MONEY DEMAND IN DEVELOPING COUNTRIES:

A DYNAMIC PANEL APPROACH

BY

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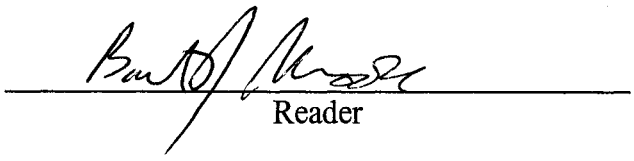

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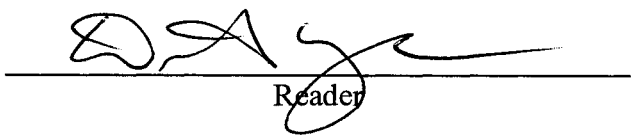

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To my daughter,

Iman Adeola Akinkunmi

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I. Introduction

Estimating money demand is a popular and venerated pastime, but there are surprisingly few attempts to estimate money demand in panel regression framework, especially for developing countries. Sriram (1999) surveys over 25 papers describing money demand equation estimates, 19 of which are for developing countries. While Fair (1987), Boughton (1992) and more recently Nelson and Sul (2002) provide comparable cross country estimates of money demand for high income OECD countries, to my knowledge, no uniform or panel estimates of money demand in developing countries exists. This dissertation examines the performance of such panel estimates for 36 developing countries.

The demand for money balances is a fundamental building block of mainstream macroeconomic models and a critical tool for implementing monetary policy. For this reason, the stability and predictability of the money demand function has long been a key research issue. What has changed over the years are the econometric techniques used to estimate and test the stability of money demand equations. As Agénor (2002) notes in his survey, the modern approach is to use various Johansen type cointegration tests for stationarity of the residuals to determine the stability of money demand in a particular country. A typical money demand specification takes the following form:

$$\Delta m^d = f(\Delta y, i(\pi,r), \Delta z) \qquad (1)$$

where m^d is real money balances (M/P), y is real GDP, i is nominal interest rate, which depends on the inflation rate π and the real interest rate r and z are other variables potentially affecting money demand in a small open economy. Among the variables z_t

tested here are the change and the log level of the terms of trade and an international interest such the LIBOR or the U.S. Treasury Bill rate converted into domestic currency using the actual change the nominal exchange rate. The elements of (1) are said to be cointegrated if each individual element is nonstationary and integrated of the same order, and the residuals of the cointegrating regression base on (1) are stationary. As discussed by Agenor (2001) error correction models incorporate these residuals directly into a short-term money demand equation estimated in first differences:

$$\Delta m_t^d = \alpha_0 + \sum_{h=0}^{n} \alpha_{1h} \Delta i_{t-h} + \sum_{h=1}^{n} \beta_t \Delta m_{t-h} - \gamma ec_{t-1} \qquad (2)$$

where changes in real money demand Δm_t^d reflect changes in the opportunity cost of holding money Δi_{t-h} and the deviations in the error correction term ec_{t-1}, which is generally the residuals from a cointegrating relationship generated by a long run money demand relationship such as that described in equation (1) above. If the estimated coefficient on the error correction term γ is positive, significant and less than the adjustment process is stable so that Δm_t^d will converge toward its long-term value.

Objectives

This objective of this research is to apply dynamic panel techniques to the estimation of money demand in developing countries. Panel techniques are just beginning to incorporate modern time series methods, including error-correction and cointegration tests. Though many single country money demand estimates are available, as reviewed by Sriram (1999) for example, few if any studies have applied panel techniques for estimating money demand in developing countries, as Nelson and Sul

(2002) do for 18 OECD economies. Simultaneous equation estimates were used by Fair (1987) and Driscoll and Lehari (1983).

A similar panel estimation approach was applied to 36 developing countries. Following a number of papers by Baltagi and Griffen, estimates based on panel methods were compared to individual equations using out of sample forecasts. Baltagi and Griffen found that for cigarettes, gasoline and a number of other commodities the efficiency of panel estimation seems to outweigh the strong homogeneity assumptions imposed by panel methods. Out of sample root mean squared error tests were used to evaluate the performance of panel vs. individual country estimates of money demand.

II. Review of Literature

This review of the literature focuses mainly on studies that evaluated the demand for money using the Error-Correction approach, across a range of industrial and developing countries. I begin by briefly presenting issues relevant to modeling and estimating the demand for money; and synthesizing information concerning variables, data period and frequency, unit root and cointegration techniques, stability tests and findings. In addition, I will discuss the long-run and short-run elasticity of money demand with respect to a number of variables such as income, the price level, interest rate, openness, capital market flows, etc.

Error Correction Money Demand Studies

Estimation of money demand equations is an exhaustible industry, one that is essential for understanding the workings of monetary policy. A large number of articles are published every year on topics related to money demand such as theoretical specifications, the definition and measurements of money and related variables, policy implications, and so forth. According to Boughton (1992, p.7), the central problem from a policy perspective is to identify the factors that have been driving changes in the demand for money and to determine whether those are ongoing influences or once off-shifts in behavior. Boughton (1992, p.7) identifies five general classes of factors that may have been important in influencing money demand in many countries. Those factors are: (1) shifts in inflationary expectations, (2) the effects of non-unitary real income elasticity on velocity, (3) shifts in the term structure of interest rates, (4) financial innovation and shifts in policy regimes, (5) open economy considerations such as expected exchange rate changes. From this observation set forth by Boughton and the

review of the literature, we realize that there are no existing studies, thus far, on money demand that integrates in the money demand model explanatory variables for commercial and financial openness and that seek to understand the effects of such variables on money demand and the related policy implications. This issue is important especially in this era of globalization of the world goods and capital markets, and if the level of openness has effects on money demand, whether money (M1) or money (M2), this might be an important factor to consider in the formulation and conduct of monetary policy in developing countries.

Melnick (1990) studies the demand for money in Argentina from 1978 to 1987. The money demand is estimated by two alternative approaches, a traditional approach, based on Goldfield (1973), and a modern time series approach based on Hendry (1980) and includes some new developments in the theory of cointegration presented by Engle and Granger (1987). The results indicate that when the cointegration approach to time series analysis is combined with a correctly specified behavioral equation, a reasonable stable empirical relationship can be obtained. This contradicts the common view of unstable behavioral relationships; unlike with the traditional approach, no major structural breaks were detected in the money demand estimated by the cointegration approach.

Sriram (1999) analyzes the demand for broad money in Malaysia from August 1973 to December 1995 under both a closed and an open economy framework. The main purpose of the study was to evaluate the long and short-run determinants and stability of money demand in Malaysia. This country has been liberalizing its domestic financial markets and fostering financial innovation over the past three decades. Major efforts

were directed at liberalizing interest rates, boosting competition in the financial system, undertaking institutional reform, promoting growth and deepening in the financial and capital markets. Based on cointegration and weak-exogeneity test results, two short-run dynamic error-correction models were specified and estimated, one for an open economy and one for a closed economy. The two models were similar except that in the open economy model two additional variables are included (foreign interest rate and the expected depreciation of the domestic currency) to take into account the currency substitution literature. The most important finding of this study is that both in the long and short-run, the demand for real money M2 appears to be almost stable. The parameter constancy tests indicate that the financial system as a whole shows signs of structural break during 1994 as a result of measures taken to stem capital inflows.

Rother (1998) studies the impact of regional monetary integration and financial liberalization on the stability of the money demand function in African countries which are members of the West African Economic and Monetary Union. With financial liberalization, new financial instruments may develop thus widening the array of financial assets at the agent's disposal. In response, economic agents will be able to substitute money holdings for other financial assets and vice versa, in case of changes in the economic environment. An error-correction model that links the demand for narrow and broad money with the traditional explanatory variables was specified and estimated. The results of the study indicated that the relationship between real money (M1) and the explanatory variables remains stable over time and yields accurate forecast, while the relationship of broad money demand (M2) with the explanatory variables is found to be unstable.

Ericsson et al. (1996) used an error-correction specification to model the empirical relationship between broad money, prices, real output and interest rates in an attempt to test the stability of broad money demand in Greece for the period 1974-1996. Greece has undergone some changes in its financial system, including the removal of most external capital control and of restrictions on the portfolios of deposit-taking institutions. Capital market liberalization was introduced in the early 1990s and financial innovation started to take place in the country's financial sector during that period. In addition, the inter-bank market has deepened, interest rates have been more flexible, and indirect instruments of monetary controls are being developed. Such financial reforms are assumed to have some impacts on the stability of the money demand function in Greece. The results of the study showed that the money demand function in Greece remained remarkably stable during 1976-1994 in the face of large fluctuations in the inflation rate and a progressive financial liberalization.

This brief review of the literature presents some representative works on the consistency and stability of money demand elasticity using the error-correction approach. Many other useful studies were reviewed by Sriram (1999). These studies are summarized in Table A.1 from Sriram's revive and are appended to this proposal. Additionally, these and other country level estimates are summarized for comparative purposes in a series of tables found at the end of this dissertation.

To Pool or Not to Pool?

Baltagi et al. (2000) studied the question of whether to pool or not to pool estimates of cigarette demand equations for 46 states covering 1963-1992. Their studies standardized on the frequency utilized dynamic demand specification and a common data

set. They used forecast properties of alternative estimators; essentially a prediction-performance alternative criteria that helped them to choose among alternative estimators with disparate price elasticity implications. They concluded that pooled estimation is superior to individual estimation. They used out of sample forecasts to compare heterogeneous models for individual states with the homogenous panel models and produced lower MSEs. While panel estimation is important, they did not find dynamic panel estimators make much difference in the estimates they obtain. With regards to the dynamic demand studies for gasoline, Baltagi et al. (1996) found that for long time series, heterogeneous models for individual countries tend to produce inferior results. Furthermore, of all heterogeneous estimators, the shrinkage estimator appears the most promising, but even it is dominated by traditional homogenous pooled estimators. The superiority of homogenous over heterogeneous estimators is due to their relative variability of the data between the individual time series and panels.

III. Estimating Money Demand

Econometric techniques designed to accommodate nonstationary data are used to examine interest stability and income stability of money demand in a number of developed and developing countries. Tests for the existence of cointegration and the methods used to estimate the income elasticities are based on procedures presented by Soren Johansen (1988). Corresponding error-correction estimates offer insights about the dynamics of the process. What is novel about this study is the application of the error-correction approach *en masse*, simultaneously estimating money demand in a large number of countries. The advantage or this approach is that it potentially greatly increases the number of observations as well as the range of observed money demand variables. One disadvantage is that the choice of specification and the estimation methods must be standardized enough to apply uniformly across countries.

Our working hypothesis is that the gains in efficiency will offset the lack of variety and specification tests. However, we test this hypothesis using RMSE out of sample forecast tests as Baltagi et. al. (2000). The other advantage of this approach is that it generates a series of comparable elasticity estimates for a large number of countries.

Baba et al. (1992) argue that necessary conditions can be tested, including the absence of the long-run money demand cointegrating vector from the model. If the resulting conditional demand model is constant and the supply function shifted during the sample period then the "classical" identification problem will not exist since all linear combinations involving the shifting equations are automatically excluded.
Economic theory maintains that the demand for real money balances depends on variables such as wealth in real terms, real income, expected returns on other assets, and

the expected rate of inflation. Cagan (1956), however, finds that in times of hyperinflation, because the fluctuation in prices is so extreme, the rate of inflation becomes the most important determinant of money demand. This facet of monetary economics is of particular interest because of the consequences associated with holding money.

The error-correction model is a dynamic formulation in which the long-run equilibrium relationship between money and its determinants is embedded in an equation that captures the short-run variations and dynamics. The original Engle-Granger error-correction approach involves four steps:

1- Determine the orders of integration of each of the variables under consideration; that is, difference each series successively until stationarity is achieved.

2- Estimate cointegration regressions with ordinary least squares.

3- Test the residuals of the cointegration regressions for stationarity

4- Construct the error-correction model and test the coefficient of the error-correction term. This involves regressing the first difference of each variable in the cointegration equation onto lagged values of the first differences of all the variables including the error-term, plus the lagged value of the first difference of the dependent variable. Using the long-run money demand relationship specified in equation (1), we construct the following error-correction model,

$$\Delta m_t^d = \beta_0 + \beta_y \Delta y_t + \beta_\pi \pi_t + \beta_\psi \Delta \psi_{t-1} + \beta_{TT} \Delta TT_t + \varepsilon_t \qquad (3)$$

where Δy_t is the log change in GDP, π is the inflation rate and ψ is the residual from the relevant long run money demand equation, terms of trade is the terms of trade and ϵ is the error term.

$$m_t^d = \beta_0 + \beta_1 y_t + \beta_2 \pi_t + \beta_3 TT_t + \psi_t . \quad (4)$$

We estimate several variations on this general specification, particularly with and without the terms of trade. In this standard error correction set up, the stability of the money demand can be confirmed by testing the null hypothesis that the cointegrating residual is stationary ψ_t.

Since the residual from equation (4) can be interpreted as an excess supply of money where we assume $m^s = m^d$ and the estimated money in each period is,

$$\hat{m}_t^d = \beta_0 + \beta_1 y_t + \beta_2 \pi_t + \beta_3 TT_t \quad (5)$$

This implies that a further test of money demand stability using the short-run money equation (3) is that the error correction term be ψ_t negative and significant. This test suggests excess supply of money results in slower growth of the money supply in the next period.

This Engle-Granger-error procedure has the advantage of incorporating long term trends in money demand into a short term money equation free of spurious trends introduced non-stationary variables. In other words, we can be reasonable confident that all the variables in (3) are stationary, whereas in equation (4) most if not all the levels are not stationary. That said, the error-correction approach has some well known limitations. In particular, its results may depend on which variable is put on the left hand-side when estimating the cointegrating equation, it does not permit us to investigate the number of cointegration equations that may be present in the data, and it relies on a two step estimator so that any error introduced in the first step is carried into the second step. The Johansen approach overcomes some of these problems, but proved impractical to program and implement for a large number of counties.

Unit Root Tests

The concept of cointegration plays an important role in economic models involving time series and is widely used in money demand studies. Economic theory often suggests that certain pairs of economic variables should be linked by a long-run relationship. Although the variables may drift away from the equilibrium for a while, economic forces may be expected to act to restore equilibrium. This is exactly the case for series that are cointegrated. Such series do not deviate much from each other over time, because a linear combination is "stable" and fluctuates around a certain mean with a fixed variance. On the other hand, series that are not cointegrated deviate from each other over time without a bound. A non-stationary time series is said to be integrated of order one, I (1), if stationarity is achieved by differencing the original series. A (weakly) stationary, I (0), series, on the other hand, is defined to have constant mean, variance, and auto-covariance over time. As a result, testing for cointegration involves examining whether the variables in question have a unit root or if they are integrated of the same order. Granger (1986) and Engle and Granger (1987) have introduced and popularized the concept of cointegration, while Dickey and Fuller (1987), Phillips and Perron (1988), Johansen (1988), Johansen and Juselius (1990), and others have developed statistical procedures for its estimation and testing.

After applying all these tests to make sure the variables in the money demand functions are nonstationary, we will conduct other stability tests to confirm the consistency of the elasticity coefficients. These tests may be limited in power by the short time series available for some countries—but then that is one of the reasons we attempt to test and use panel methods.

Dynamic Panel Data Models.

We provide here a brief description of the econometric procedure used to analyze panel data. We estimated the panel versions of equation (3) using OLS, GLS as well standard fixed and random effects models. A classic problem in the estimation of money is simultaneous equation bias, and the identification problem. This is especially problematic when using the error-correction approach because the cointegrating residual includes a lagged dependent variable. Including a lagged dependent variable in panel regression creates a bias in both OLS and GLS estimates, even if there is no serial correlation in the error terms. One solution to this problem proposed by Arellano and Bond (1991) is to exploit the orthogonality that exists between the lagged values of the dependent variable and the error term. Both the Arellano-Bond procedure and the subsequent Arellano-Bover method use lagged differences and lagged levels beyond t-2 as instruments for the lagged dependent variable. This instruments can be used in addition to standard exogenous determination of money demand in GMM estimators similar but more efficient than earlier IV panel estimators proposed by Anderson and Hsiao (1981). Moreover, the orthogonality or "exogeneity" of the instrument set can be tested using the GMM J-statistic to compute the familiar Sargan (1958) test.

Many recent studies have analyzed panel or longitudinal data sets (see Greene, 1997, pp. 612-647 or Baltagi et al, 1997). The basic framework for panel data is a regression model of the form:

$$Y_{it} = \alpha_i + \beta' X_{it} + \epsilon_{it}$$

In this model, there are K regressors in X_{it}, not including the constant term. The individual effect is α_{it}, which is taken to be constant over time t and specific to the

individual cross-sectional unit i. As it stands, this is a classical regression model. If we take the αi's to be the same across all units, ordinary least squares(OLS) provides consistent and efficient estimates of α and β.

IV. Individual Country Money Demand Estimates

In the effort to study and estimate money demand in developing countries, three groups of country were select: one group of 16 African countries and 20 other developing economies. Time-series and cross section data were obtained for the World Bank Development Indicators 2003 covering the sample period 1961 to 2001. The initial Africa grouping consisted of thirty countries of which sixteen had sufficient observations for detailed analysis and inferential studies. The Non-Africa grouping consists of twenty countries from Latin America, Asia and the Caribbean which results in a combined union of thirty six countries in this study.

The empirical investigation started with an analysis of the time-series properties of the variables of interest for the money demand model as stated in Equation (4) above to resolve the unit root test for all money demand variable and generate the cointegration residual. Then short term money demand equations based on equation (3) was estimated. Both M2 and M3 were used in this analysis because some of the countries have better data for M2 while others have better data for M3.

The first step carried out was the conversion of the money demand series into and index of real M2. M2 is money plus quasi money in currency units. The M2 series was converted to real money demand using the GDP deflator and then normalized to 1990 to create an index of real money. Similarly M3 which is reported by the WDI as liquid liabilities as a percent of GDP was multiplied by real GDP in local currency units and then normalized to 1990. Natural logarithms were taken for the remaining series which include real GDP in local currency unites and the GDP deflator. Because the GDP deflator base year varies by country it was also normalized to a 1990 base year. Finally

we used the WDI's CPI (1995=100) and terms of trade data obtained from various sources including the World Bank Africa database and the 2003 WDI.

The first step in computing the individual country estimates as was to determine whether each series is stationary or nonstationary. The Philips-Perron (PP) test was used to test the null hypothesis that each series has a unit root, versus the alternative hypothesis that each series is stationary. Failure to reject the null hypothesis occurs if the PP test statistic is larger than the critical value. Actual test results for all countries in the sample can be found in **Table A-1** in the Appendix.

