EMPIRICAL ANALYSIS OF MONEY DEMAND AND SHOCKS IN WAEMU

ANALYSE EMPIRIQUE DE LA DEMANDE DE MONNAIE ET CHOCS DANS L'UEMOA

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Abstract:

The study of the demand for money is not only to grasp the quantity of money on hand. This is to ask the fundamental concern, is the economic definition of the demand for money intuitive? The answer to this question helps monetary policymakers formulate more effective policy. Using cointegration regression and the error correction model method over the period 1960 to 2009, applied to the Ivorian economy. Our results suggest that M1 is not cointegrated with its determinants real income and expected inflation and therefore unstable. As for the broader definition of M2 money, a long-term equilibrium relationship with its determinants is found over the period 1960-2009. M2 money demand is co-integrated with real output and expected inflation at the 5% significance level. The income elasticity for M2 is 0:716 suggesting that M2 plays more of a transactional role than its other unit of account or store of value functions. Short-term dynamics of M2 money demand outcomes using error-correction modeling indicate that a deviation from the long-term equilibrium path could be restored in about 24 days. The money demand shocks that occurred after 1980 were stronger and therefore underwent prolonged periods of adjustment. Finally, we conclude that M2 remains the most appropriate definition of money for the Ivorian economy, implying that it can be used as an alternative to the interest rate for a long-term monetary policy instrument.

Keywords: Co-integration; Error correction; Money; Stability; Inflation.

Résumé:

L'étude de la demande de monnaie n'est pas seulement de saisir la quantité de monnaie en main. Il s'agit de poser la préoccupation fondamentale, est ce que la définition économique de la demande de monnaie est-elle intuitive ? La réponse à cette question aide les responsables de la politique monétaire à formuler une politique plus efficace. En utilisant la régression de co-intégration et la méthode du modèle à correction d'erreur sur la période 1960 à 2009, appliquée à l'économie ivoirienne. Nos résultats suggèrent que M1 n'est pas co-intégré avec ses déterminants le revenu réel et l'inflation anticipée et donc instable. Quant à la définition plus large de la monnaie M2, une relation d'équilibre de long terme avec ses déterminants est trouvée sur la période 1960-2009. La demande de monnaie M2 est co-intégrée avec la production réelle et l'inflation anticipée au seuil de signification de 5 %. L'élasticité-revenu pour M2 est de 0:716 suggérant que M2 joue plus un rôle de transaction que ses autres fonctions d'unité de compte ou de réserve de valeur. La dynamique à court terme des résultats de la demande de monnaie M2 à l'aide de la modélisation à correction d'erreur indique qu'un écart par rapport à la trajectoire d'équilibre à long terme pourrait être rétabli en 24 jours environ. Les chocs de demande de monnaie qui se sont produits après 1980 ont été plus forts et ont donc subi des périodes d'ajustement prolongées. Enfin, nous concluons que M2 reste la définition la plus appropriée de la monnaie pour l'économie ivoirienne, ce qui implique qu'elle peut être utilisée comme une alternative au taux d'intérêt pour un instrument de politique monétaire à long terme.

Mots-clés: Co-intégration; Correction d'erreur; Monnaie; Stabilité; Inflation.

Introduction

The long-term behavior and stability of money demand has been documented in recent years for most developed countries, but rarely has the literature focused on the same issue in poor and underdeveloped economies. The question that the literature has tried to answer is: what part of the money demand function represents the real balance and is the relationship between the money demand and the real balance stable? The stability of money demand should guide monetary authorities in their decision to pursue an interest rate target or a monetary base target (M1). Poole (1970) argued that with a preference for unstable liquidity, monetary officials would wisely view an interest rate target as monetary policy in order to be effective. The main idea or other problem when we study the demand for money is not just to grasp the amount of money on hand. This is to ask the fundamental concern, is the economic definition of the demand for money intuitive?

So answering this last question helps monetary policy makers formulate more effective policy. Because, like everything, we want the quantitative monetary aggregate (however defined here) to capture real economic values. However, if the demand for money is found to be stable with an unequal relationship between investment and savings, the central bank can guide a monetary base target policy. As mentioned above, the literature addressing the issue specifically for Sub-Saharan African countries is far from abundant.

