	-3.71(0.00)	-0.187	-1.57(0.12)
C(6)	Δln (PLA)	0.145	6.13(0.00)	-0.060	-1.64(0.10)	-0.003	-0.19(0.84)	-0.012	-0.80(0.42)	0.088	9.43(0.00)	-0.096	-1.78(0.08)	0.025	0.82(0.41)
C(7)	Δln (*W/P**)	-0.173	-12.00(0.00)	-0.866	-2.29(0.02)	-1.576	-2.81(0.00)	-0.150	-1.24(0.21)	-0.495	-4.73(0.00)	-10.49	-9.33(0.00)	-0.298	-0.95(0.34)
C(8)	ln EXP	0.002	0.05(0.95)	2.365	4.69(0.00)	0.007	0.00(0.99)	0.314	1.73(0.08)	2.663	5.46(0.00)	18.81	2.23(0.03)	6.010	6.19(0.00)
C(9)	ln REXC	0.000	10.62(0.00)	-0.015	-3.24(0.00)	-0.015	-3.24(0.00)	0.003	1.98(0.05)	-0.001	-2.00(0.05)	0.148	2.58(0.01)	-0.001	-2.00(0.05)

Notes: See Table 3.