A majority of the thirty six countries show failure to reject the null hypothesis indicating that M2, M3, GDP, CPI, terms of trade, the GDP deflator have unit roots and are thus nonstationary. The null hypothesis of a unit root was rejected for the following series; M2 in Cote D'Ivoire, Kenya and Zambia; M3 in Cote D'Ivoire and Kenya; GDP in Cote D'Ivoire, South Africa, Zambia and Israel; CPI in Tunisia, Bangladesh, Indonesia and Republic of Korea; terms of trade in Cameroon, Argentina, Dominican Republic, El Salvador and Malaysia; GDP deflator in Mauritius, Indonesia and Republic of Korea; Exchange Rate in Bangladesh, Ecuador and Republic of Korea.

The third step in the analysis of time-series properties was to test the cointegration behavior of the money demand variables. A stable Money Demand Equation expressed as a cointegration vector should generate stationary residuals.

Inflation predictor varies from country to country. Some countries produced better results using GDPflator as the inflation predictor variable for Money Demand and in the others CPI proved to be a better inflation predictor.

$$\sum_{i=0}^{n} m_t^d = \beta_0 + \sum_{i=0}^{n} \beta_1 Y_i + \sum_{i=0}^{n} \beta_2 \pi_i + \beta_\psi \qquad (6)$$

$$\sum_{i=0}^{n} m_t^d = \beta_0 + \sum_{i=0}^{n} \beta_1 Y_i + \sum_{i=0}^{n} \beta_2 \pi_i + \sum_{i=0}^{n} \beta_3 T_i + \beta_\psi \qquad (7)$$

Tests for cointegration among the endogenous variables M2, M3, GDP and inflation evaluated for the African Countries and Non Africa Countries. The cointegrating vectors used for these long-run money demand results in Tables 1-8.

Three of the sixteen African countries' series failed to produce stationary residuals in this initial model for long run demand for predicting M2 (see **Tables 1 & 2**). These three countries, Burundi, Egypt and Gambia have p-values of less than 0.05 for both the M2 model without terms of trade and the M2 model with TT. The same three African countries, with a fourth addition (Tunisia) also failed to produce stationary residuals for predicting M3 without or with terms of trade (see **Tables 3 & 4**).

All of the twenty Non-African countries' produced stationary residuals in their model for M2 and M3 (see **Tables 5 – 8**)

In summary, three of the thirty six countries; Burundi, Egypt and Gambia, all from the African grouping, produced unstable Money Demand Equations for this initial individual model as evidenced by their cointegration vectors with nonstationary residuals.

The fourth step in the analysis of time-series properties was the creation of money demand models for the African and Non-African countries. As with the long-run money demand scenario, these models also used the inclusion and exclusion of TT. The models result can be found on **Table 9** through **Table 16**.

For the Africa Demand for M2 models three countries' data indicate that their coefficients of income elasticities, for the model without TT, are zero. A zero coefficient indicates that for the M2 model without TT, data for the three countries; Ghana, Kenya and Zambia, indicate income elasticities have no effect on Money Demand as evidenced by T statistics of less than 1.98. For the M2 models with terms of trade included only Ghana and Zambia's data still indicate that the income elasticities have no effect on money demand.

Seven of the sixteen African countries have significant coefficients for inflation elasticities for predicting demand for real M2 without or with terms of trade elasticities. All seven have negative inflation coefficients indicating inflation has a negative effect on money demand. Most of the African countries' models indicate terms of trade elasticities have no effect on money demand. Coefficients for cointegration residuals are mostly significant and negative for this same group of countries' models. The M3 findings for the African countries mirror that of the M2 model findings.

Eight of the twenty Non-African countries have significant coefficients for income elasticities. All coefficients for income elasticities are positive indicating the same positive effect on demand for M2 and M3 as seen with the African countries. Inflation, for those countries with significant coefficients, is observed to be negative for predicting demand for M2 and M3 for instances where terms of trade is excluded as well as those where terms of trade is included. For those countries that have statistically significant coefficients for cointegration residuals, these coefficients are negative.

Elasticity coefficients for panel africa, panel Non-Africa and All Country Panel data mirror results seen for the individual countries. Coefficients for terms of trade

elasticities for panel data are not statistically significant as was seen with the individual countries' results. Ignoring models that include TT, statistically significant coefficients or coefficient ranges for M2 money demand models are as follows:

- Income Elasticities for Africa (0.7 – 3.1), for Non-Africa (0.6 – 1.2), for Panel Africa 1.0, for Panel Non-Africa 0.9 and for Panel All Countries 1.0.
- Inflation Elasticities for Africa in absolute value (-0.22, -0.44), for Non-Africa in absolute value (-0.08, -0.8), for Panel Africa -0.10, for Panel Non-Africa -2.10 and for Panel All Countries -0.09
- Cointegration Residuals for Africa in absolute value (-0.11, -0.99), for Non-Africa in absolute value (-0.09, -0.39), for Panel Africa -0.36, for Panel Non-Africa -0.25 and for Panel All Countries -0.31

Statistically significant coefficients or coefficient ranges for M3 money demand models are as follows:

- Income Elasticities for Africa (0.2 – 3.1), for Non-Africa (0.4 – 1.3), for Panel Africa 1.0, for Panel Non-Africa 0.9 and for Panel All Countries 1.0
- Inflation Elasticities for Africa in absolute value (-0.26, -0.74), for Non-Africa in absolute value (-0.09, -0.8), for Panel Africa -0.22, for Panel Non-Africa -1.2 and for Panel All Countries -0.11
- Cointegration Residuals for Africa in absolute value (-0.1, -0.99), for Non-Africa in absolute value (-0.11, -0.68), for Panel Africa -0.36, for Panel Non-Africa -0.28 and for Panel All Countries -0.33

V. Panel Estimates of Money Demand

In the previous chapter estimation was done using OLS. There are two key problems with OLS: Simultaneous equation and Identification problem. This section will illustrate how estimation can be done using dynamic panel data model using GMM and Pooled least square to resolve those problems. The former follows Arellano and Bond methodology. GMM has the capability to test for orthogonality and it also has lag dependent variable.

Arellano and Bond (1991) argue that additional instruments can be obtained in a dynamic panel model if one utilizes the orthogonality conditions that exist between lagged values of y_{it} and the disturbance v_{it}. If we look at the autoregressive model with no repressor:

$$Y_{it} = \delta Y_{i,t-1} + U_{it} \qquad I = 1,\ldots N;\ t = 1,\ldots.T \tag{8}$$

Now if we difference equation (7) to eliminate the individual effects, we will have

$$Y_{it} - Y_{i,t-1} = \delta(Y_{i,t-1} - Y_{i,t-2}) + (V_{it} - V_{i,t-1}) \tag{9}$$

To deal with the problem at hand, the co-integration residual (R) was included in the model.

This procedure solves the first econometric problem, as described above, but introduces a correlation between the new error term $\Delta\varepsilon_t$ and the lagged dependent variables

Arellano and Bond (1991) propose using the lagged values of the explanatory variables in levels as instruments to solve this problem and endogeneity problem. They

assume that there is no serial correlation in the error term ϵ and the explanatory variables. These explanatory variables are considered weakly exogenous. They also presented a two-step GMM estimator. In the first step the error terms are assumed to be independent and homoskedastic across countries and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thus relaxing the assumptions of independence and homoskedasticity. We will refer to this estimator as the difference estimator. As with the difference estimator, the models are estimated in a two-step GMM procedure generating consistent and efficient coefficient estimates.

The consistency of the GMM estimator depends on the validity of the assumptions that ϵ does not exhibit serial correlation and on the validity of the instruments. We use two tests proposed by Arellano and Bond (1991) to test for these assumptions. This test was performed using Eviews 5.0 which works with stacked data that have a panel structure. In order to resolve the cross-section fixed effects, difference was selected to indicate that the estimation procedure should use first differenced data (as in Arellano and Bond, 1991). Table 29 shows the results for the standard Arellano-Bond 2-step estimation. All models yield similar elasticities with regard to the statistical significance of parameter estimates and the required signs for stable money demand. Moreover the Sargan tests suggest the instrument set is consistent with the required orthogonality assumptions. These results suggest that OLS estimate reported earlier for countries and pooled regressions do not suffer from serious simultaneous equation bias.

Additional evaluation of the four basic money demand models was done and model results for M2, M2 with Terms of Trade, M3 and M3 with Terms of Trade were

evaluated based on stationarity criteria of the cointegration residuals, the sign of the inflation elasticity coefficient, and whether the model was stable adjusted. Based on these criteria, M2 with terms of trade appears to be the overall model of money demand.

The next step of analysis was to evaluate M2 demand with terms of trade using different estimation methods. **Table 30** provides results of estimation using two types of fixed effects estimators, a random effects estimator, GLS, GMM and OLS. Of the six models, the model produced by the GLS estimator using cross section weights produced the smallest error correction term, the largest in absolute value inflation coefficient and the largest adjusted R^2 value. All other parameter estimates were consistent with findings from other models.

Pooled estimates with least squares, cross section fixed effects, period fixed effects, random effects and GLS (GLS weighting) all yield similar elasticities. Only the GLS estimates of the inflation/interest rate elasticities differ significantly from the OLS estimates. These effects were used to estimate only for M2 money with terms of trade. See **Table 30.** The result (**Table 29** and **Table 30**) from both methods reveal that the estimate is consistent across with regard to different methods employed. In the panel GMM the Sargan test for over-identifying restrictions under the null-hypothesis of the orthogonality of the chosen instruments is tested the distribution χ^2 with (J-K) degrees of freedom, where J is the number of instruments and K is the number of regressors. The test confirms that no assumptions of serial correlation in the error terms. The differenced error term is second-order serially correlated. Under the null-hypothesis of no second-order correlation, this test is distributed standard-normal therefore it failed to reject the null hypothesis of both tests which gives support to our model.

VI. To Pool or not to Pool: Performance Tests

One approach to addressing the 'pool' or 'not to pool' question for the large data set for 36 countries over a 40 year time period, is to estimate the models for truncated data sets and then apply each model to an out-of-sample forecast period. Results from this approach involve assessing the root mean square error (RMSE) using a one-year ahead view, a three year ahead and a five-year ahead view. The one-year view represents a forecast for 1998, the three year ahead view a forecast from 1995 through 1998 and the five-year view a forecast from 1993 through 1998. Comparisons started with three country groupings; Africa countries, Non-Africa countries and the combined grouping of all the Africa and Non-Africa countries. Within each of the three groupings, comparisons were made between the individual country RMSE's and pooled RMSE's for each of the out of sample forecast periods. **Tables 17** through **28** display the findings for these RMSE comparisons that were calculated for the period predictions.

Table 17: Africa M2 Demand Out of Sample Forecast Test

Table 18: Africa M2 Demand with Terms of Trade Out of Sample Forecast Test

Table 19: Africa M3 Demand Out of Sample Forecast Test

Table 20: Africa M3 Demand with Terms of Trade Out of Sample Forecast Test

Table 21: Non-Africa M2 Demand Out of Sample Forecast Tests

Table 22: Non-Africa M2 Demand with Terms of Trade Out of Sample Forecast Tests

Table 23: Non-Africa M3 Demand Out of Sample Forecast Tests

Table 24: Non-Africa M3 Demand with Terms of Trade Out of Sample Forecast Tests

Table 25: All Countries M2 Demand Out of Sample Forecast Tests

Table 26: All Countries M2 Demand with Terms of Trade Out of Sample Forecast Tests

Table 27: All Countries Demand for M3 Out of Sample Forecast Tests

Table 28: All Countries M3 Demand with Terms of Trade Out of Sample Forecast Tests

For each of the 12 tables mentioned above, the number and proportion and percentage of times the pooled RMSE's are less than individual RMSE's is noted in rows so labeled at the bottom of each table. Group means for individual country and pooled RMSE's are also provided along with the t-statistic for the difference in means.

Results show that overall pooled countries performed the same as, or marginally different from individual countries in the one year ahead forecast as evidenced by similar RMSEs for pooled countries. For the Africa countries pooled one year ahead RMSE's are lower than individual RMSE's 56% to 69% of the time. For the Non-Africa countries, one-year ahead pooled RMSE's are lower than individual RMSE's 60% to 70% of the time while pooled RMSE's for All Countries are lower than individual countries 58% to 69% of the time.

Results for the three-year ahead forecast indicate that pooled RMSE's are the same as, or in a few instances marginally different from individual RMSE's. Five year ahead forecasts however, show markedly lower RMSE's for pooled countries over individual countries. For the Africa countries pooled RMSE's are lower than individual RMSE's 63% to 88% of the time. Non-Africa countries pooled RMSE's are lower than individual RMSE's 75% to 85% of the time, while for All Countries, pooled RMSE's are lower than individual RMSE's 75% to 86% of the time.

These overall results indicate that, since the RMSE represents group error or variation, in all instances smaller errors occur with the use of the pooled model in the long run, versus similar errors with individual and pooled in the short term.

To statistically validate the preliminary findings mentioned above, the t-test for the difference in the two average RMSEs were conducted and reported under the difference in the mean under the average difference a the bottom of each table. This test is one way to determine whether mean RMSE's for individual and mean RMSE's means for pooled out of sample forecasts are really different.

For M2 for the Africa countries, the t-statistic is 0.04 indicating a rejection of the null hypothesis at the 95% level of confidence in favor of the alternative, concluding that the pooled mean RMSE's for 1st year out of sample forecast is smaller than the individual. The three year ahead forecast results indicate a p-value of 0.21 and a failure to reject the null hypothesis that the out of sample mean for individual and pooled RMSE's are the same. The five-year ahead forecast results show a p-value of 0.04 indicating the pooled mean RMSE's are lower. Full results can be found on **Table 17.**

For M2 with terms of trade for the Africa countries, the one-year and three-year ahead forecasts show no statistically significant differences between the pooled and individual mean RMSE's as indicated by p-values of 0.24 and 0.25 respectively. For the five-year ahead forecast, however, the p-value of 0.004 indicates statistically significantly lower mean RMSE for the pooled over the individual at a 99% level of confidence. These results can be found on **Table 18.**

For M3 for the Africa countries, as was seen with M2, the p-value for the one-year ahead forecasts show statistically significant lower pooled mean RMSE over the individual mean RMSE. The p-value of 0.04 indicates this rejection is at a significant level of 95%. There is no statistically significant difference at the three-year ahead

forecast level, but the five-year forecast shows statistically significant lower mean RMSE for the pooled over individual. Results can be found on **Table 19.**

For M3 with terms of trade for the Africa countries, as also seen with M2 with TT, the one-year and three-year ahead forecasts show no statistically significant differences between the pooled and individual mean RMSE's as indicated by p-values of 0.19 and 0.47 respectively. For the five-year ahead forecast, however, the p-value of 0.0002 indicates statistically significantly lower mean RMSE for the pooled over the individual at a 99% level of confidence. These results can be found on **Table 20.**

M2 for the Non-Africa countries show no statistically significant difference for the one-year ahead individual and pooled mean RMSE's, as indicated a p-value of 0.28. The three-year ahead forecast shows a statistically significant lower mean RMSE for the pooled versus the individual percentage. The p-value for this test is 0.06, and is significant at the 90% level of confidence. The five-year ahead forecast results indicate a p-value of 0.003 indicating a statistically significant lower mean RMSE for the pooled over the individual with a 99% level of confidence. Results can be found on **Table 21.**

For M2 with terms of trade for the Non-Africa countries, the one-year and three-year ahead forecasts show no statistically significant differences between the pooled and individual mean RMSE's as indicated by p-values of 0.29 and 0.11 respectively. For the five-year ahead forecast, however, the p-value of 0.003 indicates statistically significantly lower mean RMSE for the pooled over the individual at a 99% level of confidence. These results can be found on **Table 22.**

For M3 for the Non-Africa countries, the one-year ahead forecasts show no statistically significant differences between the pooled and individual mean RMSE's as

indicated by p-values of 0.16 For the three-and five-year ahead forecast, however, the p-values of 0.05 and 0.0008 indicate statistically significantly lower mean RMSE for the pooled over the individual with the five-year difference at a 99% level of confidence. These results can be found on **Table 23.**

For M3 with terms of trade for the Non-Africa countries, the one-year ahead forecasts show no statistically significant differences between the pooled and individual mean RMSE's as indicated by p-value of 0.2. For the three-and five-year ahead forecast, however, the p-values of 0.05 and 0.02 indicate statistically significantly lower mean RMSE for the pooled over the individual. These results can be found on **Table 24.**

M2 for All Countries combined show statistically significant difference for the one-year ahead at a 90% level of confidence as evidenced by a p-value of 0.06. The three-year ahead forecasts is not statistically significant as evidenced by a p-value 0.1. The five-year ahead forecast results indicate a p-value of 0.005 indicating a statistically significant lower mean RMSE for All Countries pooled over the individual country mean RMSE with a 99% level of confidence. Results can be found on **Table 25**

M2 with terms of trade for All Countries combined show no statistically significant difference for the one-year ahead and three-year ahead forecasts as evidenced by p-values of 0.2 and 0.3. The five-year ahead forecast results show a p-value of 0.0004 indicating a statistically significant lower mean RMSE for All Countries pooled over the individual country mean RMSE with a 99% level of confidence. Results can be found on **Table 26.**

M3 for the All Countries combined show statistically significant lower mean RMSE for the all pooled one-year ahead forecast, no statistically significant difference at

the three-year ahead mark and statistically significant lower all pooled at the five-year forecast mark. The five-year ahead forecast p-value of 0.00006 indicate a statistically significant lower mean RMSE for all countries pooled over the individual country mean RMSE with a 99% level of confidence. Results can be found on **Table 27.**

M3 with terms of trade for all countries combined show no statistically significant difference in the mean RMSE's for the one-and three-year ahead forecast. The five-year ahead forecast p-value of 0.005 indicate a statistically significant lower mean RMSE for all countries pooled over the individual country mean RMSE with a 99% level of confidence. Results can be found on **Table 28.**

The overall summary of t-Test results support previous findings that in the short run RMSE's for individual and pooled models are very similar in their predictive power. In the long run, however, results of five-year out of sample t-Tests show pooled models outperform individual models as evidenced by statistically significant lower RMSE's from pooled models.

Ordinary least squares estimators are known to be biased in a nonstationary autoregression, therefore, to validate RMSE model findings reported for pooled models, OLS and GLS model RMSE's were compared to determine if there is a significant difference between pooled RMSE means. **Tables 31** shows country by country comparison of OLS versus GLS for pooled data. **Table 31** shows results from a t-Test for differences of mean RMSE's under GLS and OLS. Results indicate there is a statistically significant difference between OLS and GLS for one-year ahead and five-year ahead forecasts.