A synthesis of work from the economic literature shows contrasting results as to the nature of the demand for money in developed countries. Most of the papers have argued that the M1 money demand is unstable and that it makes the political variable meaningless in most of the developed countries because it does not exhibit a long-term sustainable relationship with the different real variables (Cuthbertson, 1988; Wang and Yip, 1992; Mounkala, 2012). A situation explained by many writings by the evolution of the financial and banking system which prevails in the developed economies. Many authors have written that the M1 in the United States is unpredictable and that shifting monetary policy from the Federal Reserve to an interest rate component such as Treasury bills or the federal funds will make policy more effective (Dreger, Reimer and Roffia, 2007; Carrera, 2012).

However, in developing countries, some articles in the empirical literature have found that M1 and M2 are in some cases both stable, as the opportunity cost of holding money

is variable and production (Diarisso and Tenou, 1998; Ondo Ossa, 2002; Mvondo, 2011). One of those rare studies by Fielding (1994) on the behavior of an African monetary aggregate and with a case study of Côte d'Ivoire and Nigeria using Johansen's maximum likelihood estimation. He finds an income elasticity of 1.58 (M1) and 0.72 (M2) respectively. Thus, he concluded that the demand for money was stable in both countries. Kallon (1992) reached the same conclusion that the two aggregates were stable when he studied the case of Ghana, but raised the question of stability over the period 1966-1987. Kallon studies the responsiveness of Ghanaian money demand to interest rate and output and found that money demand was stable from 1966:1 to 1986:4 using Johansen's cointegration technique. Other studies include Drama and Yao (2010), Owoye and Onafowora (2007), Nachega (2001), Bahmani-Oskooee and Gelan (2009).

Working on the demand for money in Côte d'Ivoire for a sample from 1980 to 2007, Drama and Yao (2010) found a long-term equilibrium relationship between M1 and money-related variables such as the exchange rate. interest and production. However, they found no such evidence using M2 as currency. It should also be mentioned that in their analysis, they used the market discount rate as an approximation of the nominal interest rate. Our contribution in this article goes beyond the mere empirical investigation of Cagan's money demand stability and one country's monetary shocks which has received little attention in the monetary literature. The choice of expected inflation is a significant difference to which our article contributes. The argument we make is that consumer behavior is more sensitive to inflation than to the nominal interest rate.

Our data supports this view by giving the “thin” amount of less liquid or quasi-money in the market during the sample period. The more liquid part of M2 contributes more to the money supply than the less liquid component, savings and the other components.

This document is organized as follows. The first section will focus on the development of the money demand methodology. The second section will deal with the processing of the data collected. Finally, the third section presents and discusses the results from the estimations.

1. Methodology

Friedman (1956) was among the first to theoretically and emprically produced the analysis on the money demand function. Since then Mankiw (1986) and Faig (1988)

and many more have incorporated the transaction costs when keeping the Friedman framework. Thus with that framework in mind, the demand function of money is believed to be some positive function of real income whereas the individuals unhoard the money stock with an increase in the rate of interest. This interpretation translates into the times series analysis of real money balance, real income and the interest rate having the same time trend.

$$(\frac{M}{P})_t = F(y_t; OC_t) + v_t \qquad (1)$$

$\frac{M}{P}$ is the real money demand, $F(y; OC)$ is a deterministic function of real money demand which is nondecreasing in the aggregate real income and nonincreasing in the opportunity cost of holding money and v_t is the error term a stationary process also known as the excess money. As a consequence of this specification the money demand shock v_t creates a disturbance to the aggregate money demand long-run movement. There fore monetary policy actions should be taken to bring the money market to its long-run equilibrium $F(y_t, OC_t)$ when $v_t = 0$.

$$m_t - p_t = \alpha_0 + \alpha_y y_t + \alpha_i E(\pi_t) + \mu_t \qquad (2)$$

$m_t - p_t$ is the log real money balance, y_t is the log real income, $E(\pi_t)$ the expected inflation and μ_t a stationary process representing the deviation from the long-run equilibrium.

The choice of Ivory Coast at the WAEMU[1] level is justified on the one hand by the fact that it has the most developed financial system and on the other hand it holds more than forty percent of banking assets at the level of the central bank of this Economic and Monetary Union.

In our study of money demand we will subsidy the rate of interest by the expected inflation. Ericsson (1998) has shown that the use of the expected is a better proxy for real returns on assets. So a very well chosen expected inflation values represent the complete opportunity cost of holding money.