VII. Conclusions

This dissertation provides new insight into how best to estimate money demand in developing countries. Conditions and assumptions for applying a pooled approach are laid out and ways of verifying and tests these assumptions are provided. The assumptions underlying the error correction approach at the country level, including testing for unit roots, cointegration of key money demand estimates over time are tested for each country. In addition, a number of different pooled and dynamic panel estimators are tested against individual country estimates. For the most part, despite a relatively simple and standard function from, both the country and the panel money demand elasticities have the expected positive coefficients for income elasticities, negative coefficients for inflation elasticities, and negative and significant lagged error correction terms. These results are consistent with stable money demand functions for a most of the 36 developing countries tested.

Do the efficiency gains of pooling outweigh the flexibility of country specific money demand estimates? Our out of sample forecast RMSE tests demonstrate that in the short run, panel demand and individual money demand estimates are very similar in their predictive power. However, efficiency gains from pooling, however, become most evident at in the longer term five year forecasting period. This is consistent with the hypothesis that the pooled money demand estimates best capture the longer term behavior of underlying money demand parameters. This suggests pooled estimates should be considered viable alternatives to individual money demand estimates, especially in countries with unreliable data or high volatility in inflation or money emissions. .

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Data Sources

Most of the data for this study comes directly from World Development Indicators 2003 CD-Rom version, supplemented by terms of trade data from the World Bank's African development indicators. International interest rates, such as the U.S. Treasury Bill rate and the LIBOR were obtained from IMF's International Financial Statistics online database. The M2 money aggregate (Money and quasi money M2 Current Local Currency Units (LCU) was deflated using the WDI GDP deflator. The M3 money aggregate was also obtained from the WDI but as "Liquid Liabilities M3 as percent of GDP." To this GDP share to real M3, we simply multiplied it by real GDP from the WDI (GDP constant LCU).

Appendix A

Table A-1: Unit Root Tests: Phillips Perron T-Statistics with One Lag

	Real M2			Real M3			Real GDP			CPI			Terms of Trade			GDP Deflator		
Africa	t-stat	prob.	T	t-stat	prob.	T	t-stat	prob	T	t-stat	prob.	T	t-stat	prob.	T	t-stat	prob.	T
Algeria	-2.5	0.13	37	-2.5	0.13	37	-0.9	0.79	41	-2.0	0.30	32	-1.8	0.36	35	1.6	1.00	41
Botswana	-2.6	0.10	29	-2.6	0.10	29	-1.2	0.66	41	-1.9	0.34	27	-0.6	0.84	18	1.4	1.00	41
Burundi	-1.9	0.32	37	-1.9	0.32	37	-1.6	0.48	41	1.7	1.00	36	-1.5	0.52	41	1.8	1.00	41
Cameroon	-1.6	0.46	41	-1.6	0.46	41	-0.9	0.77	41	-1.5	0.52	33	-4.7	0.00	35	-1.0	0.74	41
Cote d'Ivoire	-6.5	0.00	41	-6.5	0.00	41	-3.6	0.01	41	-0.3	0.92	33	-1.5	0.51	35	-0.4	0.90	41
Egypt	-1.0	0.74	41	-1.0	0.74	41	-1.0	0.74	41	0.8	0.99	41	-0.8	0.80	35	0.9	0.99	41
Gabon	-1.9	0.33	41	-1.9	0.33	41	-2.0	0.27	41	-1.0	0.73	38	-1.9	0.34	41	-0.8	0.82	41
Gambia	-0.2	0.93	35	-0.2	0.93	35	-0.7	0.84	35	0.1	0.96	39	-1.8	0.38	35	-0.4	0.90	35
Ghana	-1.5	0.54	41	-1.5	0.54	41	0.6	0.99	41	0.2	0.97	37	-1.9	0.34	35	0.9	0.99	41
Kenya	-4.6	0.00	40	-4.6	0.00	40	-2.1	0.24	41	1.4	1.00	41	-1.7	0.42	35	2.3	1.00	41
Mauritius	-0.6	0.86	21	-0.6	0.86	21	-0.2	0.92	21	-0.2	0.94	38	-2.9	0.06	35	-3.5	0.02	21
Morocco	0.4	0.98	41	0.4	0.98	41	-1.6	0.47	41	-0.3	0.91	41	-2.5	0.12	41	-0.3	0.91	41
Nigeria	-1.2	0.67	41	-1.2	0.67	41	-1.0	0.75	41	2.1	1.00	41	-1.8	0.39	35	1.6	1.00	41
South Africa	-1.3	0.61	36	-1.3	0.61	36	-5.1	0.00	41	0.9	1.00	41	-2.8	0.07	35	1.0	1.00	41
Tunisia	-1.4	0.57	40	-1.4	0.57	40	-1.5	0.51	40	-6.7	0.00	18	-2.0	0.28	40	-0.2	0.93	40
Zambia	-2.5	0.12	36	-2.5	0.12	36	-3.6	0.01	41	-0.6	0.83	12	-1.1	0.72	35	1.6	1.00	41
Non-Africa																		
Argentina	-1.1	0.69	41	-1.3	0.63	41	-1.4	0.55	41	-0.1	0.94	41	-4.4	0.00	39	-0.2	0.94	41
Bangladesh	1.6	1.00	27	1.6	1.00	27	1.1	1.00	41	-4.6	0.00	15	-2.4	0.14	36	-0.8	0.81	41
Brazil	-0.8	0.79	41	-1.2	0.66	41	-2.4	0.16	41	-0.9	0.75	21	-1.0	0.75	41	0.6	0.99	41
Chile	0.0	0.95	40	-0.1	0.95	40	0.7	0.99	41	-1.4	0.57	41	-1.3	0.63	41	-1.5	0.54	41
China	-2.6	0.11	40	-0.7	0.82	40	1.9	1.00	41	-1.9	0.32	41	-0.8	0.79	23	0.7	0.99	41
Colombia	-0.8	0.80	41	-0.9	0.76	41	-2.8	0.06	41	1.1	1.00	41	-2.8	0.07	41	1.1	1.00	41
Costa Rica	-1.3	0.63	41	-1.3	0.63	41	-1.1	0.69	41	1.2	1.00	41	-2.2	0.20	41	1.1	1.00	41
Dominican Rep.	0.1	0.96	41	-0.3	0.92	41	-0.9	0.79	41	0.8	0.99	41	-3.6	0.01	41	0.9	0.99	41
Ecuador	-0.9	0.77	41	-1.0	0.76	41	-1.9	0.31	41	4.9	1.00	41	-1.2	0.67	41	-1.4	0.56	41
El Salvador	-1.8	0.38	41	-1.3	0.64	41	-1.6	0.46	41	0.6	0.99	41	-3.3	0.02	41	0.7	0.99	41
India	1.7	1.00	41	1.8	1.00	41	3.3	1.00	41	0.9	0.99	41	-2.0	0.29	31	0.2	0.97	41
Indonesia	-0.3	0.91	36	-0.4	0.91	36	-0.4	0.89	41	-4.2	0.00	41	-3.5	0.02	34	-4.3	0.00	41
Israel	-1.2	0.65	41	-2.6	0.09	41	-3.2	0.03	41	-0.3	0.91	41	-3.1	0.03	40	-0.3	0.91	41
Jamaica	-2.7	0.08	41	-2.6	0.11	41	-2.1	0.23	41	1.3	1.00	41	-2.2	0.21	41	1.5	1.00	41
Korea, Rep.	-0.6	0.86	41	-0.9	0.76	41	-1.2	0.66	41	-3.3	0.02	35	-1.0	0.73	41	-3.8	0.01	41
Malaysia	-0.7	0.84	41	-0.9	0.76	41	-0.8	0.82	41	0.1	0.96	41	-4.4	0.00	41	0.3	0.98	41
Mexico	-1.6	0.46	41	-2.0	0.28	41	-2.9	0.05	41	0.6	0.99	41	-0.8	0.82	41	0.6	0.99	41
Philippines	-0.3	0.92	41	-0.6	0.86	41	-2.2	0.19	41	0.1	0.96	41	-2.7	0.08	41	0.2	0.97	41
Thailand	-1.0	0.75	41	-1.1	0.71	41	-1.5	0.51	41	-0.3	0.92	41	-0.3	0.91	41	-0.2	0.94	41
Turkey	1.6	1.00	33	1.4	1.00	33	-1.5	0.53	33	5.0	1.00	41	-2.6	0.12	14	4.2	1.00	33

List of Tables

Table 1: Africa Long-Run Demand for M2

				Stationarity Tests 3/	
		β_y	β_π	**Residual**	**Prob. Value**
Algeria	2/	0.96	-0.59	-1.79	0.38
Botswana	2/	1.07	-0.39	-5.80	0.00
Burundi	2/	1.61	0.96	-4.42	0.00
Cameroon	2/	1.16	0.90	-1.92	0.32
Cote d'Ivoire	1/	1.47	0.35	-8.19	0.00
Egypt	2/	1.47	1.79	-3.04	0.04
Gabon	1/	1.05	-0.42	-2.98	0.05
Gambia	2/	1.29	0.00	-3.06	0.04
Ghana	1/	1.15	-0.40	-2.13	0.23
Kenya	2/	1.93	0.12	-2.40	0.15
Mauritius	2/	1.65	0.06	-1.72	0.41
Morocco	1/	1.65	-0.86	-2.96	0.05
Nigeria	1/	1.67	-0.27	-1.76	0.39
South Africa	1/	0.83	-0.21	-2.07	0.26
Tunisia	1/	1.29	-0.07	-2.80	0.07
Zambia	1/	1.67	-0.48	-2.06	0.26

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

Table 2: Africa Long-Run Demand for M2 with Terms of Trade

					Stationarity Tests 3/	
		β_y	β_π	β_{TT}	**Residual**	**Prob. Value**
Algeria	2/	0.95	-0.51	0.11	-1.19	0.67
Botswana	2/	0.99	-0.78	-0.05	-2.95	0.06
Burundi	2/	1.55	0.93	-0.10	-4.90	0.00
Cameroon	2/	1.16	0.91	-0.05	-1.98	0.29
Cote d'Ivoire	1/	1.23	0.11	0.24	-1.11	0.70
Egypt	2/	1.67	1.86	0.35	-3.89	0.01
Gabon	1/	1.03	-0.59	0.11	-2.94	0.05
Gambia	2/	1.34	0.06	0.12	-3.33	0.02
Ghana	1/	1.63	-0.57	0.60	-2.57	0.11
Kenya	2/	1.72	0.14	0.86	-8.79	0.00
Mauritius	2/	1.64	0.16	0.73	-3.56	0.02
Morocco	1/	1.60	-0.87	0.66	-4.35	0.00
Nigeria	1/	1.16	-0.13	0.49	-2.52	0.12
South Africa	1/	0.76	-0.29	0.16	-2.54	0.11
Tunisia	1/	1.31	-0.03	0.04	-2.92	0.05
Zambia	1/	2.43	-0.52	0.14	-2.14	0.23

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

6/ β_{TT} is the coefficient on Terms of Trade

Table 3: Africa Long-Run Demand for M3

				Stationarity Tests 3/	
		β_y	β_π	**Residual**	**Prob. Value**
Algeria	2/	0.96	-0.75	-1.58	0.48
Botswana	2/	1.07	-0.39	-5.80	0.00
Burundi	2/	1.76	0.58	-4.71	0.00
Cameroon	2/	1.16	0.90	-1.92	0.32
Cote d'Ivoire	1/	1.46	0.35	-8.19	0.00
Egypt	2/	1.51	1.68	-2.91	0.05
Gabon	1/	1.05	-0.42	-2.98	0.05
Gambia	2/	1.24	-0.06	-3.02	0.04
Ghana	1/	1.18	-0.41	-2.16	0.22
Kenya	2/	2.03	0.80	-2.30	0.18
Mauritius	2/	1.64	0.06	-1.76	0.39
Morocco	1/	1.69	-0.38	-3.82	0.01
Nigeria	1/	1.66	-0.24	-1.81	0.37
South Africa	1/	0.53	0.19	-1.67	0.44
Tunisia	1/	1.29	0.24	-3.24	0.03
Zambia	1/	1.02	-0.58	-1.83	0.36

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

Table 4: Africa Long-Run Demand for M3 with Terms of Trade

					Stationarity Tests 3/	
		β_y	β_π	β_{TT}	**Residual**	**Prob. Value**
Algeria	2/	0.96	-0.68	0.15	-1.10	0.70
Botswana	2/	0.99	-0.78	-0.05	-2.95	0.06
Burundi	2/	1.72	0.55	-0.06	-4.79	0.00
Cameroon	2/	1.16	0.91	-0.05	-1.98	0.29
Cote d'Ivoire	1/	1.22	0.11	0.24	-1.14	0.69
Egypt	2/	1.71	1.78	0.36	-3.65	0.01
Gabon	1/	1.03	-0.59	0.11	-2.94	0.05
Gambia	2/	1.28	-0.01	0.10	-3.25	0.03
Ghana	1/	1.65	-0.57	0.59	-2.57	0.11
Kenya	2/	1.71	0.53	0.29	-8.65	0.00
Mauritius	2/	1.62	0.16	0.71	-3.61	0.02
Morocco	1/	1.67	-0.38	0.32	-4.16	0.00
Nigeria	1/	1.15	-0.10	0.51	-2.41	0.15
South Africa	1/	0.42	-0.07	0.33	-2.16	0.22
Tunisia	1/	1.30	0.25	0.01	-3.27	0.02
Zambia	1/	1.82	-0.63	0.15	-1.89	0.33

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

6/ β_{TT} is the coefficient on Terms of Trade

Table 5: Non-Africa Long-Run Demand for M2

				Stationarity Tests 3/	
		β_y	β_π	**Residual**	**Prob. Value**
Argentina	1/	1.49	-0.06	-2.42	0.14
Bangladesh	1/	1.93	-0.29	-4.56	0.00
Brazil	1/	1.13	0.24	-2.16	0.22
Chile	1/	1.74	-0.11	-2.68	0.09
China	2/	1.68	-0.57	-1.83	0.35
Colombia	1/	1.15	-0.82	-3.18	0.03
Costa Rica	1/	1.31	0.87	-3.17	0.03
Dominican Rep.	1/	1.31	-0.34	-4.54	0.00
Ecuador	1/	1.19	0.37	-2.49	0.13
El Salvador	2/	1.80	0.79	-2.52	0.12
India	2/	1.62	-0.15	-1.69	0.43
Indonesia	2/	1.98	0.04	-4.09	0.00
Israel	2/	1.54	0.20	-2.65	0.09
Jamaica	2/	2.01	-0.08	-2.47	0.13
Korea, Rep.	2/	1.28	-0.23	-1.37	0.59
Malaysia	1/	1.59	-0.46	-3.10	0.03
Mexico	2/	1.42	-0.01	-3.10	0.03
Philippines	2/	1.68	-1.25	-1.80	0.37
Thailand	1/	1.61	-0.79	-2.99	0.04
Turkey	1/	1.85	-0.79	-2.95	0.05

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

Table 6: Non-Africa Long-Run Demand for M2 with Terms of Trade

					Stationarity Tests 3/	
		β_y	β_π	β_{TT}	**Residual**	**Prob. Value**
Argentina	1/	1.52	-0.04	0.21	-2.31	0.17
Bangladesh	1/	1.77	-0.39	0.59	-5.23	0.00
Brazil	1/	0.86	0.18	-0.84	-2.73	0.08
Chile	1/	1.57	-0.07	-0.48	-3.51	0.01
China	2/	1.67	-0.57	-0.15	-2.00	0.28
Colombia	1/	1.15	-0.91	0.10	-3.18	0.03
Costa Rica	1/	1.31	0.87	0.00	-3.16	0.03
Dominician Rep.	1/	1.27	-0.29	-1.19	-4.16	0.00
Ecuador	1/	1.14	0.43	-0.14	-2.69	0.08
El Salvador	2/	1.87	0.56	-0.39	-2.85	0.06
India	2/	1.58	-0.27	0.18	-2.27	0.19
Indonesia	2/	2.08	-0.33	-0.18	-2.63	0.10
Israel	2/	1.57	0.24	0.16	-2.67	0.09
Jamaica	2/	2.01	-0.08	-0.01	-2.46	0.13
Korea, Rep.	2/	1.23	-0.69	-1.32	-2.77	0.07
Malaysia	1/	1.59	-0.41	-0.21	-3.13	0.03
Mexico	2/	1.53	0.05	0.25	-3.31	0.02
Philippines	2/	1.68	-1.23	0.36	-1.87	0.34
Thailand	1/	1.57	-0.71	-0.19	-2.94	0.05
Turkey	1/	2.38	-0.58	-1.27	-3.39	0.03

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

6/ β_{TT} is the coefficient on Terms of Trade

Table 7: Non-Africa Long-Run Demand for M3

				Stationarity Tests 3/	
		β_y	β_π	**Residual**	**Prob. Value**
Argentina	1/	1.47	-0.06	-2.49	0.13
Bangladesh	1/	1.93	-0.29	-4.56	0.00
Brazil	1/	1.25	0.19	-5.30	0.00
Chile	1/	1.75	-0.12	-2.63	0.10
China	2/	1.68	-0.57	-1.83	0.35
Colombia	1/	1.36	-0.79	-2.74	0.08
Costa Rica	1/	1.31	0.87	-3.16	0.03
Dominican Rep.	1/	1.37	-0.19	-5.51	0.00
Ecuador	1/	1.21	0.42	-2.56	0.11
El Salvador	2/	1.88	0.65	-2.42	0.14
India	2/	1.56	-0.17	-1.76	0.39
Indonesia	2/	1.99	0.04	-4.10	0.00
Israel	2/	1.49	0.38	-2.70	0.08
Jamaica	2/	2.12	0.12	-2.27	0.19
Korea, Rep.	2/	1.45	-0.35	-1.34	0.60
Malaysia	1/	1.66	-0.05	-2.66	0.09
Mexico	2/	1.05	-0.21	-3.40	0.02
Philippines	2/	1.70	-1.16	-1.84	0.36
Thailand	1/	1.60	-0.82	-2.48	0.13
Turkey	1/	1.85	-0.83	-3.12	0.03

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that theresidual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

Table 8: Non-Africa Long-Run Demand for M3 with Terms of Trade

					Stationarity Tests 3/	
		β_y	β_π	β_{TT}	**Residual**	**Prob. Value**
Argentina	1/	1.50	-0.04	0.24	-2.40	0.15
Bangladesh	1/	1.77	-0.39	0.59	-5.23	0.00
Brazil	1/	1.23	0.18	-0.08	-5.64	0.00
Chile	1/	1.58	-0.08	-0.50	-3.53	0.01
China	2/	1.67	-0.57	-0.15	-2.00	0.28
Colombia	1/	1.36	-0.74	-0.06	-2.77	0.07
Costa Rica	1/	1.31	0.87	-0.01	-3.15	0.03
Dominican Rep.	1/	1.34	-0.13	-1.19	-5.12	0.00
Ecuador	1/	1.16	0.47	-0.14	-2.74	0.08
El Salvador	2/	1.96	0.41	-0.42	-2.94	0.05
India	2/	1.52	-0.30	0.16	-2.22	0.20
Indonesia	2/	2.09	-0.33	-0.18	-2.64	0.10
Israel	2/	1.40	0.35	-0.33	-2.85	0.06
Jamaica	2/	2.11	0.11	0.03	-2.28	0.18
Korea, Rep.	2/	1.43	-0.50	-0.40	-1.54	0.50
Malaysia	1/	1.66	0.00	-0.25	-2.64	0.09
Mexico	2/	1.32	-0.07	0.58	-3.91	0.00
Philippines	2/	1.70	-1.15	0.33	-1.91	0.32
Thailand	1/	1.57	-0.75	-0.15	-2.43	0.14
Turkey	1/	2.29	-0.73	-1.37	-3.18	0.04

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ The prob value is for rejecting the null hypothesis that the residual of long-run money demand equation is stationary.