[1] Owned by eight countries, Burkina Faso, Benin, Ivory Coast, Mali, Niger, Guinée Bisau, Senegal, and Togo, with same central bank.

It should also be noted that the financial sector is not well developed enough and there are very restricted financial instruments. One other thing which is asserted here is that the observed values of money stock does not represent money supply due to the fact that Ivory Coast is an under developed economy and the central bank of the currency union does not have a control of the money supply. In order to study the long-run equilibrium relationship of $m_t - p_t$, y_t and $E(\pi_t)$[2] we will need to show that all the variables specifed in our model have the same order of integration using the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron test.

Only after the order of integration property is satisfied that we perform the cointegration analysis of the three variables of interest. Cointegration deepens the under standing of the economic meaning of long-run equilibrium. It ensures that there is actually a response from the dependent variable and the case of uncertainity dragging the explanatory variables so that the dependent variable reacts to their changes does not occur. Therefore we are investigating to find the set of parameters $\beta = (1, \alpha_0, \alpha_y, \alpha_i)$ the long-term equilibrium parameters such that with an hypothesized $\delta_1 = 0$ in the following expression we have a βx_t being stationary.

$$(1 - L)x_t = x_0 + \delta_1 x_{t-1} + \sum_{i=0}^{p} \delta_{2+i} x_{t-2-i} + \varepsilon_t \qquad (3)$$

$Lx_t = x_{t-1}$, L is the lag operator, x_t is a univariate series representing money demand, real income and expected inflation. $x_t = (1, m_t - p_t, y_t, E(\pi_t))$, p is for the autoregressive order. The Johansen and Julius (1990) τ_{trace} cointegration statistic test for testing the null hypothesis that there are at most r cointegrated vectors is used. Also we use the other cointegration statistic test τ_{max} to determinine the exact number of cointegration vectors.

$$\tau_{trace}(r) = -T \sum_{i=r+1}^{k} \log(1 - \tau_l) \qquad (4)$$

$$\tau_{max}(r, r+1) = -T \ln(1 - \tau_{i+1}) \qquad (5)$$

[2] Inflation = E(inflation) + e_t .The expected inflation is constructed using a regression of type.

τ_i is the coefficient of the cointegration vector or characteristic root obtained from the characteristic matrix. T represents the number of observations. Finally the cointegration regression helps understand the long run relationship of the money demand and its components but provides little answer when it comes to examining the short-run dynamics of the money demand. In order for us to complete our analysis of the modeling of the behavior of the money demand over the course of 1960 to 2009, we have to model not only the long run equilibrium but also the short-run dynamics. The Error Correction Model (ECM) method developped by Engle and Granger eloquently allows us to analyze the short-run deviation of the real money demand from its expected long-run path. This Error Corrrection Model starts with the idea that monetary policy makers react in the short-run to deviation of the observed money demand values from its long-run path. Specifying the short run fluctuation around the steady state value of the money demand results in testing the level of significance of the parameter, the Error Correction Model (ECM) parameter. The significance level of the coefficient δ is finally important as a necessary condition to the existence of the cointegration ie long-run equilibrium among money demand and its determinants. In other terms the Error Correction Model specification has explanation for the short run movement of the money demand but also for the long-run behavior. Our lag selection is based not only on a theoretical argument but also on the data structures.

$$\Delta x_t = \delta_m \beta'(ECM)_{t-1} + \sum_{j=1}^{k} y_j \, \Delta x_{t-j} + \varepsilon_t \qquad (6)$$

With $ECM = \alpha_0 + \alpha\,(m-p) + \alpha_y y_t + \alpha_i\, E\,(\pi)$ the above equation 6 stresses that with the existence of the cointegration among the variables (long run equilibrium in the money demand estimation) any deviance from this long-run equilibrium made in the short-run is brought back to the equilibrium by the short-run factor (ECM).

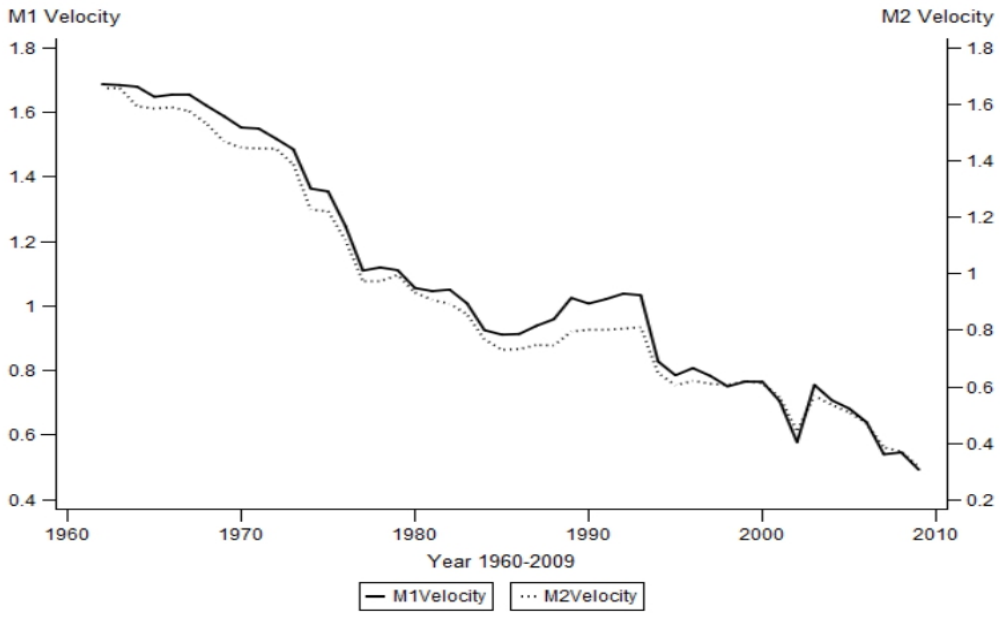
2. Data Analysis

The data is provided by the IFS (International Financial Statistics), the principal statistical institution with the IMF covering international and domestic finance data. And the sample is from 1960 to the latest data available 2009 which constitutes an additional difference with the Drama and Yao (2010) along with the decision to not consider the interest rate as the opportunity cost of holding money. The main reasons

of the omission of the interest rate in the money demand determinants find support in the poor level of financial development and the low amount of the less liquid of the money data. The data shows a very poor level of interest bearing money such as saving, supporting our choice of replacing the interest rate as part of explaining the long run equilibrium of money demand.

We chose an alternative variable in the expected inflation which we argued provides a better indication than the interest rate of the amount of money the individuals are willing to hold in order to carry future transactions. Further studies such as Ericsson (1998) have shown that the use of the expected inflation is a much better proxy for the real returns on assets. We generate the expected inflation as a porportion of lag 1 inflation after rejection of the further lags values appear to be not significant. Government bonds and one year Treasury bill have sometimes being used an opportunity cost of holding money but in this study insufficient data reasons make us not consider their use. Figure 1 to 4 show the times series movement over the sample of 1960 to 2009.

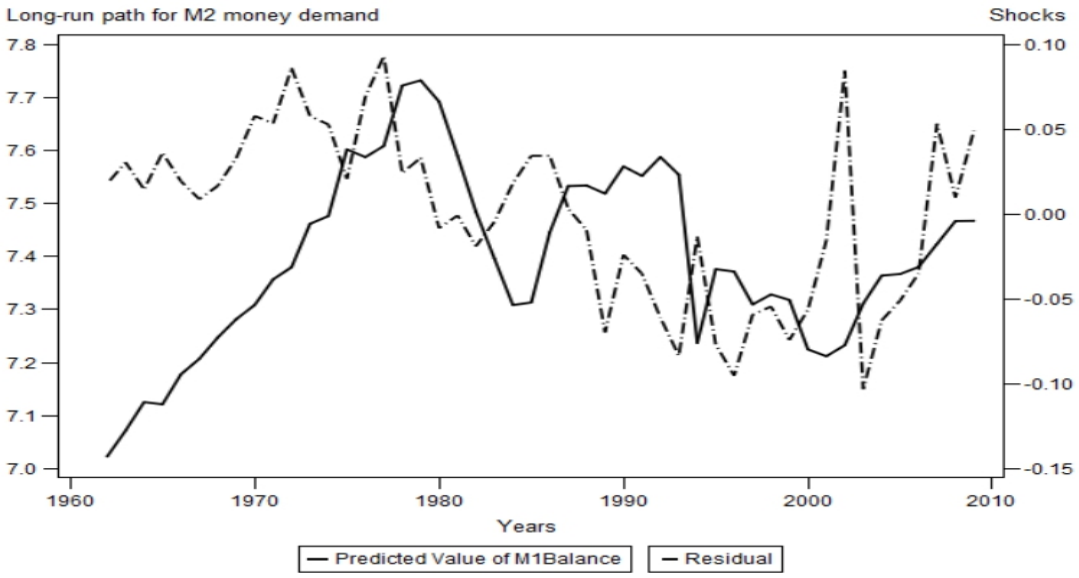
Figure 1: Real income and M1 stock Series