4/ β_y is the coefficient on GDP

5/ β_π is the coefficient on Inflation

6/ β_{TT} is the coefficient on Terms of Trade

Table 9: Africa Demand for M2

	Income Elasticities			Inflation Elasticities				Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Algeria	**1.07**	*0.22*	*4.8*	**-0.59**	*0.33*	*-1.8*	*2/*	**-0.18**	*0.10*	*-1.7*	0.34	1.8	31
Botswana	**3.07**	*0.86*	*3.6*	**0.86**	*1.27*	*0.7*	*2/*	**-0.99**	*0.12*	*-8.5*	0.71	1.5	26
Burundi	**0.91**	*0.38*	*2.4*	**-0.18**	*0.39*	*-0.5*	*2/*	**-0.41**	*0.20*	*-2.1*	0.29	2.7	35
Cameroon	**0.75**	*0.26*	*2.9*	**0.37**	*0.26*	*1.4*	*2/*	**-0.14**	*0.12*	*-1.2*	0.20	1.6	32
Cote d'Ivoire	**2.44**	*0.43*	*5.7*	**0.08**	*0.22*	*0.4*	*1/*	**-0.94**	*0.18*	*-5.3*	0.79	0.4	40
Egypt	**1.15**	*0.37*	*3.1*	**0.05**	*0.16*	*0.3*	*2/*	**-0.10**	*0.09*	*-1.1*	0.15	1.2	40
Gabon	**1.09**	*0.18*	*6.0*	**-0.62**	*0.07*	*-9.1*	*1/*	**-0.24**	*0.07*	*-3.3*	0.71	1.3	40
Gambia	**2.41**	*0.76*	*3.2*	**-0.39**	*0.24*	*-1.7*	*2/*	**-0.47**	*0.18*	*-2.6*	0.36	2.1	34
Ghana	**0.39**	*0.47*	*0.8*	**-0.43**	*0.16*	*-2.7*	*1/*	**-0.22**	*0.11*	*-2.1*	0.37	1.8	40
Kenya	**2.62**	*1.70*	*1.5*	**0.04**	*0.36*	*0.1*	*2/*	**-0.20**	*0.16*	*-1.3*	0.23	1.6	40
Mauritius	**2.58**	*0.70*	*3.7*	**-0.42**	*0.33*	*-1.3*	*2/*	**-0.33**	*0.20*	*-1.7*	0.44	1.7	21
Morocco	**0.39**	*0.13*	*3.1*	**-0.40**	*0.16*	*-2.5*	*1/*	**-0.14**	*0.07*	*-2.0*	0.25	1.6	40
Nigeria	**0.66**	*0.22*	*3.0*	**-0.44**	*0.12*	*-3.6*	*1/*	**-0.11**	*0.05*	*-2.4*	0.40	1.3	40
South Africa	**0.71**	*0.17*	*4.1*	**-0.34**	*0.14*	*-2.3*	*1/*	**-0.21**	*0.11*	*-1.9*	0.47	1.8	36
Tunisia	**0.71**	*0.20*	*3.5*	**-0.22**	*0.10*	*-2.1*	*1/*	**-0.33**	*0.12*	*-2.8*	0.39	1.6	39
Zambia	**0.23**	*0.43*	*0.5*	**-0.25**	*0.12*	*-2.0*	*1/*	**-0.19**	*0.07*	*-2.8*	0.30	2.5	36
Panel Africa	**1.03**	*0.11*	*9.2*	**-0.21**	*0.10*	*-2.1*	*2/*	**-0.36**	*0.03*	*-12.8*	0.35	1.4	520
				-0.25	*0.05*	*-4.6*	*1/*						
Panel Non-Africa M2	**0.88**	*0.12*	*7.6*	**-0.10**	*0.03*	*-3.4*	*2/*	**-0.25**	*0.03*	*-10.0*	0.23	1.8	712
				-0.05	*0.01*	*-3.6*	*1/*						
Panel All-Ctry	**0.99**	*0.08*	*12.3*	**-0.09**	*0.03*	*-3.2*	*2/*	**-0.31**	*0.02*	*-16.5*	0.28	1.6	1232
				-0.1	0.01	*-4.3*	*1/*						

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta\psi(t-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 10: Africa Demand for M2 with Terms of Trade

	Income Elasticities			Inflation Elasticities				Terms of Trade Elasticities			Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\Delta T}$	s.e.	t-stat	$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Algeria	**1.11**	*0.13*	*8.5*	**-0.69**	*0.21*	*-3.3*	*2/*	**-0.30**	*0.09*	*-3.4*	**-0.18**	*0.06*	*-2.9*	0.72	2.0	30
Botswana	**2.11**	*1.03*	*2.1*	**0.18**	*2.27*	*0.1*	*2/*	**-0.09**	*0.41*	*-0.2*	**-0.82**	*0.28*	*-2.9*	0.35	2.1	18
Burundi	**0.90**	*0.40*	*2.3*	**-0.07**	*0.41*	*-0.2*	*2/*	**0.02**	*0.09*	*0.3*	**-0.48**	*0.19*	*-2.5*	0.28	2.7	35
Cameroon	**0.76**	*0.25*	*3.0*	**0.36**	*0.24*	*1.5*	*2/*	**0.11**	*0.09*	*1.3*	**-0.14**	*0.11*	*-1.2*	0.21	1.5	31
Cote d'Ivoire	**1.05**	*0.18*	*5.7*	**0.01**	*0.12*	*0.1*	*1/*	**0.19**	*0.07*	*2.9*	**-0.08**	*0.08*	*-0.9*	0.59	1.8	35
Egypt	**1.15**	*0.35*	*3.3*	**0.23**	*0.16*	*1.5*	*2/*	**0.17**	*0.10*	*1.6*	**-0.30**	*0.15*	*-2.1*	0.32	1.3	35
Gabon	**1.10**	*0.19*	*5.9*	**-0.60**	*0.08*	*-7.3*	*1/*	**-0.04**	*0.08*	*-0.5*	**-0.28**	*0.07*	*-4.1*	0.72	1.4	40
Gambia	**2.04**	*0.80*	*2.6*	**-0.37**	*0.20*	*-1.9*	*2/*	**-0.24**	*0.13*	*-1.9*	**-0.46**	*0.19*	*-2.5*	0.39	2.0	34
Ghana	**0.59**	*0.42*	*1.4*	**-0.43**	*0.14*	*-3.1*	*1/*	**-0.07**	*0.11*	*-0.6*	**-0.12**	*0.10*	*-1.2*	0.41	1.7	35
Kenya	**1.74**	*0.63*	*2.8*	**-0.33**	*0.36*	*-0.9*	*2/*	**0.68**	*0.15*	*4.5*	**-0.95**	*0.12*	*-8.2*	0.84	0.9	35
Mauritius	**2.38**	*0.59*	*4.0*	**-0.40**	*0.32*	*-1.3*	*2/*	**0.29**	*0.19*	*1.5*	**-0.70**	*0.25*	*-2.9*	0.52	1.8	20
Morocco	**0.42**	*0.12*	*3.5*	**-0.40**	*0.18*	*-2.2*	*1/*	**0.11**	*0.10*	*1.1*	**-0.23**	*0.08*	*-2.8*	0.28	1.6	40
Nigeria	**0.76**	*0.20*	*3.9*	**-0.37**	*0.13*	*-2.9*	*1/*	**0.06**	*0.08*	*0.8*	**-0.25**	*0.09*	*-2.8*	0.47	1.4	35
South Africa	**0.70**	*0.19*	*3.7*	**-0.30**	*0.15*	*-2.0*	*1/*	**0.01**	*0.09*	*0.2*	**-0.29**	*0.10*	*-2.8*	0.50	1.7	35
Tunisia	**0.70**	*0.21*	*3.3*	**-0.25**	*0.11*	*-2.3*	*1/*	**0.06**	*0.02*	*2.6*	**-0.32**	*0.12*	*-2.6*	0.38	1.6	39
Zambia	**0.37**	*0.45*	*0.8*	**-0.25**	*0.12*	*-2.1*	*1/*	**0.01**	*0.06*	*0.2*	**-0.21**	*0.07*	*-2.9*	0.31	2.3	35
Panel Africa	**1.00**	*0.09*	*11.5*	**-0.15**	*0.08*	*-2.0*	*2/*	**-0.01**	*0.03*	*-0.5*	**-0.37**	*0.03*	*-11.5*	0.40	1.9	486
				-0.20	*0.04*	*-4.7*	*1/*									
Panel Non-Africa M2 w/TT	**0.86**	*0.12*	*7.2*	**-0.07**	*0.04*	*-1.9*	*2/*	**0.00**	*0.05*	*0.1*	**-0.28**	*0.03*	*-10.5*	0.23	1.9	681
				-0.04	*0.01*	*-3.2*	*1/*									
Panel All-Ctry	**0.97**	*0.07*	*13.2*	**-0.06**	*0.03*	*-1.9*	*2/*	**-0.02**	*0.03*	*-0.8*	**-0.32**	*0.02*	*-15.4*	0.29	1.9	1167
				-0.05	*0.01*	*-4.1*	1/									

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta_{\Delta T}$ is the coefficient on Terms of Trade

6/ $\beta\psi(t-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 11: Africa Demand for M3

	Income Elasticities			Inflation Elasticities				Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Algeria	**1.08**	*0.25*	*4.4*	**-0.74**	*0.38*	*-2.0*	*2/*	**-0.14**	*0.09*	*-1.7*	0.34	1.8	31
Botswana	**3.07**	*0.86*	*3.6*	**0.86**	*1.27*	*0.7*	*2/*	**-0.99**	*0.12*	*-8.5*	0.71	1.5	26
Burundi	**1.00**	*0.35*	*2.8*	**-0.15**	*0.35*	*-0.4*	*2/*	**-0.58**	*0.14*	*-4.0*	0.40	2.4	35
Cameroon	**0.75**	*0.26*	*2.9*	**0.37**	*0.26*	*1.4*	*2/*	**-0.14**	*0.12*	*-1.2*	0.20	1.6	32
Cote d'Ivoire	**2.45**	*0.43*	*5.7*	**0.08**	*0.22*	*0.4*	*1/*	**-0.94**	*0.17*	*-5.4*	0.79	0.4	40
Egypt	**1.18**	*0.39*	*3.0*	**0.05**	*0.17*	*0.3*	*2/*	**-0.10**	*0.09*	*-1.1*	0.16	1.2	40
Gabon	**1.09**	*0.18*	*6.0*	**-0.62**	*0.07*	*-9.1*	*1/*	**-0.24**	*0.07*	*-3.3*	0.71	1.3	40
Gambia	**2.37**	*0.74*	*3.2*	**-0.39**	*0.23*	*-1.7*	*2/*	**-0.48**	*0.19*	*-2.6*	0.36	2.1	34
Ghana	**0.38**	*0.47*	*0.8*	**-0.43**	*0.16*	*-2.7*	*1/*	**-0.23**	*0.11*	*-2.1*	0.37	1.8	40
Kenya	**2.73**	*1.76*	*1.6*	**0.09**	*0.37*	*0.3*	*2/*	**-0.20**	*0.17*	*-1.2*	0.23	1.6	40
Mauritius	**2.56**	*0.69*	*3.7*	**-0.41**	*0.33*	*-1.3*	*2/*	**-0.35**	*0.20*	*-1.7*	0.44	1.7	21
Morocco	**0.60**	*0.12*	*4.9*	**-0.30**	*0.14*	*-2.2*	*1/*	**-0.24**	*0.07*	*-3.2*	0.38	1.5	40
Nigeria	**0.64**	*0.22*	*2.9*	**-0.46**	*0.12*	*-3.8*	*1/*	**-0.10**	*0.04*	*-2.2*	0.41	1.3	40
South Africa	**0.50**	*0.18*	*2.8*	**-0.45**	*0.14*	*-3.2*	*1/*	**-0.05**	*0.09*	*-0.6*	0.36	1.8	36
Tunisia	**0.70**	*0.19*	*3.7*	**-0.10**	*0.12*	*-0.8*	*1/*	**-0.39**	*0.13*	*-3.1*	0.38	1.7	39
Zambia	**0.16**	*0.40*	*0.4*	**-0.26**	*0.12*	*-2.1*	*1/*	**-0.18**	*0.07*	*-2.7*	0.30	2.5	36
Panel Africa	**1.04**	*0.11*	*9.2*	**-0.22**	*0.10*	*-2.2*	*2/*	**-0.36**	*0.03*	*-12.6*	0.36	1.3	520
				-0.26	*0.05*	*-4.6*	*1/*						
Panel Non-Africa M3	**0.85**	*0.11*	*7.7*	**-0.12**	*0.03*	*-4.4*	*2/*	**-0.28**	*0.03*	*-10.3*	0.25	1.9	712
				-0.05	*0.01*	*-4.2*	*1/*						
Panel All-Ctry	**0.98**	*0.08*	*12.4*	**-0.11**	*0.03*	*-3.9*	*2/*	**-0.33**	*0.02*	*-16.8*	0.30	1.6	1232
				-0.06	*0.01*	*-4.8*	1/						

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 12: Africa Demand for M3 with Terms of Trade

	Income Elasticities			Inflation Elasticities				Terms of Trade Elasticities			Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\Delta T}$	s.e.	t-stat	$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Algeria	**1.12**	*0.16*	*6.8*	**-0.86**	*0.27*	*-3.1*	2/	**-0.32**	*0.09*	*-3.5*	**-0.16**	*0.06*	*-2.7*	0.68	2.1	30
Botswana	**2.11**	*1.03*	*2.1*	**0.18**	*2.27*	*0.1*	2/	**-0.09**	*0.41*	*-0.2*	**-0.82**	*0.28*	*-2.9*	0.35	2.1	18
Burundi	**1.04**	*0.38*	*2.7*	**-0.13**	*0.34*	*-0.4*	2/	**-0.03**	*0.08*	*-0.3*	**-0.59**	*0.16*	*-3.7*	0.37	2.4	35
Cameroon	**0.76**	*0.25*	*3.0*	**0.36**	*0.24*	*1.5*	2/	**0.11**	*0.09*	*1.3*	**-0.14**	*0.11*	*-1.2*	0.21	1.5	31
Cote d'Ivoire	**1.04**	*0.18*	*5.7*	**0.01**	*0.12*	*0.1*	1/	**0.19**	*0.07*	*2.9*	**-0.08**	*0.08*	*-0.9*	0.59	1.8	35
Egypt	**1.19**	*0.36*	*3.3*	**0.22**	*0.16*	*1.4*	2/	**0.17**	*0.11*	*1.6*	**-0.30**	*0.14*	*-2.2*	0.34	1.3	35
Gabon	**1.10**	*0.19*	*5.9*	**-0.60**	*0.08*	*-7.3*	1/	**-0.04**	*0.08*	*-0.5*	**-0.28**	*0.07*	*-4.1*	0.72	1.4	40
Gambia	**2.01**	*0.78*	*2.6*	**-0.36**	*0.20*	*-1.9*	2/	**-0.24**	*0.12*	*-1.9*	**-0.47**	*0.19*	*-2.5*	0.40	2.0	34
Ghana	**0.58**	*0.42*	*1.4*	**-0.44**	*0.14*	*-3.1*	1/	**-0.07**	*0.11*	*-0.6*	**-0.13**	*0.10*	*-1.4*	0.41	1.7	35
Kenya	**2.03**	*0.65*	*3.1*	**-0.17**	*0.36*	*-0.5*	2/	**0.28**	*0.15*	*1.9*	**-0.92**	*0.10*	*-8.8*	0.83	1.0	35
Mauritius	**2.35**	*0.59*	*4.0*	**-0.40**	*0.31*	*-1.3*	2/	**0.29**	*0.19*	*1.5*	**-0.72**	*0.25*	*-2.9*	0.52	1.8	20
Morocco	**0.61**	*0.12*	*4.9*	**-0.27**	*0.17*	*-1.6*	1/	**0.03**	*0.09*	*0.3*	**-0.26**	*0.07*	*-3.8*	0.37	1.5	40
Nigeria	**0.74**	*0.20*	*3.8*	**-0.40**	*0.13*	*-3.0*	1/	**0.06**	*0.08*	*0.8*	**-0.22**	*0.08*	*-2.7*	0.49	1.4	35
South Africa	**0.49**	*0.20*	*2.5*	**-0.40**	*0.13*	*-3.1*	1/	**0.01**	*0.10*	*0.1*	**-0.12**	*0.09*	*-1.3*	0.36	1.8	35
Tunisia	**0.69**	*0.19*	*3.6*	**-0.12**	*0.13*	*-0.9*	1/	**0.04**	*0.04*	*1.0*	**-0.38**	*0.13*	*-2.8*	0.37	1.7	39
Zambia	**0.28**	*0.41*	*0.7*	**-0.24**	*0.11*	*-2.2*	1/	**-0.01**	*0.06*	*-0.2*	**-0.20**	*0.07*	*-2.7*	0.31	2.3	35
Panel Africa	**1.01**	*0.09*	*11.7*	**-0.18**	*0.08*	*-2.3*	2/	**-0.03**	*0.03*	*-1.1*	**-0.36**	*0.03*	*-11.6*	0.41	1.8	486
				-0.20	*0.04*	*-4.9*	1/	**0.00**	*0.00*	*0.0*	**0.00**	*0.00*	*0.0*	0.00	0.0	0
Panel Non-Africa M3 w/TT	**0.81**	*0.11*	*7.1*	**-0.11**	*0.03*	*-3.1*	2/	**0.02**	*0.05*	*0.5*	**-0.31**	*0.03*	*-10.7*	0.25	1.9	681
				-0.05	*0.01*	*-3.9*	1/									
Panel All-Ctry	**0.96**	*0.07*	*13.4*	**-0.09**	*0.03*	*-3.00*	2/	**-0.02**	*0.03*	*-0.9*	**-0.34**	*0.02*	*-15.8*	0.31	1.9	1167
				-0.05	*0.01*	*-4.70*	1/									