Source : Authors

We clealy can notice in Figure 1 that M1 series of real money stock loocks to share the same time trend with real income series.

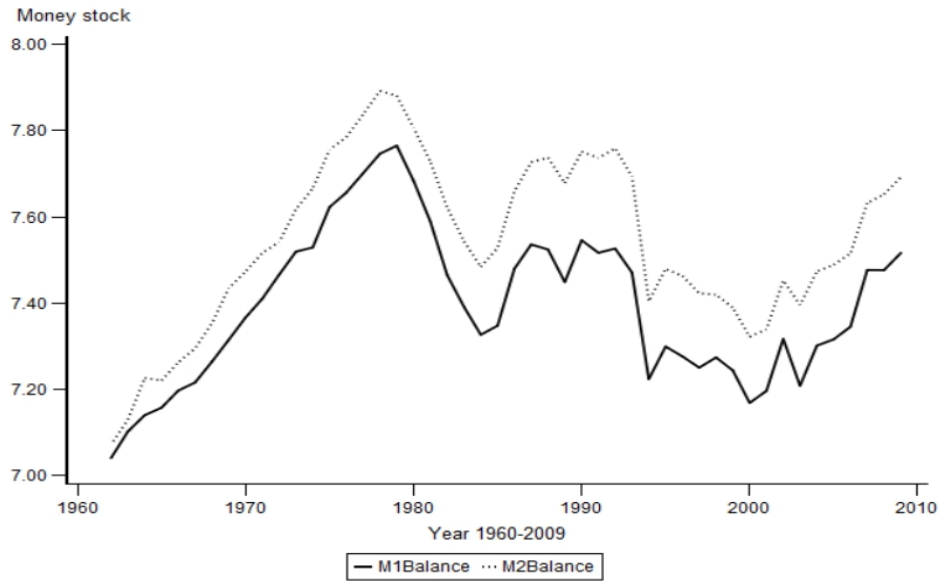
Figure 2: Money stock in Ivory Coast



Source : Authors

The same observation is made with M2. Both series of money stock and real income present two distinct trends. The period pre 1980 with a clear economic expension reaching its peak in 1979 and the period after 1980 with a more recurrent shocks almost every 3 years. Figure 3 shows the very stricking observation of a decreasing trend ever since of the velocity of both definition of money even in years of economic prosperity like the first two decades after 1960.

Figure 3: M_1 and M_2 velocity Movement

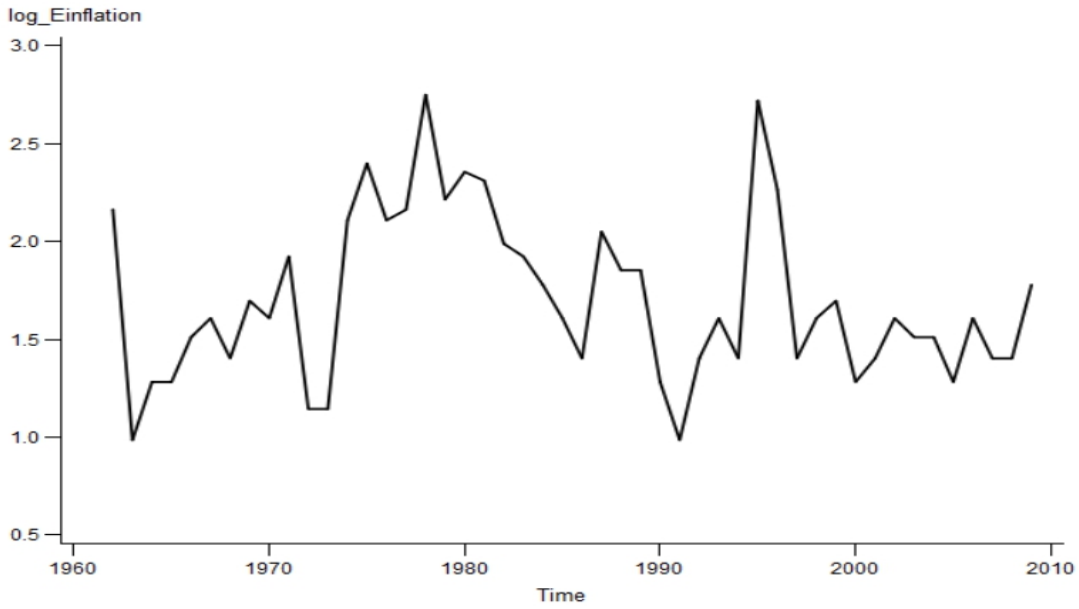


Source : Authors

It is understood in the monetary literature that velocity of money represents the average times at which the money change hand at a given period.

Also we can notice two noise apperences in the expected inflation series in late 1970 and in 1994.

Figure 4: Expected inflation series for Ivory Coast



Source : Authors

The first noise in the expected inflation is the global commodity price hike due to the oil supply shock: inflation created by the oil price shock in the late 1970. The second noise in 1994 is attributed to the devaluation of the CFA franc in 1994 which created a skyrocketing in domestic prices.

Thus it can be interpreted as the density of transactions in the economy at a given period and moving along with the aggregate demand. So its falling ever since could be an indication of a constant shocks in aggregate demand.

3. Empirical Results

We first examine individually the stationary properties of the variables in our money demand equation by using the Augmented Dickey Fuller (ADF) test and the Phillips-Perrion (PP) test. Table 1-3, report the Augmented Dickey Fuller test and the PP for the unit root of the variables.

Table 1: M1 stock series as a AR(1) processes

Phillips-Perron Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*
Zero Mean	0	-39.4260	<.0001	-5.84	<.0001
	1	-38.8129	<.0001	-5.82	<.0001
Single Mean	0	-40.0556	0.0004	-5.85	0.0001
	1	-39.5677	0.0004	-5.84	0.0001
Trend	0	-40.5887	<.0001	-5.82	0.0001
	1	-40.2129	<.0001	-5.81	0.0001

Augmented Dickey-Fuller Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*	*F*	*Pr < F*
Zero	0	-39.4260	<.0001	-5.84	<.0001		
Mean	1	-29.3843	<.0001	-5.82	<.0001		
Single	0	-40.0556	0.0004	-5.85	0.0001	17.09	0.0010
Mean	1	-30.3503	0.0004	-5.84	0.0001	7.17	0.0010
Trend	0	-40.5887	<.0001	-5.82	0.0001	16.96	0.0001
	1	-31.0753	0.0013	-5.81	0.0001	7.09	0.0416

Source : Authors

We fail to reject the null hypothesis of unit root for all the variables in the first place. It appears after we first differentiate the differente series that M1 money Balance.

M2 money Balance, real income and the expected inflation are all generated by differentes I(1) processes.

Table 2: M2 stock series as a AR(1) processes

Phillips-Perron Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*
Zero Mean	0	-34.4136	<.0001	-5.20	<.0001
	1	-33.3607	<.0001	-5.17	<.0001
Single Mean	0	-35.3816	0.0004	-5.26	0.0001
	1	-34.5408	0.0004	-5.23	0.0002

Trend	0	-36.2862	0.0002	-5.27	0.0005
	1	-35.6773	0.0003	-5.25	0.0005

Augmented Dickey-Fuller Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*	*F*	*Pr < F*
Zero	0	-34.4136	<.0001	-5.20	<.0001		
Mean	1	-27.1584	<.0001	-3.71	0.0004		
Single	0	-35.3816	0.0004	-5.26	0.0001	13.83	0.0010
Mean	1	-28.3873	0.0004	-3.72	0.0066	6.95	0.0032
Trend	0	-36.2862	0.0002	-5.27	0.0005	13.93	0.0010
	1	-29.3043	0.0024	-3.67	0.0347	6.86	0.0469

Source : Authors

We reject at 5 % percent level of significance the null hypothesis of unit root for the first difference of the different variables.