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta_{\Delta T}$ is the coefficient on Terms of Trade

6/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 13: Non-Africa Demand for M2

	Income Elasticities			Inflation Elasticities				Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Argentina	**1.19**	*0.42*	*2.8*	**-0.08**	*0.04*	*-2.1*	1/	**-0.29**	*0.10*	*-2.8*	0.57	1.7	40
Bangladesh	**0.84**	*0.58*	*1.5*	**-0.80**	*0.19*	*-4.1*	1/	**-0.39**	*0.21*	*-1.9*	0.81	1.1	27
Brazil	**0.96**	*0.94*	*1.0*	**0.02**	*0.07*	*0.2*	1/	**-0.18**	*0.10*	*-1.8*	0.02	1.8	40
Chile	**0.40**	*0.57*	*0.7*	**-0.16**	*0.11*	*-1.5*	1/	**-0.30**	*0.12*	*-2.5*	0.25	1.7	40
China	**0.96**	*0.82*	*1.2*	**-0.31**	*0.16*	*-1.9*	2/	**-0.29**	*0.41*	*-0.7*	0.12	1.6	14
Colombia	**0.32**	*0.30*	*1.0*	**-0.36**	*0.12*	*-2.9*	1/	**-0.50**	*0.15*	*-3.4*	0.36	2.2	40
Costa Rica	**-0.59**	*0.71*	*-0.8*	**-0.57**	*0.16*	*-3.4*	1/	**-0.15**	*0.10*	*-1.5*	0.28	2.4	40
Dominican Rep.	**0.15**	*0.45*	*0.3*	**-0.40**	*0.21*	*-1.9*	1/	**-0.42**	*0.26*	*-1.6*	0.24	1.8	40
Ecuador	**1.10**	*0.35*	*3.1*	**-0.03**	*0.18*	*-0.2*	1/	**-0.20**	*0.14*	*-1.5*	0.12	2.3	40
El Salvador	**0.93**	*0.28*	*3.3*	**-0.11**	*0.16*	*-0.7*	2/	**-0.15**	*0.08*	*-1.9*	0.28	1.4	40
India	**0.56**	*0.15*	*3.8*	**-0.58**	*0.10*	*-6.1*	2/	**-0.02**	*0.04*	*-0.5*	0.51	1.1	40
Indonesia	**0.98**	*0.25*	*3.9*	**-0.19**	*0.02*	*-7.8*	2/	**-0.24**	*0.12*	*-1.9*	0.68	1.3	36
Israel	**0.51**	*0.91*	*0.6*	**0.04**	*0.15*	*0.3*	2/	**-0.29**	*0.28*	*-1.0*	0.08	1.7	40
Jamaica	**0.88**	*0.24*	*3.7*	**-0.23**	*0.12*	*-1.9*	2/	**-0.13**	*0.09*	*-1.5*	0.34	1.5	40
Korea, Rep.	**0.49**	*0.63*	*0.8*	**-0.45**	*0.23*	*-2.0*	2/	**-0.02**	*0.12*	*-0.1*	0.10	0.8	34
Malaysia	**1.06**	*0.20*	*5.2*	**-0.53**	*0.24*	*-2.2*	1/	**-0.36**	*0.12*	*-2.9*	0.43	1.7	40
Mexico	**0.63**	*0.84*	*0.7*	**-0.30**	*0.37*	*-0.8*	2/	**-0.34**	*0.15*	*-2.2*	0.25	2.0	40
Philippines	**0.60**	*0.42*	*1.4*	**-0.71**	*0.21*	*-3.4*	2/	**-0.14**	*0.07*	*-2.2*	0.49	1.6	40
Thailand	**0.58**	*0.11*	*5.2*	**-0.41**	*0.08*	*-5.0*	1/	**-0.26**	*0.07*	*-3.8*	0.47	1.3	40
Turkey	**-0.37**	*0.47*	*-0.8*	**-0.13**	*0.09*	*-1.4*	1/	**-0.09**	*0.13*	*-0.7*	-0.04	1.6	32
Panel Non-Africa	**0.88**	*0.12*	*7.6*	**-0.10**	*0.03*	*-3.4*	2/	**-0.25**	*0.03*	*-10.0*	0.23	1.8	712
				-0.05	*0.01*	*-3.6*	1/						
Panel Africa M2	**1.03**	*0.11*	*9.2*	**-0.21**	*0.10*	*-2.1*	2/	**-0.36**	*0.03*	*-12.8*	0.35	1.4	520
				-0.25	*0.05*	*-4.6*	1/						
Panel All-Ctry	**0.99**	*0.08*	*12.3*	**-0.09**	*0.03*	*-3.2*	2/	**-0.31**	*0.02*	*-16.5*	0.28	1.6	1232
				-0.05	*0.01*	*-4.3*	1/						

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 14: Non-Africa Demand for M2 with Terms of Trade

	Income Elasticities			Inflation Elasticities				Terms of Trade Elasticities			Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\Delta T}$	s.e.	t-stat	$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Argentina	**1.08**	*0.43*	*2.5*	**-0.09**	*0.04*	*-2.3*	1/	**0.12**	*0.12*	*1.0*	**-0.27**	*0.11*	*-2.5*	0.57	1.7	39
Bangladesh	**0.94**	*0.57*	*1.7*	**-0.74**	*0.16*	*-4.6*	1/	**0.32**	*0.13*	*2.4*	**-0.49**	*0.25*	*-2.0*	0.81	1.6	27
Brazil	**0.84**	*0.88*	*1.0*	**0.02**	*0.07*	*0.3*	1/	**0.63**	*0.43*	*1.5*	**-0.19**	*0.10*	*-2.0*	0.09	1.6	40
Chile	**0.25**	*0.64*	*0.4*	**-0.12**	*0.09*	*-1.4*	1/	**0.03**	*0.20*	*0.1*	**-0.43**	*0.16*	*-2.7*	0.30	1.5	40
China	**1.12**	*0.76*	*1.5*	**-0.41**	*0.16*	*-2.6*	2/	**0.62**	*0.31*	*2.0*	**-0.26**	*0.45*	*-0.6*	0.25	2.2	14
Colombia	**0.18**	*0.32*	*0.6*	**-0.38**	*0.12*	*-3.3*	1/	**0.13**	*0.09*	*1.5*	**-0.54**	*0.15*	*-3.6*	0.38	2.2	40
Costa Rica	**-0.33**	*0.63*	*-0.5*	**-0.50**	*0.17*	*-2.9*	1/	**-0.32**	*0.27*	*-1.2*	**-0.16**	*0.09*	*-1.7*	0.31	2.4	40
Dominican Rep.	**0.37**	*0.40*	*0.9*	**-0.35**	*0.21*	*-1.7*	1/	**-0.81**	*0.38*	*-2.2*	**-0.49**	*0.26*	*-1.8*	0.28	1.8	40
Ecuador	**1.33**	*0.47*	*2.8*	**-0.13**	*0.25*	*-0.5*	1/	**0.16**	*0.17*	*0.9*	**-0.21**	*0.14*	*-1.5*	0.14	2.2	40
El Salvador	**1.05**	*0.27*	*3.9*	**-0.08**	*0.16*	*-0.5*	2/	**-0.09**	*0.06*	*-1.5*	**-0.19**	*0.08*	*-2.5*	0.28	1.3	40
India	**0.66**	*0.12*	*5.3*	**-0.60**	*0.08*	*-7.5*	2/	**0.03**	*0.07*	*0.5*	**-0.08**	*0.03*	*-2.3*	0.70	1.8	31
Indonesia	**1.01**	*0.21*	*4.9*	**-0.15**	*0.08*	*-1.9*	2/	**-0.09**	*0.12*	*-0.8*	**-0.33**	*0.12*	*-2.8*	0.36	1.3	34
Israel	**0.55**	*1.11*	*0.5*	**0.04**	*0.15*	*0.3*	2/	**-0.02**	*0.14*	*-0.2*	**-0.30**	*0.29*	*-1.0*	0.06	1.7	39
Jamaica	**0.88**	*0.24*	*3.6*	**-0.23**	*0.11*	*-2.0*	2/	**-0.01**	*0.12*	*-0.1*	**-0.13**	*0.09*	*-1.4*	0.32	1.5	40
Korea, Rep.	**0.73**	*0.76*	*1.0*	**-0.44**	*0.22*	*-2.0*	2/	**-0.44**	*0.38*	*-1.2*	**-0.15**	*0.18*	*-0.8*	0.12	0.8	34
Malaysia	**1.06**	*0.21*	*5.0*	**-0.39**	*0.32*	*-1.2*	1/	**-0.16**	*0.18*	*-0.9*	**-0.40**	*0.12*	*-3.3*	0.45	1.7	40
Mexico	**1.01**	*0.92*	*1.1*	**-0.30**	*0.37*	*-0.8*	2/	**-0.33**	*0.57*	*-0.6*	**-0.37**	*0.15*	*-2.4*	0.26	2.1	40
Philippines	**0.48**	*0.48*	*1.0*	**-0.73**	*0.23*	*-3.2*	2/	**-0.07**	*0.13*	*-0.5*	**-0.13**	*0.07*	*-1.9*	0.46	1.6	40
Thailand	**0.56**	*0.12*	*4.5*	**-0.42**	*0.09*	*-4.6*	1/	**0.00**	*0.06*	*0.1*	**-0.28**	*0.07*	*-4.1*	0.49	1.3	40
Turkey	**-0.34**	*0.74*	*-0.5*	**0.02**	*0.20*	*0.1*	1/	**-0.77**	*0.79*	*-1.0*	**-0.49**	*0.24*	*-2.0*	0.32	1.5	14
Panel Non-Africa	**0.86**	*0.12*	*7.2*	**-0.07**	*0.04*	*-1.9*	2/	**0.00**	*0.05*	*0.1*	**-0.28**	*0.03*	*-10.5*	0.23	1.9	681
				-0.04	*0.01*	*-3.2*	1/									
Panel Africa M2 w/TT	**1.00**	*0.09*	*11.5*	**-0.15**	*0.08*	*-2.0*	2/	**-0.01**	*0.03*	*-0.5*	**-0.37**	*0.03*	*-11.5*	0.40	1.9	486
				-0.20	*0.04*	*-4.7*	1/									
Panel All-Ctry	**0.97**	*0.07*	*13.2*	**-0.06**	*0.03*	*-1.9*	2/	**-0.02**	*0.03*	*-0.8*	**-0.32**	*0.02*	*-15.4*	0.29	1.9	1167
				-0.05	*0.01*	*-4.1*	1/									

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta_{\Delta T}$ is the coefficient on Terms of Trade

6/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 15: Non-Africa Demand for M3

	Income Elasticities			Inflation Elasticities				Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Argentina	**1.28**	*0.47*	*2.7*	**-0.09**	*0.04*	*-2.1*	1/	**-0.27**	*0.10*	*-2.6*	0.53	1.8	40
Bangladesh	**0.84**	*0.58*	*1.5*	**-0.80**	*0.19*	*-4.1*	1/	**-0.39**	*0.21*	*-1.9*	0.81	1.1	27
Brazil	**1.22**	*0.86*	*1.4*	**0.03**	*0.07*	*0.4*	1/	**-0.68**	*0.29*	*-2.4*	0.18	1.7	40
Chile	**0.50**	*0.59*	*0.9*	**-0.15**	*0.11*	*-1.4*	1/	**-0.29**	*0.12*	*-2.5*	0.25	1.7	40
China	**0.96**	*0.82*	*1.2*	**-0.31**	*0.16*	*-1.9*	2/	**-0.29**	*0.41*	*-0.7*	0.12	1.6	14
Colombia	**0.46**	*0.52*	*0.9*	**-0.03**	*0.28*	*-0.1*	1/	**-0.30**	*0.15*	*-2.0*	0.09	1.8	40
Costa Rica	**-0.59**	*0.71*	*-0.8*	**-0.57**	*0.16*	*-3.4*	1/	**-0.15**	*0.10*	*-1.5*	0.28	2.4	40
Dominican Rep.	**0.29**	*0.29*	*1.0*	**-0.34**	*0.16*	*-2.2*	1/	**-0.56**	*0.20*	*-2.8*	0.37	1.6	40
Ecuador	**1.17**	*0.35*	*3.3*	**-0.01**	*0.18*	*-0.1*	1/	**-0.21**	*0.14*	*-1.4*	0.14	2.3	40
El Salvador	**0.89**	*0.25*	*3.5*	**-0.16**	*0.13*	*-1.2*	2/	**-0.11**	*0.06*	*-1.9*	0.33	1.8	40
India	**0.55**	*0.14*	*3.9*	**-0.59**	*0.09*	*-6.9*	2/	**-0.02**	*0.04*	*-0.6*	0.56	1.2	40
Indonesia	**0.98**	*0.25*	*3.9*	**-0.19**	*0.02*	*-7.8*	2/	**-0.24**	*0.12*	*-1.9*	0.67	1.3	36
Israel	**0.26**	*0.38*	*0.7*	**-0.07**	*0.10*	*-0.8*	2/	**0.06**	*0.12*	*0.5*	0.01	1.6	40
Jamaica	**0.98**	*0.21*	*4.7*	**-0.24**	*0.14*	*-1.7*	2/	**-0.11**	*0.08*	*-1.3*	0.38	1.7	40
Korea, Rep.	**0.81**	*0.38*	*2.1*	**-0.38**	*0.20*	*-1.9*	2/	**-0.08**	*0.07*	*-1.1*	0.23	0.9	34
Malaysia	**0.41**	*0.66*	*0.6*	**-0.11**	*0.49*	*-0.2*	1/	**-0.29**	*0.15*	*-1.9*	0.10	1.9	40
Mexico	**0.62**	*0.70*	*0.9*	**-0.26**	*0.31*	*-0.8*	2/	**-0.45**	*0.07*	*-6.6*	0.37	2.1	40
Philippines	**0.83**	*0.42*	*2.0*	**-0.68**	*0.20*	*-3.4*	2/	**-0.13**	*0.07*	*-2.0*	0.54	1.8	40
Thailand	**0.44**	*0.10*	*4.3*	**-0.43**	*0.08*	*-5.3*	1/	**-0.23**	*0.06*	*-3.9*	0.43	1.4	40
Turkey	**-0.34**	*0.52*	*-0.6*	**-0.14**	*0.10*	*-1.5*	1/	**-0.11**	*0.14*	*-0.8*	-0.04	1.6	32
Panel Non-Africa	**0.85**	*0.11*	*7.7*	**-0.12**	*0.03*	*-4.4*	2/	**-0.28**	*0.03*	*-10.3*	0.25	1.9	712
				-0.05	*0.01*	*-4.2*	1/						
Panel Africa M3	**1.04**	*0.11*	*9.2*	**-0.22**	*0.10*	*-2.2*	2/	**-0.36**	*0.03*	*-12.6*	0.36	1.3	520
				-0.26	*0.05*	*-4.6*	1/						
Panel All-Ctry	**0.98**	*0.08*	*12.4*	**-0.11**	*0.03*	*-3.9*	2/	**-0.33**	*0.02*	*-16.8*	0.30	1.6	1232
				-0.06	*0.01*	*-4.8*	1/						

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 16: Non-Africa Demand for M3 with Terms of Trade