Table 3: Real income series as a AR(1) processes

Phillips-Perron Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*
Zero Mean	0	-38.3333	<.0001	-5.59	<.0001
	1	-38.3704	<.0001	-5.59	<.0001
Single Mean	0	-39.1336	0.0004	-5.62	0.0001
	1	-39.2387	0.0004	-5.62	0.0001
Trend	0	-40.1978	<.0001	-5.70	0.0001
	1	-40.3678	<.0001	-5.70	0.0001

Augmented Dickey-Fuller Unit Root Tests

Type	*Lags*	*Rho*	*Pr < Rho*	*Tau*	*Pr < Tau*	*F*	*Pr < F*
Zero	0	-38.3333	<.0001	-5.59	<.0001		
Mean	1	-38.5693	<.0001	-4.30	<.0001		
Single	0	-39.1336	0.0004	-5.62	0.0001	15.81	0.0010
Mean	1	-39.2387	0.0004	-4.34	0.0011	9.43	0.0010
Trend	0	-40.1978	<.0001	-5.70	0.0001	16.23	0.0010
	1	-40.3678	<.0001	-4.45	0.0047	9.89	0.0010

Source : Authors

We strongly reject with the *tau* and *rho* statistics compared to the *F* statistics. Next we perform the cointegration tests using the Johansen and Julius (1990) procedure with the τ_{trace} and τ_{max} tests (only the τ_{trace} is reported here).

Table 4: Johansen Cointegration results for M1

Cointegration Rank Test Using Trace

Simple Summary Statistics

Variable	*Type*	*N*	*Mean*	Std	*Min*	*Max*
M1Balance	*Dependent*	48	7.39496	0.17696	7.04056	7.76539
RealIncome	*Dependent*	50	8.12157	0.14970	7.76836	8.41702
E_Inflation	*Dependent*	48	6.04167	2.93440	2.67670	15.63521

H0:	*H1:*					
Rank>r	*Rank=r*	*Eigenvalue*	*Trace*	*5% Critical Value*	*Drift in ECM*	*Drift in Process*
0	*0*	0.4090	47.8253	29.38	Constant	Linear
1	*1*	0.3287	23.1032	15.34		
2	*2*	0.0888	4.3684	3.84		

Long-Run Parameter Beta Estimates

Variable	*1*	*2*	*3*
M1Balance	-11.47196	-13.36529	9.12410
RealIncome	10.71368	19.49098	-4.83946
E_Inflation	0.35845	-0.13500	0.03962

Source : Authors

The results from Table 4 as for the M1 money demand case show that the different hypothesis of the possible number of cointegration vectors are strongly rejected. For rank = 0 we found the τ_{trace} statistic τ_{trace}= 47.82 and the 5% percent significance level critical value is 29:38 suggesting a rejection of the hypothesis of the presence of cointegration vectors. A further rejection for the different rank = 1 and rank = 2. We can conclude from this statistic that we have actually rank = 3 and so there is no long-

run equilibrium among M1 money demand and its two determinants the real income and the expected inflation. Their relationship is therefore unstable and unpredictable to the point monetary policy makers can not rely on M1 as an instrument to control money supply. As for the broader definition of money M2, a long-run equilibrium relationship with its determinants is found to be stable over the period of 1960 - 2009.

After we reject the two lower rank level we fail to reject when rank = 2 with the τ_{trace} is 2.1290 at 5% percent level of significance lower than the critical value of 3.84. The τ_{max} statistic also confirms the existence of 2 cointegration vectors. So we fail to reject the null hypothesis and reach the conclusion that real money balance M2 and its determinant real income and the expected inflation are cointegrated of order 1 (see Table 5).

Table 5: Johansen Cointegration results for M2

Cointegration Rank Test Using Trace

Simple Summary Statistics

Variable	*Type*	*N*	*Mean*	*Std*	*Min*	*Max*
M1Balance	*Dependent*	*48*	*7.54084*	*0.19903*	*7.04056*	*7.76539*
RealIncome	*Dependent*	*50*	*8.12157*	*0.14970*	*7.76836*	*8.41702*
E_Inflation	*Dependent*	*48*	*6.04167*	*2.93440*	*2.67670*	*15.63521*

H0:	*H1:*					
Rank>r	*Rank=r*	*Eigenvalue*	*Trace*	*5% Critical Value*	*Drift in ECM*	*Drift in Process*
0	*0*	0.4420	56.2889	29.38	Constant	Linear
1	*1*	0.3836	28.8673	15.34		
2	*2*	0.1223	6.1290	3.84		