	Income Elasticities			Inflation Elasticities				Terms of Trade Elasticities			Coint. Residual					
	$\beta_{\Delta y}$	s.e.	t-stat	β_{π}	s.e.	t-stat		$\beta_{\Delta T}$	s.e.	t-stat	$\beta_{\psi(t-1)}$	s.e.	t-stat	R^2	dw	Obs
Argentina	**1.15**	*0.49*	*2.4*	**-0.09**	*0.04*	*-2.2*	1/	**0.14**	*0.1*	*1.1*	**-0.26**	*0.11*	*-2.4*	0.53	1.7	39
Bangladesh	**0.94**	*0.57*	*1.7*	**-0.74**	*0.16*	*-4.6*	1/	**0.32**	*0.1*	*2.4*	**-0.49**	*0.25*	*-2.0*	0.81	1.6	27
Brazil	**1.09**	*0.71*	*1.6*	**0.03**	*0.07*	*0.4*	1/	**0.30**	*0.5*	*0.6*	**-0.67**	*0.27*	*-2.5*	0.18	1.7	40
Chile	**0.35**	*0.66*	*0.5*	**-0.12**	*0.09*	*-1.4*	1/	**0.02**	*0.2*	*0.1*	**-0.44**	*0.16*	*-2.7*	0.30	1.5	40
China	**1.12**	*0.76*	*1.5*	**-0.41**	*0.16*	*-2.6*	2/	**0.62**	*0.3*	*2.0*	**-0.26**	*0.45*	*-0.6*	0.25	2.2	14
Colombia	**0.36**	*0.56*	*0.6*	**-0.04**	*0.28*	*-0.1*	1/	**0.24**	*0.2*	*1.2*	**-0.29**	*0.16*	*-1.9*	0.10	1.7	40
Costa Rica	**-0.32**	*0.63*	*-0.5*	**-0.50**	*0.17*	*-2.9*	1/	**-0.32**	*0.3*	*-1.2*	**-0.15**	*0.09*	*-1.7*	0.31	2.4	40
Dominican Rep.	**0.45**	*0.25*	*1.8*	**-0.29**	*0.15*	*-1.9*	1/	**-0.82**	*0.2*	*-3.3*	**-0.66**	*0.21*	*-3.1*	0.44	1.6	40
Ecuador	**1.41**	*0.47*	*3.0*	**-0.12**	*0.25*	*-0.5*	1/	**0.16**	*0.2*	*1.0*	**-0.22**	*0.15*	*-1.5*	0.15	2.2	40
El Salvador	**1.02**	*0.24*	*4.2*	**-0.12**	*0.13*	*-1.0*	2/	**-0.09**	*0.1*	*-1.4*	**-0.16**	*0.06*	*-2.6*	0.36	1.6	40
India	**0.65**	*0.12*	*5.2*	**-0.60**	*0.07*	*-8.4*	2/	**0.03**	*0.1*	*0.6*	**-0.08**	*0.04*	*-2.1*	0.72	1.8	31
Indonesia	**1.02**	*0.21*	*4.9*	**-0.15**	*0.08*	*-1.9*	2/	**-0.09**	*0.1*	*-0.8*	**-0.33**	*0.12*	*-2.8*	0.36	1.3	34
Israel	**0.12**	*0.47*	*0.2*	**-0.08**	*0.10*	*-0.8*	2/	**-0.09**	*0.1*	*-1.6*	**0.07**	*0.16*	*0.4*	-0.01	1.6	39
Jamaica	**0.97**	*0.21*	*4.7*	**-0.24**	*0.13*	*-1.9*	2/	**0.03**	*0.1*	*0.2*	**-0.11**	*0.08*	*-1.3*	0.36	1.6	40
Korea, Rep.	**0.78**	*0.45*	*1.7*	**-0.38**	*0.19*	*-2.0*	2/	**0.05**	*0.3*	*0.2*	**-0.05**	*0.08*	*-0.6*	0.19	1.0	34
Malaysia	**0.47**	*0.71*	*0.7*	**0.39**	*0.72*	*0.5*	1/	**-0.45**	*0.3*	*-1.3*	**-0.30**	*0.15*	*-1.9*	0.09	1.9	40
Mexico	**0.14**	*0.59*	*0.2*	**-0.25**	*0.28*	*-0.9*	2/	**0.45**	*0.3*	*1.3*	**-0.55**	*0.08*	*-6.8*	0.41	2.0	40
Philippines	**0.72**	*0.46*	*1.6*	**-0.70**	*0.21*	*-3.3*	2/	**-0.07**	*0.1*	*-0.6*	**-0.13**	*0.07*	*-1.8*	0.52	1.8	40
Thailand	**0.42**	*0.12*	*3.5*	**-0.44**	*0.09*	*-5.1*	1/	**0.02**	*0.1*	*0.3*	**-0.25**	*0.06*	*-4.2*	0.44	1.4	40
Turkey	**-0.42**	*0.82*	*-0.5*	**0.02**	*0.23*	*0.1*	1/	**-0.77**	*0.9*	*-0.9*	**-0.46**	*0.26*	*-1.7*	0.24	1.3	14
Panel Non-Africa	**0.81**	*0.11*	*7.1*	**-0.11**	*0.03*	*-3.1*	2/	**0.02**	*0.0*	*0.5*	**-0.31**	*0.03*	*-10.7*	0.25	1.9	681
				-0.05	*0.01*	*-3.9*	1/									
Panel Africa M3 w/TT	**1.01**	*0.09*	*11.7*	**-0.18**	*0.08*	*-2.3*	2/	**-0.03**	*0.0*	*-1.1*	**-0.36**	*0.03*	*-11.6*	0.41	1.8	486
				-0.20	*0.04*	*-4.9*	1/									
Panel All-Ctry	**0.96**	*0.07*	*13.4*	**-0.09**	*0.03*	*-3.0*	2/	**-0.02**	*0.0*	*-0.9*	**-0.34**	*0.02*	*-15.8*	0.31	1.9	1167
				-0.05	*0.01*	*-4.7*	1/									

Notes:

1/ Inflation measured as the log change in the GDP deflator.

2/ Inflation is measured as the log change in the CPI.

3/ $\beta_{\Delta y}$ is the coefficient on Income

4/ β_{π} is the coefficient on Inflation

5/ $\beta_{\Delta T}$ is the coefficient on Terms of Trade

6/ $\beta\psi(\tau-1)$ is the coefficient on the cointegrating residual or error correction term.

Table 17: Africa M2 Demand Out of Sample Forecast Test

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference
Algeria	11.0%	11.3%	-0.3%	5.9%	6.7%	-0.8%	3.8%	6.1%	-2.3%
Botswana	35.0%	21.8%	13.2%	14.3%	7.3%	7.0%	10.2%	4.4%	5.8%
Burundi	26.6%	22.6%	4.0%	12.3%	9.0%	3.2%	12.5%	5.3%	7.1%
Cameroon	3.7%	8.9%	-5.2%	9.0%	11.8%	-2.7%	9.9%	8.6%	1.2%
Cote d'Ivoire	23.1%	14.1%	9.0%	9.7%	10.2%	-0.4%	6.9%	6.5%	0.3%
Egypt	2.1%	8.6%	-6.4%	4.5%	6.4%	-1.8%	6.1%	4.1%	2.0%
Gabon	7.8%	3.2%	4.6%	3.3%	5.2%	-1.9%	0.4%	2.4%	-2.1%
Gambia	6.6%	3.1%	3.5%	3.3%	2.5%	0.8%	2.8%	1.4%	1.4%
Ghana	1.6%	0.4%	1.2%	4.9%	5.9%	-1.0%	5.8%	3.8%	2.0%
Kenya	3.5%	1.4%	2.1%	5.5%	9.0%	-3.6%	3.4%	4.1%	-0.7%
Mauritius	11.3%	5.5%	5.8%	2.4%	3.4%	-1.0%	3.1%	1.9%	1.2%
Morocco	1.8%	0.8%	1.0%	2.2%	3.3%	-1.1%	1.7%	2.4%	-0.7%
Nigeria	8.2%	1.6%	6.6%	9.4%	14.2%	-4.8%	10.6%	8.2%	2.4%
South Africa	8.6%	4.7%	4.0%	3.4%	1.4%	1.9%	2.2%	0.8%	1.4%
Tunisia	6.3%	8.1%	-1.8%	1.8%	3.6%	-1.8%	2.4%	2.6%	-0.2%
Zambia	3.6%	6.8%	-3.2%	4.1%	5.2%	-1.2%	3.4%	3.9%	-0.5%
Mean	10.1%	7.7%	2.4%	6.0%	6.6%	-0.6%	5.3%	4.2%	1.2%
t-stat	*(1.84)*			*(-0.81)*			*(1.83)*		
p-value	*0.04*			*0.21*			*0.04*		
# Cntrys w/ lower Panel RMSE			11			4			10
% Cntrys w/ lower Panel RMSE			69%			25%			63%

Table 18: Africa M2 Demand with Terms of Trade Out of Sample Forecast Test

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference
Algeria	1.2%	15.0%	-13.8%	5.6%	7.2%	-1.6%	2.7%	5.0%	-2.4%
Botswana	55.5%	25.1%	30.4%	12.2%	7.9%	4.3%	12.4%	4.7%	7.8%
Burundi	27.8%	22.7%	5.0%	12.2%	9.8%	2.4%	13.0%	5.4%	7.6%
Cameroon	3.6%	10.5%	-6.8%	8.9%	11.1%	-2.2%	10.1%	6.8%	3.4%
Cote d'Ivoire	10.5%	16.2%	-5.7%	8.9%	9.0%	0.0%	5.6%	5.2%	0.3%
Egypt	4.5%	10.4%	-5.9%	4.5%	5.4%	-0.9%	4.7%	2.3%	2.5%
Gabon	10.6%	3.5%	7.1%	1.1%	6.7%	-5.6%	1.5%	1.9%	-0.4%
Gambia	6.7%	6.6%	0.0%	3.4%	3.6%	-0.2%	2.7%	1.9%	0.8%
Ghana	3.9%	0.9%	3.1%	4.1%	5.0%	-0.9%	6.5%	2.6%	3.9%
Kenya	14.0%	10.6%	3.4%	5.9%	5.0%	0.9%	4.0%	2.8%	1.2%
Mauritius	11.3%	4.6%	6.6%	2.4%	1.8%	0.5%	2.9%	1.1%	1.9%
Morocco	2.2%	2.6%	-0.4%	2.2%	3.9%	-1.7%	1.6%	2.5%	-0.9%
Nigeria	9.1%	2.4%	6.7%	15.9%	14.9%	1.0%	10.8%	7.1%	3.7%
South Africa	8.6%	6.7%	1.9%	3.3%	1.9%	1.4%	2.2%	1.1%	1.0%
Tunisia	6.3%	7.4%	-1.1%	1.9%	3.2%	-1.2%	2.6%	1.4%	1.2%
Zambia	2.9%	6.6%	-3.7%	3.6%	6.1%	-2.4%	3.7%	2.0%	1.7%
Mean	11.2%	9.5%	1.7%	6.0%	6.4%	-0.4%	5.4%	3.4%	2.1%
t-stat	*(0.69)*			*(-0.69)*			*(3.05)*		
p-value	*0.25*			*0.25*			*0.00*		
# Cntrys w/ lower Panel RMSE			9			6			13
% Cntrys w/ lower Panel RMSE			56%			38%			81%

Table 19: Africa M3 Demand Out of Sample Forecast Test

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference
Algeria	9.9%	11.5%	-1.6%	5.1%	6.6%	-1.5%	2.7%	6.0%	-3.2%
Botswana	35.0%	21.8%	13.2%	14.3%	7.3%	7.0%	10.2%	4.4%	5.8%
Burundi	33.3%	24.9%	8.5%	10.4%	8.3%	2.1%	8.1%	5.2%	2.9%
Cameroon	3.7%	9.3%	-5.6%	9.0%	11.8%	-2.8%	9.9%	8.6%	1.2%
Cote d'Ivoire	22.9%	14.4%	8.5%	9.7%	10.0%	-0.3%	6.9%	6.5%	0.4%
Egypt	1.1%	7.6%	-6.4%	3.7%	5.7%	-2.0%	5.4%	3.6%	1.8%
Gabon	7.8%	3.9%	4.0%	3.3%	5.3%	-2.0%	0.4%	2.4%	-2.0%
Gambia	7.9%	3.5%	4.4%	3.5%	2.4%	1.1%	2.9%	1.3%	1.5%
Ghana	1.6%	0.7%	0.9%	4.8%	6.1%	-1.3%	5.4%	3.8%	1.7%
Kenya	6.5%	5.1%	1.4%	4.6%	5.1%	-0.5%	5.0%	2.8%	2.1%
Mauritius	11.0%	5.5%	5.5%	2.3%	3.4%	-1.0%	3.1%	2.0%	1.1%
Morocco	3.3%	5.3%	-2.0%	5.7%	4.9%	0.8%	4.1%	3.6%	0.5%
Nigeria	8.2%	0.6%	7.6%	9.1%	15.0%	-5.9%	10.5%	8.2%	2.3%
South Africa	9.3%	4.7%	4.5%	3.9%	1.9%	2.0%	2.6%	0.7%	1.8%
Tunisia	5.9%	7.7%	-1.9%	1.8%	3.7%	-1.8%	2.4%	2.7%	-0.2%
Zambia	7.3%	8.6%	-1.3%	5.8%	5.7%	0.1%	4.1%	4.3%	-0.2%
Mean	10.9%	8.4%	2.5%	6.1%	6.5%	-0.4%	5.2%	4.1%	1.1%
t-stat	*(1.81)*			*(-0.56)*			*(2.14))*		
p-value	*0.04*			*0.29*			*0.02*		
# Cntrys w/ lower Panel RMSE			10			6			12
% Cntrys w/ lower Panel RMSE			63%			38%			75%

Table 20: Africa M3 Demand with Terms of Trade Out of Sample Forecast Test

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference	**Individual Country**	**Africa Panel**	RMSE Difference
Algeria	0.2%	15.3%	-15.1%	5.0%	6.7%	-1.7%	3.8%	4.8%	-1.0%
Botswana	55.5%	24.9%	30.6%	12.2%	7.7%	4.4%	12.4%	4.6%	7.9%
Burundi	34.3%	25.8%	8.4%	9.6%	8.5%	1.1%	8.2%	5.2%	2.9%
Cameroon	3.6%	10.8%	-7.2%	8.9%	11.2%	-2.3%	10.1%	6.8%	3.3%
Cote d'Ivoire	10.5%	16.4%	-5.9%	8.9%	8.9%	0.0%	5.5%	5.2%	0.3%
Egypt	3.3%	9.2%	-5.9%	3.9%	5.0%	-1.1%	4.3%	2.0%	2.3%
Gabon	10.6%	4.7%	5.8%	1.1%	6.5%	-5.4%	1.5%	1.6%	-0.1%
Gambia	8.0%	7.1%	0.9%	3.7%	3.5%	0.1%	2.8%	1.8%	1.0%
Ghana	3.8%	1.1%	2.7%	4.0%	5.2%	-1.2%	5.9%	2.8%	3.1%
Kenya	23.2%	14.8%	8.4%	8.1%	4.3%	3.8%	6.0%	2.6%	3.4%
Mauritius	10.9%	4.5%	6.4%	2.3%	1.8%	0.5%	2.9%	1.1%	1.8%
Morocco	3.9%	3.5%	0.3%	6.0%	2.6%	3.4%	4.1%	2.3%	1.8%
Nigeria	8.7%	0.4%	8.2%	15.1%	15.2%	-0.1%	10.9%	6.7%	4.3%
South Africa	9.4%	6.9%	2.5%	3.7%	2.2%	1.5%	2.5%	1.2%	1.3%
Tunisia	6.3%	7.8%	-1.5%	2.1%	3.2%	-1.1%	2.6%	1.3%	1.3%
Zambia	6.2%	8.7%	-2.5%	5.1%	6.4%	-1.3%	4.5%	2.2%	2.3%
Mean	12.4%	10.1%	2.3%	6.2%	6.2%	0.0%	5.5%	3.3%	2.2%
t-stat	*(0.89)*			*(0.05)*			*(4.37)*		
p-value	*0.19*			*0.48*			*0.00*		
# Cntrys w/ lower Panel RMSE			10			8			14
% Cntrys w/ lower Panel RMSE			63%			50%			88%

Table 21: Non-Africa M2 Demand Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference
Argentina	12.1%	9.5%	2.5%	6.9%	9.2%	-2.3%	3.9%	4.6%	-0.7%
Bangladesh	7.8%	7.2%	0.7%	8.4%	3.4%	5.0%	6.3%	1.5%	4.8%
Brazil	0.3%	11.9%	-11.6%	11.1%	12.8%	-1.7%	24.6%	12.2%	12.4%
Chile	11.3%	2.7%	8.6%	5.8%	0.3%	5.5%	6.5%	0.1%	6.4%
China	5.1%	5.0%	0.1%	3.8%	4.8%	-1.1%	1.7%	2.8%	-1.1%
Colombia	11.0%	5.6%	5.4%	5.0%	5.3%	-0.3%	3.2%	2.7%	0.5%
Costa Rica	0.4%	7.2%	-6.7%	5.0%	2.2%	2.8%	6.5%	1.5%	4.9%
Dominican Rep.	7.1%	2.9%	4.2%	4.0%	2.0%	2.0%	2.1%	0.5%	1.6%
Ecuador	7.6%	9.0%	-1.3%	8.3%	7.2%	1.1%	6.6%	3.8%	2.8%
El Salvador	0.7%	0.6%	0.0%	3.4%	2.2%	1.2%	2.0%	1.3%	0.7%
India	3.7%	2.3%	1.4%	3.4%	1.9%	1.5%	1.6%	1.3%	0.3%
Indonesia	14.3%	5.6%	8.7%	3.9%	3.8%	0.1%	3.1%	3.2%	-0.1%
Israel	8.5%	5.5%	3.1%	4.3%	1.9%	2.4%	3.7%	1.3%	2.3%
Jamaica	4.2%	5.6%	-1.5%	5.6%	6.0%	-0.4%	1.7%	2.3%	-0.6%
Korea, Rep.	33.6%	23.5%	10.2%	12.1%	7.9%	4.1%	7.2%	4.8%	2.5%
Malaysia	9.4%	5.9%	3.5%	2.8%	2.0%	0.8%	2.2%	1.4%	0.7%
Mexico	2.7%	2.0%	0.7%	2.5%	1.8%	0.7%	2.6%	1.7%	0.9%
Philippines	3.3%	9.5%	-6.2%	5.2%	8.5%	-3.3%	6.6%	4.6%	2.0%
Thailand	0.5%	10.0%	-9.5%	1.6%	4.8%	-3.2%	2.0%	3.1%	-1.0%
Turkey	8.9%	5.8%	3.1%	8.5%	6.2%	2.3%	10.4%	4.3%	6.1%
Mean	7.6%	6.9%	0.8%	5.6%	4.7%	0.9%	5.2%	3.0%	2.3%
t-stat	*(0.58)*			*(1.57)*			*(3.07)*		
p-value	*0.28*			*0.07*			*0.00*		
# Cntrys w/ lower Panel RMSE			14			13			15
% Cntrys w/ lower Panel RMSE			70%			65%			75%

Table 22: Non-Africa M2 Demand with Terms of Trade Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference
Argentina	8.1%	8.9%	-0.8%	5.0%	9.2%	-4.2%	2.8%	4.6%	-1.8%
Bangladesh	7.7%	6.1%	1.7%	6.7%	3.3%	3.4%	5.8%	1.3%	4.5%
Brazil	2.5%	14.2%	-11.7%	13.2%	15.1%	-1.9%	25.5%	11.2%	14.4%
Chile	10.5%	3.2%	7.3%	3.8%	0.4%	3.4%	6.7%	0.4%	6.4%
China	4.6%	4.3%	0.2%	3.5%	5.0%	-1.5%	12.1%	2.8%	9.3%
Colombia	11.4%	6.0%	5.4%	5.0%	5.4%	-0.4%	3.1%	2.8%	0.4%
Costa Rica	1.9%	6.8%	-4.9%	6.2%	2.1%	4.1%	5.8%	1.3%	4.5%
Dominican Rep.	7.2%	3.4%	3.9%	3.1%	2.3%	0.8%	1.6%	0.7%	0.9%
Ecuador	5.5%	7.1%	-1.6%	9.5%	8.2%	1.3%	8.3%	4.0%	4.3%
El Salvador	0.2%	0.2%	0.0%	3.4%	2.5%	0.9%	2.1%	1.3%	0.8%
India	3.3%	1.9%	1.4%	2.0%	1.7%	0.3%	1.9%	1.3%	0.6%
Indonesia	16.7%	3.8%	13.0%	4.4%	3.0%	1.5%	3.7%	2.5%	1.3%
Israel	17.0%	10.9%	6.1%	7.5%	3.0%	4.5%	5.2%	1.4%	3.9%
Jamaica	6.9%	9.1%	-2.3%	5.7%	6.1%	-0.4%	1.9%	2.8%	-0.9%
Korea, Rep.	30.1%	20.5%	9.6%	10.3%	7.6%	2.7%	6.5%	4.7%	1.8%
Malaysia	5.7%	3.3%	2.4%	4.0%	3.2%	0.8%	2.6%	1.9%	0.8%
Mexico	1.1%	0.9%	0.2%	3.9%	1.9%	1.9%	2.9%	2.3%	0.7%
Philippines	2.1%	9.7%	-7.6%	5.2%	8.5%	-3.3%	7.0%	4.1%	3.0%
Thailand	2.7%	11.3%	-8.6%	2.4%	5.0%	-2.6%	2.0%	3.1%	-1.1%
Turkey	6.7%	5.7%	1.0%	9.2%	6.3%	2.9%	23.1%	3.9%	19.2%
Mean	7.6%	6.9%	0.7%	5.7%	5.0%	0.7%	6.5%	2.9%	3.6%
t-stat	*(0.54)*			*(1.26)*			*(3.07)*		
p-value	*0.30*			*0.11*			*0.00*		
# Cntrys w/ lower Panel RMSE			13			13			17
% Cntrys w/ lower Panel RMSE			65%			65%			85%