Long-Run Parameter Beta Estimates

Variable	*1*	*2*	*3*
M1Balance	1.00000	1.00000	1.00000
RealIncome	-1.402541	-0.23178	-0.71616
E_Inflation	0.00002	-0.11852	0.00242

Source : Authors

We then have two cointegration vectors. As recommended in the literature Dickey and al. (1991), the cointegration vectors do not represent the structural parameters but the selection of the meaningful parameters can be used for economic interpretation. After normalization of the long run parameters β, the elasticity of income with respect to M2 is 0.71616. These elasticities differ from the paper of Drama and Yao (2010) sample over the period of 1980-2007. They found for M1 5.311 and a lesser elasticity for M2 1.438. The effect of a percent change in expected inflation is meaningful for M2 (0.00242) and also provides the desired sign. Thus the long run equilibrium relationship between M2 money demand and its determinants looks stable at 5% percent level of significance with its determinants whereas we found there is no long-run stability among M1 and its determinants.

The cointegration regression helps understand the long run relationship of the money demand and its components but provides little interpretation when it comes to examining the short run dynamics of the money demand. In order for us to complete our analysis of the modeling of the behavior of the money demand over the course of 1960 to 2009, we have to model not only the long run equilibrium but also the short run dynamics. The Error Correction Model (ECM) method developped by Engle and Granger (1987) eloquently allows us to analyze the short-run deviation of the real money demand from its expected long-run path. We choose the number of lags k = 4 given the sample of 50 observations for the different variables.

The ECM results shows a short run response from a stochastic shock and from past deviation from the long-run equilibrium. Also with 1% percent increase of the actual real money balance M2 above its expected long run value the aggregate money balance adjusts by reducing actual money balance by 0.0637 percent for future consumption. The error correction coefficient is 0.0637% and positive, suggesting a larger increase of in short-run M2 money supply whenever the long- run value rises. The Error correction estimate shows after a short term shocks M2 money demand is brought to its long-run equilibrium in about 24 days.

$$\Delta m_t = 0.0637(ECM)_{t-1} + 1.413\,\Delta\, m_{t-1} - 0.390\, y_{t-1} - 0.002\, E(\pi_{t-1}) + 0.147\,\Delta m_{t-2} - 0.207 y_{t-2} - 0.002\, E(\pi_{t-2}) + \cdots + \mu_t \qquad (7)$$

Finally since monetary policy pegged exchange rate has for consequence of a loss in foreign exchange, thus it is ineffective in such regime to conduct a monetary policy. However if money shocks do not affect the real economy it is necessary to have money demand stable along its long-run path in order to have the money market under control. We then examine the short-run money shocks effects on the deviation from long-run path. The shocks were much longer in duration and higherin intensity in the period post 1980 compared to the period pre 1980.

The period post 1980 registers several intensive money demand shocks. One of these is the permanent shock during the years 2000 to 2002 before sharply falling toward and adjusted to its long-run path in 2003.

Conclusion

We have examined in this paper the stability of the narrow definition of money demand (M1) and for the broader definiton of money demand M2 during the period of 1960 to 2009 for Ivory Coast economy using the cointegration regression and the Error Correction Model Method. Unlike Drama and Yao (2010) we do not find evidence of M1 being stable with its long term determinants of real income and the expected inflation. However our result suggests that M1 is is not cointegrated and therefore unstable.

As for the broader definition of money M2 a long-run equilibrium relationship with its determinants is found over the period 1960-2009. Money demand M2 is cointegrated with real output and the expected inflation at a 5% significance level. The income elasticity for M2 is 0.716 suggesting with this lesser effect that M2 plays more a role of transaction than its other functions of unit of account or store of value. Further studies need to be addressed to explain the sharp fall in velocity during two decades before 1980 where aggregate demand was increasing for 20 years but velocity was strongly falling for the same period. Related to the short-run dynamics of money demand our empirical investigation shows a larger deviation from long run equilibrium for M2.

We also provide in this study the short-run dynamics of M2 using the Error Correction model. The Error correction estimate shows after a short term shocks M2 money demand is brought to its long-run equilibrium is about 24 days. Finally we can conclude M2 remains the most appropriate definition of money for Ivory Cost economy implying

it can be used as an alternative to the interest rate for a long term monetary policy instrument.

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