Table 23: Non-Africa M3 Demand Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference
Argentina	10.3%	8.5%	1.8%	6.2%	8.3%	-2.1%	3.4%	4.0%	-0.6%
Bangladesh	7.8%	7.9%	-0.1%	8.4%	3.9%	4.5%	6.3%	1.9%	4.5%
Brazil	10.0%	11.5%	-1.5%	16.5%	11.7%	4.9%	14.9%	10.8%	4.1%
Chile	11.5%	3.5%	8.0%	5.9%	0.5%	5.3%	6.6%	0.2%	6.4%
China	5.1%	4.5%	0.6%	3.8%	4.4%	-0.6%	1.7%	2.7%	-1.0%
Colombia	6.6%	4.4%	2.2%	2.9%	2.3%	0.6%	2.3%	1.7%	0.6%
Costa Rica	0.5%	8.2%	-7.7%	5.1%	2.5%	2.5%	6.5%	1.7%	4.8%
Dominican Rep.	4.7%	1.8%	2.9%	2.6%	1.1%	1.5%	1.5%	0.7%	0.8%
Ecuador	7.1%	9.1%	-2.0%	7.5%	7.0%	0.5%	6.6%	3.8%	2.8%
El Salvador	2.5%	3.0%	-0.5%	0.8%	1.1%	-0.4%	3.4%	0.6%	2.8%
India	4.2%	2.2%	2.0%	3.8%	2.0%	1.8%	1.8%	1.3%	0.6%
Indonesia	13.6%	5.8%	7.8%	3.7%	3.5%	0.2%	3.1%	2.9%	0.2%
Israel	1.4%	0.1%	1.2%	2.0%	2.3%	-0.3%	1.9%	1.0%	0.8%
Jamaica	5.7%	10.5%	-4.8%	7.0%	8.4%	-1.4%	3.5%	3.5%	0.0%
Korea, Rep.	9.8%	8.4%	1.4%	2.2%	3.3%	-1.1%	1.4%	2.1%	-0.7%
Malaysia	44.2%	5.6%	38.7%	13.3%	1.1%	12.2%	7.6%	0.3%	7.3%
Mexico	5.7%	1.8%	3.9%	6.8%	2.4%	4.4%	4.0%	1.3%	2.7%
Philippines	3.1%	8.5%	-5.4%	4.4%	8.0%	-3.6%	5.9%	4.0%	1.9%
Thailand	2.3%	11.1%	-8.9%	1.9%	5.4%	-3.6%	2.6%	3.4%	-0.8%
Turkey	9.1%	6.2%	2.9%	8.8%	6.4%	2.4%	11.5%	4.3%	7.2%
Mean	8.3%	6.1%	2.1%	5.7%	4.3%	1.4%	4.8%	2.6%	2.2%
t-stat	*(0.98)*			*(1.70)*			*(3.67)*		
p-value	*0.17*			*0.05*			*0.00*		
# Cntrys w/ lower Panel RMSE			12			12			15
% Cntrys w/ lower Panel RMSE			60%			60%			75%

Table 24: Non-Africa M3 Demand with Terms of Trade Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference	**Individual Country**	**Non-Africa Panel**	RMSE Difference
Argentina	6.9%	8.0%	-1.0%	4.4%	8.2%	-3.8%	2.7%	4.0%	-1.3%
Bangladesh	7.7%	6.9%	0.8%	6.7%	3.8%	2.9%	5.8%	1.7%	4.2%
Brazil	7.8%	11.4%	-3.6%	16.8%	12.2%	4.6%	16.8%	10.1%	6.7%
Chile	10.7%	4.0%	6.7%	3.8%	0.3%	3.4%	6.8%	0.2%	6.6%
China	4.6%	3.9%	0.7%	3.5%	4.7%	-1.2%	12.1%	2.8%	9.3%
Colombia	5.2%	3.6%	1.5%	2.8%	2.1%	0.7%	2.9%	1.5%	1.4%
Costa Rica	1.9%	7.9%	-6.0%	6.3%	2.6%	3.8%	5.8%	1.5%	4.3%
Dominican Rep.	4.7%	2.3%	2.5%	2.0%	1.4%	0.6%	1.2%	0.7%	0.6%
Ecuador	4.7%	6.2%	-1.5%	8.7%	7.7%	1.1%	8.3%	3.7%	4.6%
El Salvador	2.2%	2.2%	-0.1%	0.9%	1.1%	-0.2%	3.5%	0.6%	2.8%
India	3.8%	1.5%	2.4%	2.5%	1.8%	0.7%	1.5%	1.2%	0.3%
Indonesia	15.8%	3.5%	12.2%	4.1%	2.5%	1.6%	3.7%	2.2%	1.5%
Israel	6.9%	3.1%	3.8%	3.3%	1.9%	1.5%	2.7%	1.0%	1.7%
Jamaica	7.9%	14.3%	-6.4%	7.2%	8.5%	-1.3%	3.6%	3.9%	-0.2%
Korea, Rep.	6.6%	4.7%	1.9%	3.0%	2.9%	0.2%	2.8%	2.1%	0.7%
Malaysia	41.7%	1.0%	40.7%	15.4%	2.7%	12.7%	9.8%	1.1%	8.7%
Mexico	2.9%	0.5%	2.4%	4.8%	2.0%	2.8%	3.6%	1.8%	1.8%
Philippines	1.9%	8.4%	-6.5%	4.4%	8.0%	-3.6%	6.2%	3.6%	2.6%
Thailand	0.1%	12.2%	-12.1%	2.2%	5.4%	-3.2%	2.4%	3.3%	-0.9%
Turkey	8.5%	7.2%	1.3%	10.5%	7.2%	3.2%	56.1%	4.4%	51.7%
Mean	7.6%	5.6%	2.0%	5.7%	4.3%	1.3%	7.9%	2.6%	5.4%
t-stat	*(0.84)*			*(1.63)*			*(2.11)*		
p-value	*0.20*			*0.06*			*0.02*		
# Cntrys w/ lower Panel RMSE			12			14			17
% Cntrys w/ lower Panel RMSE			60%			70%			85%

Table 25: All Countries M2 Demand Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference
Algeria	11.0%	12.2%	-1.3%	5.6%	6.6%	-1.0%	3.8%	6.9%	-3.1%
Botswana	35.0%	22.3%	12.7%	14.3%	7.6%	6.7%	10.2%	4.6%	5.6%
Burundi	26.6%	23.0%	3.6%	12.0%	9.4%	2.6%	12.5%	5.7%	6.7%
Cameroon	3.7%	7.5%	-3.8%	7.1%	9.0%	-1.9%	9.9%	8.4%	1.5%
Cote d'Ivoire	23.1%	13.4%	9.8%	9.2%	9.5%	-0.2%	6.9%	6.7%	0.2%
Egypt	2.1%	7.3%	-5.2%	4.2%	4.6%	-0.4%	6.1%	3.6%	2.5%
Gabon	7.8%	2.9%	4.9%	3.1%	4.6%	-1.5%	0.4%	2.6%	-2.3%
Gambia	6.6%	4.6%	2.0%	3.1%	3.6%	-0.5%	2.8%	2.0%	0.8%
Ghana	1.6%	1.7%	-0.1%	4.7%	3.8%	0.9%	5.8%	2.2%	3.6%
Kenya	3.5%	1.7%	1.8%	4.4%	6.8%	-2.3%	3.4%	4.1%	-0.8%
Mauritius	11.3%	4.9%	6.4%	2.3%	2.5%	-0.2%	3.1%	1.3%	1.8%
Morocco	1.8%	0.7%	1.1%	2.2%	3.5%	-1.3%	1.7%	2.2%	-0.5%
Nigeria	8.2%	5.2%	3.0%	8.3%	12.5%	-4.2%	10.6%	10.1%	0.5%
South Africa	8.6%	4.8%	3.8%	3.3%	1.7%	1.6%	2.2%	1.0%	1.2%
Tunisia	6.3%	7.0%	-0.8%	1.8%	2.5%	-0.7%	2.4%	1.8%	0.6%
Zambia	3.5%	4.8%	-1.4%	4.1%	3.3%	0.8%	3.6%	1.8%	1.7%
Argentina	12.1%	10.0%	2.0%	6.9%	9.3%	-2.4%	3.9%	4.7%	-0.9%
Bangladesh	7.8%	6.9%	0.9%	8.4%	3.2%	5.2%	6.3%	1.4%	5.0%
Brazil	0.3%	11.6%	-11.3%	11.1%	12.4%	-1.3%	24.6%	11.4%	13.2%
Chile	11.3%	2.3%	8.9%	5.8%	0.3%	5.5%	6.5%	0.2%	6.3%
China	5.1%	5.2%	-0.1%	3.8%	4.7%	-1.0%	1.7%	2.8%	-1.0%
Colombia	11.0%	6.4%	4.6%	5.0%	5.8%	-0.8%	3.2%	2.9%	0.3%
Costa Rica	0.4%	7.0%	-6.6%	5.0%	2.1%	2.9%	6.5%	1.4%	5.1%
Dominican Rep.	7.1%	3.3%	3.8%	4.0%	2.1%	1.9%	2.1%	0.6%	1.5%
Ecuador	7.6%	8.2%	-0.6%	8.3%	7.2%	1.1%	6.6%	3.8%	2.8%
El Salvador	0.7%	0.3%	0.4%	3.4%	2.5%	0.9%	2.0%	1.4%	0.6%
India	3.7%	2.1%	1.6%	3.4%	1.9%	1.5%	1.6%	1.3%	0.3%
Indonesia	14.3%	6.8%	7.5%	3.9%	4.3%	-0.4%	3.1%	3.4%	-0.3%
Israel	8.5%	5.9%	2.7%	4.3%	2.2%	2.2%	3.7%	1.4%	2.2%
Jamaica	4.2%	5.2%	-1.0%	5.6%	5.4%	0.1%	1.7%	2.0%	-0.3%
Korea, Rep.	33.6%	24.4%	9.3%	12.1%	8.4%	3.7%	7.2%	4.9%	2.3%
Malaysia	9.4%	4.9%	4.4%	2.8%	1.8%	1.0%	2.2%	1.4%	0.8%
Mexico	2.7%	1.6%	1.1%	2.5%	1.7%	0.8%	2.6%	1.6%	1.0%
Philippines	3.3%	10.4%	-7.1%	5.2%	8.7%	-3.5%	6.6%	4.7%	1.9%
Thailand	0.5%	11.2%	-10.7%	1.6%	5.5%	-3.9%	2.0%	3.4%	-1.3%
Turkey	8.9%	7.1%	1.9%	8.5%	6.9%	1.6%	10.4%	5.0%	5.4%
Mean	8.70%	7.36%	1.34%	5.60%	5.22%	0.38%	5.27%	3.46%	1.81%
t-stat	*(1.51)*			*(0.92)*			*(3.53)*		
p-value	*0.07*			*0.18*			*0.00*		
# Cntrys w/ lower Panel RMSE			23			18			27
% Cntrys w/ lower Panel RMSE			64%			50%			75%

Table 26: All Countries M2 Demand with Terms of Trade Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference
Algeria	1.2%	14.7%	-13.5%	5.6%	7.1%	-1.5%	2.7%	6.2%	-3.5%
Botswana	55.5%	24.2%	31.3%	12.2%	7.8%	4.3%	12.4%	4.7%	7.8%
Burundi	27.8%	23.0%	4.7%	12.2%	9.9%	2.3%	13.0%	6.0%	7.0%
Cameroon	3.6%	8.1%	-4.4%	8.9%	10.6%	-1.7%	10.1%	7.5%	2.7%
Cote d'Ivoire	10.5%	13.9%	-3.4%	8.9%	10.2%	-1.3%	5.6%	6.0%	-0.5%
Egypt	4.5%	8.0%	-3.4%	4.5%	5.0%	-0.5%	4.7%	2.8%	1.9%
Gabon	10.6%	2.3%	8.3%	1.1%	6.0%	-4.9%	1.5%	2.7%	-1.2%
Gambia	6.7%	6.1%	0.6%	3.4%	4.3%	-1.0%	2.7%	2.3%	0.5%
Ghana	3.9%	1.7%	2.3%	4.1%	3.6%	0.6%	6.5%	2.2%	4.3%
Kenya	14.0%	10.5%	3.5%	5.9%	4.3%	1.6%	4.0%	2.7%	1.2%
Mauritius	11.3%	4.3%	7.0%	2.4%	2.0%	0.3%	2.9%	1.0%	1.9%
Morocco	2.2%	1.8%	0.4%	2.2%	4.0%	-1.8%	1.6%	2.4%	-0.8%
Nigeria	9.1%	7.8%	1.4%	15.9%	14.5%	1.4%	10.8%	8.9%	1.9%
South Africa	8.6%	5.9%	2.8%	3.3%	1.9%	1.4%	2.2%	1.1%	1.1%
Tunisia	6.3%	6.5%	-0.2%	1.9%	2.5%	-0.5%	2.6%	1.3%	1.3%
Zambia	3.0%	5.2%	-2.2%	4.3%	3.9%	0.4%	3.9%	1.3%	2.6%
Argentina	8.1%	10.3%	-2.3%	5.0%	9.3%	-4.3%	2.8%	4.8%	-2.0%
Bangladesh	7.7%	5.9%	1.9%	6.7%	2.8%	3.8%	5.8%	0.9%	5.0%
Brazil	2.5%	15.8%	-13.4%	13.2%	15.8%	-2.6%	25.5%	8.9%	16.6%
Chile	10.5%	3.1%	7.5%	3.8%	0.6%	3.2%	6.7%	0.8%	6.0%
China	4.6%	4.7%	-0.1%	3.5%	5.0%	-1.5%	12.1%	2.9%	9.2%
Colombia	11.4%	7.6%	3.8%	5.0%	5.9%	-0.9%	3.1%	3.1%	0.0%
Costa Rica	1.9%	7.4%	-5.6%	6.2%	2.0%	4.2%	5.8%	1.4%	4.4%
Dominican Rep.	7.2%	4.5%	2.7%	3.1%	2.7%	0.5%	1.6%	1.0%	0.6%
Ecuador	5.5%	4.4%	1.0%	9.5%	9.0%	0.5%	8.3%	4.0%	4.3%
El Salvador	0.2%	1.1%	-0.9%	3.4%	2.9%	0.5%	2.1%	1.6%	0.5%
India	3.3%	1.9%	1.5%	2.0%	1.9%	0.1%	1.9%	1.0%	0.8%
Indonesia	16.7%	5.3%	11.5%	4.4%	3.6%	0.8%	3.7%	2.7%	1.0%
Israel	17.0%	12.6%	4.4%	7.5%	3.5%	4.0%	5.2%	1.7%	3.6%
Jamaica	6.9%	9.4%	-2.6%	5.7%	5.5%	0.3%	1.9%	2.3%	-0.4%
Korea, Rep.	30.1%	21.5%	8.7%	10.3%	8.3%	2.0%	6.5%	5.1%	1.4%
Malaysia	5.7%	1.5%	4.2%	4.0%	3.4%	0.6%	2.6%	1.9%	0.7%
Mexico	1.1%	0.6%	0.5%	3.9%	1.7%	2.1%	2.9%	2.0%	0.9%
Philippines	2.1%	13.3%	-11.2%	5.2%	9.4%	-4.2%	7.0%	4.0%	3.0%
Thailand	2.7%	13.5%	-10.7%	2.4%	6.0%	-3.6%	2.0%	3.6%	-1.6%
Turkey	6.7%	7.2%	-0.5%	9.2%	6.8%	2.4%	23.1%	4.0%	19.1%
Mean	9.2%	8.2%	1.0%	5.9%	5.7%	0.2%	6.1%	3.2%	2.8%
t-stat			*(0.75)*			*(0.48)*			*(3.66)*
p-value			*0.23*			*0.32*			*0.00*
# Ctrys w/ lower Panel RMSE			21			22			28
% Ctrys w/ lower Panel RMSE			58%			61%			78%

Table 27: All Countries Demand for M3 Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference
Algeria	9.9%	12.2%	-2.4%	4.9%	6.5%	-1.7%	2.7%	6.7%	-3.9%
Botswana	35.0%	22.3%	12.7%	14.3%	7.5%	6.8%	10.2%	4.6%	5.7%
Burundi	33.3%	25.3%	8.0%	10.5%	9.3%	1.1%	8.1%	5.7%	2.4%
Cameroon	3.7%	8.1%	-4.5%	7.1%	9.1%	-2.0%	9.9%	8.4%	1.5%
Cote d'Ivoire	22.9%	14.0%	9.0%	9.2%	9.3%	-0.1%	6.9%	6.6%	0.3%
Egypt	1.1%	6.6%	-5.4%	3.4%	4.2%	-0.8%	5.4%	3.2%	2.2%
Gabon	7.8%	2.0%	5.9%	3.1%	4.6%	-1.6%	0.4%	2.5%	-2.1%
Gambia	7.9%	4.9%	3.0%	3.3%	3.3%	0.0%	2.9%	1.8%	1.1%
Ghana	1.6%	1.5%	0.0%	4.6%	3.9%	0.7%	5.4%	2.3%	3.1%
Kenya	6.5%	4.7%	1.7%	4.7%	4.6%	0.1%	5.0%	2.8%	2.2%
Mauritius	11.0%	5.0%	6.0%	2.2%	2.6%	-0.4%	3.1%	1.5%	1.6%
Morocco	3.3%	3.7%	-0.4%	5.8%	3.6%	2.2%	4.1%	2.6%	1.5%
Nigeria	8.2%	2.6%	5.6%	8.1%	12.9%	-4.7%	10.5%	9.8%	0.6%
South Africa	9.3%	4.6%	4.6%	3.9%	2.0%	1.9%	2.6%	0.9%	1.7%
Tunisia	5.9%	6.9%	-1.0%	1.7%	2.6%	-0.8%	2.4%	1.9%	0.5%
Zambia	7.2%	6.3%	0.8%	5.3%	3.5%	1.8%	4.1%	2.2%	1.9%
Argentina	10.3%	9.1%	1.3%	6.2%	8.5%	-2.4%	3.4%	4.2%	-0.8%
Bangladesh	7.8%	7.4%	0.4%	8.4%	3.5%	4.8%	6.3%	1.6%	4.7%
Brazil	10.0%	10.7%	-0.7%	16.5%	11.1%	5.5%	14.9%	10.3%	4.6%
Chile	11.5%	2.9%	8.6%	5.9%	0.4%	5.5%	6.6%	0.2%	6.5%
China	5.1%	4.8%	0.3%	3.8%	4.4%	-0.6%	1.7%	2.7%	-1.0%
Colombia	6.6%	3.4%	3.2%	2.9%	1.9%	1.0%	2.3%	1.3%	1.0%
Costa Rica	0.5%	7.9%	-7.4%	5.1%	2.2%	2.9%	6.5%	1.4%	5.0%
Dominican Rep.	4.7%	2.2%	2.5%	2.6%	1.3%	1.3%	1.5%	0.7%	0.9%
Ecuador	7.1%	8.3%	-1.1%	7.5%	6.9%	0.6%	6.6%	3.7%	2.9%
El Salvador	2.5%	2.5%	0.1%	0.8%	0.9%	-0.1%	3.4%	0.6%	2.8%
India	4.2%	1.9%	2.3%	3.8%	1.9%	1.9%	1.8%	1.3%	0.6%
Indonesia	13.6%	7.7%	6.0%	3.7%	4.4%	-0.7%	3.1%	3.3%	-0.2%
Israel	1.4%	0.4%	0.9%	2.0%	2.2%	-0.2%	1.9%	1.2%	0.7%
Jamaica	5.7%	9.8%	-4.1%	7.0%	7.6%	-0.6%	3.5%	3.1%	0.4%
Korea, Rep.	9.8%	9.7%	0.1%	2.2%	3.9%	-1.7%	1.4%	2.4%	-1.0%
Malaysia	44.2%	4.1%	40.1%	13.3%	0.8%	12.6%	7.6%	0.3%	7.3%
Mexico	5.7%	2.3%	3.4%	6.8%	2.5%	4.3%	4.0%	1.1%	2.8%
Philippines	3.1%	9.5%	-6.4%	4.4%	8.2%	-3.8%	5.9%	4.2%	1.7%
Thailand	2.3%	13.0%	-10.7%	1.9%	6.4%	-4.5%	2.6%	3.9%	-1.3%
Turkey	9.1%	7.6%	1.6%	8.8%	7.1%	1.7%	11.5%	5.1%	6.4%
Mean	9.4%	7.1%		5.7%	4.9%		5.0%	3.2%	
t-stat	*(1.73)*			*(1.50)*			*(4.30)*		
p-value	*0.05*			*0.07*			*0.00*		
# Ctrys w/ lower Panel RMSE			25			19			29
% Ctrys w/ lower Panel RMSE			69%			53%			81%

Table 28: All Countries M3 Demand with Terms of Trade Out of Sample Forecast Tests

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	Individual Country	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference	**Individual Country**	**All Panel**	RMSE Difference
Algeria	0.2%	15.5%	-15.2%	5.0%	6.9%	-1.9%	3.8%	6.0%	-2.2%
Botswana	55.5%	24.3%	31.2%	12.2%	7.8%	4.4%	12.4%	4.6%	7.8%
Burundi	34.3%	25.9%	8.3%	9.6%	9.8%	-0.2%	8.2%	5.9%	2.3%
Cameroon	3.6%	8.9%	-5.3%	8.9%	10.8%	-1.9%	10.1%	7.5%	2.7%
Cote d'Ivoire	10.5%	14.7%	-4.3%	8.9%	10.0%	-1.1%	5.5%	5.9%	-0.4%
Egypt	3.3%	7.3%	-4.0%	3.9%	4.6%	-0.8%	4.3%	2.5%	1.9%
Gabon	10.6%	1.1%	9.5%	1.1%	6.1%	-5.0%	1.5%	2.5%	-1.0%
Gambia	8.0%	6.6%	1.4%	3.7%	4.1%	-0.4%	2.8%	2.0%	0.8%
Ghana	3.8%	1.5%	2.3%	4.0%	3.7%	0.3%	5.9%	2.2%	3.7%
Kenya	23.2%	14.2%	9.0%	8.1%	4.9%	3.3%	6.0%	3.0%	3.0%
Mauritius	10.9%	4.5%	6.4%	2.3%	2.1%	0.2%	2.9%	1.2%	1.7%
Morocco	3.9%	3.2%	0.7%	6.0%	2.4%	3.6%	4.1%	2.0%	2.0%
Nigeria	8.7%	5.0%	3.7%	15.1%	15.2%	-0.1%	10.9%	8.7%	2.3%
South Africa	9.4%	5.8%	3.6%	3.7%	2.2%	1.5%	2.5%	1.0%	1.5%
Tunisia	6.3%	6.9%	-0.7%	2.1%	2.7%	-0.6%	2.6%	1.4%	1.2%
Zambia	6.1%	7.1%	-0.9%	5.8%	4.5%	1.2%	4.6%	1.4%	3.2%
Argentina	6.9%	9.3%	-2.3%	4.4%	8.5%	-4.1%	2.7%	4.3%	-1.7%
Bangladesh	7.7%	6.5%	1.2%	6.7%	3.2%	3.5%	5.8%	1.1%	4.7%
Brazil	7.8%	11.9%	-4.1%	16.8%	12.2%	4.6%	16.8%	7.9%	8.9%
Chile	10.7%	3.8%	6.9%	3.8%	0.6%	3.2%	6.8%	0.6%	6.2%
China	4.6%	4.2%	0.4%	3.5%	4.7%	-1.2%	12.1%	2.8%	9.3%
Colombia	5.2%	2.3%	2.9%	2.8%	1.9%	0.9%	2.9%	1.1%	1.8%
Costa Rica	1.9%	8.4%	-6.5%	6.3%	2.4%	3.9%	5.8%	1.4%	4.4%
Dominican Rep.	4.7%	3.1%	1.6%	2.0%	1.8%	0.2%	1.2%	0.8%	0.5%
Ecuador	4.7%	3.9%	0.7%	8.7%	8.7%	0.1%	8.3%	3.8%	4.5%
El Salvador	2.2%	1.2%	1.0%	0.9%	1.1%	-0.2%	3.5%	0.5%	3.0%
India	3.8%	1.6%	2.2%	2.5%	1.9%	0.6%	1.5%	1.0%	0.5%
Indonesia	15.8%	6.2%	9.5%	4.1%	3.6%	0.5%	3.7%	2.7%	1.0%
Israel	6.9%	4.0%	2.9%	3.3%	2.2%	1.2%	2.7%	1.4%	1.3%
Jamaica	7.9%	14.4%	-6.5%	7.2%	7.8%	-0.6%	3.6%	3.0%	0.6%
Korea, Rep.	6.6%	6.5%	0.1%	3.0%	3.7%	-0.7%	2.8%	2.4%	0.4%
Malaysia	41.7%	3.6%	38.1%	15.4%	3.1%	12.4%	9.8%	1.3%	8.5%
Mexico	2.9%	0.8%	2.1%	4.8%	2.5%	2.3%	3.6%	1.6%	2.0%
Philippines	1.9%	12.5%	-10.6%	4.4%	9.0%	-4.6%	6.2%	3.6%	2.6%
Thailand	0.1%	15.3%	-15.2%	2.2%	6.8%	-4.6%	2.4%	4.1%	-1.7%
Turkey	8.5%	9.0%	-0.5%	10.5%	7.7%	2.7%	56.1%	4.5%	51.7%
Mean	9.7%	7.8%		5.9%	5.3%		6.8%	3.0%	
t-stat		*(1.16)*			*(1.18)*			*(2.66)*	
p-value		*0.13*			*0.12*			*0.01*	
# Ctrys w/ lower Panel RMSE			23			20			31
% Ctrys w/ lower Panel RMSE			64%			56%			86%

Table 29: Dynamic Panel Estimates of Money Demand using the Arellano and Bond 2-step GMM

Dependent Variable:	**ΔM2**	**ΔM3**	**ΔM2**	**ΔM3**
ΔY (log change in real GDP)	0.93	0.85	0.91	0.91
	(306)	*(133)*	*(109)*	*(232)*
Δ log CPI	-0.05	-0.19	-0.03	-0.10
	(-9)	*(-30)*	*(-4.8)*	*(-8.5)*
Δ log GDP deflator	-0.08	-0.08	-0.05	-0.06
	(-21)	*(-25)*	*(-7.1)*	*(-10)*
Δ log terms of trade			-0.03	-0.02
			(-9.2)	*(-6.7)*
Error correction term (t-1)	-0.26	-0.29	-0.34	-0.37
	(-279)	*(-143)*	*(-132)*	*(-168)*
Sargan test (p value)	0.55	1.00	0.81	0.56
DW	3.02	2.96	3.04	3.01
S.E of regression	0.17	0.16	0.16	0.15
Number of Countries	36	36	36	36
Number of Observations	1100	1100	1112	1112

Notes: (t-statistics)

Intruments: Lagged cointegration Residual from -2 to infinity; log change in the U.S. T-Bill rate; log change in the 1 month LIBOR rate; log level and log change in of terms of trade; log change in GDP in t-1; log change in cpi in t-1; log change in cpi in t-1.

Table 30: Panel Estimates of M2 Demand with Terms of Trade for 36 Countries

Dependent Variable: log change in real M2

	Fixed Effects					
	Ctry[1/]	Year[2/]	Random Effects	GLS[3/]	GMM[4/]	OLS
Constant	0.04	0.03	0.03	0.04		0.04
	(6.9)	*(5.4)*	*(5.7)*	*(10.9)*		*(5.6)*
Real GDP growth	0.90	0.97	0.97	0.90	0.91	0.97
	(11.7)	*(12.8)*	*(13.2)*	*(17.4)*	*(108.7)*	*(13.2)*
CPI inflation	-0.10	-0.04	-0.06	-0.12	-0.03	-0.06
	(-2.7)	*(-1.4)*	*(-1.9)*	*(-4.1)*	*(-4.8)*	*(-1.9)*
GDP deflator	-0.07	-0.04	-0.05	-0.11	-0.05	-0.05
	(-4.6)	*(-3.6)*	*(-4.1)*	*(-7.5)*	*(-7.1)*	*(-4.1)*
Log Change in TT	-0.02	-0.01	-0.02	-0.01	-0.03	-0.02
	(-0.7)	*(-0.2)*	*(-0.8)*	*(-0.6)*	*(-9.2)*	*(-0.8)*
Error Correction Term	-0.31	-0.31	-0.32	-0.26	-0.34	-0.32
	(-14.8)	*(-14.8)*	*(-15.4)*	*(-13.3)*	*(-132.1)*	*(-15.4)*
Adjusted R^2	0.29	0.30	0.29	0.44	0.27	0.29
Observations	1167	1167	1167	1167	1112	1167
Durbin Watson	1.89	1.88	1.87	1.82	3.04	1.87
SE of Regression	0.12	0.12	0.12	0.12	0.16	

1/ Cross section fixed effects not reported

2/ Period fixed effects not reported

3/ GLS estimator using cross section weights.

4/ See **Table 29** for details.

Table 31: All Countries M2 Demand with Terms of Trade Out of Sample Forecast Tests (OLS vs GLS)

	1 yr ahead RMSE			3 yr ahead RMSE			5 yr ahead RMSE		
	OLS Cty Est.	GLS All Panel	RMSE GLS - OLS	OLS Cty Est.	GLS All Panel	RMSE GLS - OLS	OLS Cty Est	GLS All Panel	RMSE GLS - OLS
Algeria	1.2%	14.1%	-12.9%	5.6%	6.2%	-0.6%	2.7%	8.0%	-5.3%
Botswana	55.5%	23.0%	32.5%	12.2%	7.8%	4.4%	12.4%	4.4%	8.0%
Burundi	27.8%	22.3%	5.5%	12.2%	9.1%	3.1%	13.0%	5.6%	7.4%
Cameroon	3.6%	6.4%	-2.8%	8.9%	11.1%	-2.2%	10.1%	9.5%	0.7%
Cote d'Ivoire	10.5%	12.0%	-1.5%	8.9%	11.7%	-2.8%	5.6%	7.0%	-1.4%
Egypt	4.5%	5.9%	-1.4%	4.5%	5.1%	-0.6%	4.7%	4.4%	0.4%
Gabon	10.6%	2.2%	8.4%	1.1%	4.2%	-3.1%	1.5%	3.0%	-1.5%
Gambia	6.7%	3.6%	3.1%	3.4%	3.5%	-0.1%	2.7%	1.7%	1.0%
Ghana	3.9%	2.6%	1.3%	4.1%	4.0%	0.1%	6.5%	3.1%	3.5%
Kenya	14.0%	11.1%	2.9%	5.9%	4.2%	1.6%	4.0%	2.6%	1.4%
Mauritius	11.3%	4.1%	7.2%	2.4%	2.8%	-0.4%	2.9%	1.3%	1.6%
Morocco	2.2%	0.9%	1.3%	2.2%	3.0%	-0.8%	1.6%	1.9%	-0.3%
Nigeria	9.1%	10.5%	-1.3%	15.9%	11.4%	4.5%	10.8%	9.4%	1.4%
South Africa	8.6%	3.9%	4.7%	3.3%	1.5%	1.8%	2.2%	0.9%	1.3%
Tunisia	6.3%	6.8%	-0.4%	1.9%	2.4%	-0.4%	2.6%	2.2%	0.4%
Zambia	3.0%	4.7%	-1.8%	4.3%	3.2%	1.1%	3.9%	3.0%	0.9%
Argentina	8.1%	7.4%	0.7%	5.0%	9.5%	-4.5%	2.8%	4.9%	-2.2%
Bangladesh	7.7%	5.1%	2.7%	6.7%	3.2%	3.5%	5.8%	1.3%	4.5%
Brazil	2.5%	11.0%	-8.5%	13.2%	12.1%	1.1%	25.5%	12.9%	12.6%
Chile	10.5%	2.8%	7.7%	3.8%	1.0%	2.8%	6.7%	0.2%	6.5%
China	4.6%	4.4%	0.1%	3.5%	5.7%	-2.2%	12.1%	3.8%	8.3%
Colombia	11.4%	5.4%	5.9%	5.0%	6.6%	-1.6%	3.1%	3.0%	0.1%
Costa Rica	1.9%	4.0%	-2.2%	6.2%	3.1%	3.1%	5.8%	1.3%	4.5%
Dominican Rep.	7.2%	3.0%	4.2%	3.1%	2.6%	0.5%	1.6%	0.9%	0.7%
Ecuador	5.5%	10.7%	-5.2%	9.5%	7.1%	2.4%	8.3%	4.2%	4.1%
El Salvador	0.2%	0.2%	0.1%	3.4%	3.1%	0.3%	2.1%	1.4%	0.7%
India	3.3%	0.4%	2.9%	2.0%	1.2%	0.8%	1.9%	1.3%	0.5%
Indonesia	16.7%	6.6%	10.1%	4.4%	4.8%	-0.3%	3.7%	4.1%	-0.4%
Israel	17.0%	9.9%	7.2%	7.5%	3.5%	4.0%	5.2%	2.0%	3.2%
Jamaica	6.9%	7.3%	-0.4%	5.7%	5.2%	0.6%	1.9%	2.0%	0.0%
Korea, Rep.	30.1%	20.4%	9.7%	10.3%	7.7%	2.5%	6.5%	4.5%	2.0%
Malaysia	5.7%	4.3%	1.4%	4.0%	3.3%	0.7%	2.6%	2.1%	0.5%
Mexico	1.1%	0.9%	0.2%	3.9%	1.6%	2.2%	2.9%	1.1%	1.9%
Philippines	2.1%	7.0%	-4.9%	5.2%	8.1%	-2.9%	7.0%	5.9%	1.1%
Thailand	2.7%	9.8%	-7.1%	2.4%	5.1%	-2.7%	2.0%	2.8%	-0.9%
Turkey	6.7%	9.6%	-2.9%	9.2%	11.0%	-1.8%	23.1%	10.8%	12.3%
Mean	9.2%	7.3%	1.8%	5.9%	5.5%	0.4%	6.1%	3.8%	2.2%
t-stat			*(1.51)*			*(1.02)*			*(3.5)*
p-value			*0.07*			*0.16*			*0.00*
# Ctrys w/ lower Panel RMSE			27			22			15
% Ctrys w/ lower Panel RMSE			75%			61%			42%

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Money Demand in Developing Countries: A Dynamic Panel Approach

Dissertation directed by Prof. Darryl Mcleod

Panel estimates of money demand for thirty-six mainly developing economies were compared with similar country by country estimates. The objective is to compare the panel and individual country money demand equations out of sample forecast to see whether the efficiency gains afforded by dynamic panel estimation can improve on the performance of separate country by country money demand estimates. This "to pool" or "not to pool" question has been asked for a number of commodity demand equations, but not for money demand. There are efficiency gains obtained by pooling country data as measured by root mean squared error (RMSE) out of sample forecasts for longer term five-year forecasts, but not necessarily for one and three year ahead forecasting.

Vita

Mustapha Abiodun Akinkunmi was born to Mustapha Kehinde and Josephine Kehinde Gbaja-Biamila, on January 1st 1964, in Lagos, Nigeria. He attended Methodist Boys High School in Lagos, Nigeria and Newman Preparatory School in Boston, Massachusetts.

He obtained his Bachelors of Science in 1987 from New York Institute of Technology, Old Westbury, NY and a Masters of Science in Computer Science in 1988 from the same school.

Mustapha began his career at AT&T as a UNIX/C programmer and later moved to Salomon Brothers where he held several positions till he left in 1990 to start up a software development firm. As a principal in the software development firm, TechnologySolutions, Inc. he provided various technical consulting services focusing on data architecture to several Wall Street firms from 1990 to October 2003.

He later went back to school in the fall of 2000, to Fordham University where he received his Master of Arts in Economics in 2003 from the Graduate School of Arts and Sciences. He also completed his Ph.D. in Economics from the same school in April 2004. While working on his dissertation, Mustapha taught two undergraduate courses; Investments and Options & Futures at Manhattan College in Riverdale, NY.