# PREFERENCE FOR LIQUIDITY AND UNCERTAINTY

**Alain Simon BENGONE MVE**

Assistant Professor, Faculty of Law and Economics, Omar Bongo University in Libreville and Member of the Applied Economics Laboratory (LEA), Libreville, GABON.

bengonemve@yahoo.fr

## ABSTRACT

*The financial turmoil resulting from the liquidity shocks of recent years, as well as the changes observed in capital markets, which affect liquidity, make it possible to revisit the link between the preference for liquidity and uncertainty. Indeed, the creation of liquidity (to a large extent) outside the traditional banking system, which allows credit to be seen as another component that financial intermediaries grant, increases the close interaction between liquidity, the valuation of securitized assets and solvency and reveals new vectors of contagion.*

*The purpose of the present reflection is therefore to see, with the help of empirical verification, whether the preference for liquidity of private agents in an uncertain environment such as CEMAC is manifest or not. The result is that uncertainty influences the liquidity preference behaviour of agents and reveals two types of behaviour: that which is sensitive to the interest rate, on the one hand, and that whose interest rate has no influence at all, on the other.*

**Keywords :** Liquidity preference- Uncertainty- Monetary union- Demand for money- Interest rate.

**Code JEL :** C51-C61-E12-E41-E62

## INTRODUCTION

The financial disruptions resulting from the liquidity shocks of recent years and the changes observed on capital markets, which affect liquidity and lead to financial crises (Clerc, 2008), have given renewed interest to the analysis of the link between preference for liquidity (1) and uncertainty (2) (Knight, 1921, Keynes, 1936).

Indeed, the creation of liquidity (largely outside the traditional banking system), which makes it possible to consider credit as another component of liquidity (Clerc, 2008), increases the close interaction between liquidity, the valuation of securitized assets and solvency. Thus, new vectors of contagion (3) are emerging, in view of the uncertainty that influences both market and financing liquidity. Liquidity is thus a moving concept that is fairly easy to identify and define (4) (Crockett, 2008), both in the "old" and the "new" world (5) of finance. Thus, although they are different (6), they have common characteristics via the shocks that occur. Such shocks arise from changes in the demand for liquidity and massive withdrawals by depositors who doubt the solvency of an institution by creating or aggravating a bank's liquidity shortage (bank run) (Diamond and Dybvig, 1983).

Thus, doubts about the value of assets lead to a collapse in demand for short-term securities issued by a financial intermediary, resulting in a liquidity crisis. This situation of caution in the face of uncertainty affects liquidity through two channels (Adrian and Shin, 2008): information asymmetry (Akerlof, 1970), on the one hand, and coordination failures (Cooper and John, 1988), on the other.

The first channel occurs in incomplete markets where participants are less inclined to trade in assets whose characteristics and behaviour are difficult to assess. Liquidity in such cases depends on the ability and willingness of market participants to take risks.

The second channel manifests itself through a mechanism that guarantees market liquidity and relies on the existence of informed investors willing to take risks (7). Thus, in the event of an increase in valuation uncertainty, investors will remain in a wait-and-see attitude so as to avoid the imbalance of a market giving rise to excessive volatility.

Uncertainty then takes two forms (Rochet, 2008): strategic uncertainty, which stems from the behaviour of market players by ignoring the reactions of other players in asymmetric situations, and "fundamental" uncertainty (8) (Adrian and Shin, 2008), which affects the quality and value of assets. These two forms of uncertainty lead to two possible explanations of the process of creating cumulative dynamics in crisis situations (Adrian and Shin, 2008).

Indeed, the emergence of "fundamental" uncertainty allows market participants not to optimize their behavior according to predetermined strategies, but rather to resort to "minimax" criteria, since they seek to minimize the risks that can cause maximum losses. They make decisions based on scenarios that allow for the hoarding of maximum liquidity in order to be able to deal with unforeseen events.

Therefore, it seems important to examine the influence of uncertainty on the preference for liquidity of economic agents based on the demand for cash within CEMAC. The choice of the field of investigation rests on two essential elements:

1) the preference of private agents (households) for (short-term) credit for their transactions because of their prudent and altruistic behavior ;

2) the conduct of monetary policy within an overall framework of uncertainty, given the inflation differential between member countries and the high level of lending rates charged (Awana, 2013; Mengue Bidzo, 2006). To this end, individuals try to hold money despite its cost, since transactions are directly linked to economic activity, while transactions in value generally involve the purchase of goods and services and not financial assets (Ondo Ossa, 2002).

The present reflection will then comprise two parts: the analysis to determine the influence of uncertainty on the preference for liquidity (I) and the interpretation of the results of the model (II).

**I- Determining the influence of uncertainty on the preference for liquidity**

We use a model which we give the basis and the articulation before proceeding to the estimation.

**I.1 Foundations and articulation of the model**

The theoretical support for the proposed model is the New Keynesian Economy (NEK), which has the advantage of redefining the preference for liquidity in a context of financial instability (Minsky, 1982), uncertainty (Knight, 1921; Keynes, 1936), information asymmetry (Akerlof, 1970) and coordination failures (Cooper and John, 1988).

To this end, the holding of cash will be appreciated in an environment of financial liberalization that creates instability and makes economic agents wary (prudent), since unforeseen expenditure and income integrate psychological assessments through speculative motives (Gilles, 1992).

Such a framework makes it possible to envisage a degree of preference for liquidity as a function of the state of confidence, especially since the holding of cash differs from its traditional understanding. It appears to be a means of appeasing uncertainty (Creel, 2001). Agents' preference for liquidity then becomes a barometer of agents' degree of confidence (Orléans, 1985; Wei, 2009; Grishchenko, 2011).

Moreover, in such a framework, the preference for liquidity expresses the agents' choice for money or its close substitute. Since the demand for money for transaction and precautionary reasons is a function of income, it is the demand for cash for speculative reasons that explains the autonomous variations in the cash holdings of economic agents (Creel, 2001). The latter express their preference according to the expectations they formulate on the evolution of the securities market and, above all, on their yields (8).

Following Goux (2000) and Bordes et al. (2001), taken up by Ondo Ossa (2002), we start from a general presentation that corresponds to the various theoretical approaches to the demand for cash balances (9). However, we are mainly interested in the influence of uncertainty on the preference for holding money.

As CEMAC is a set of heterogeneous countries grouped together in a common central bank (BEAC) in charge of conducting monetary policy, we use a country analysis to highlight the degree of influence of uncertainty on the behaviour of money holdings in each of the member countries of the monetary union. The demand for cash is thus presented in the following form :

$$M_t = AY_t^{\phi}\left(1 + \pi_t\right)^{\rho}\left(1 + r_t\right)^{\beta}\varepsilon_t, \qquad\qquad [1]$$

with :

$M_t$, the amount of nominal cash taken as the preference for holding liquidity ;

$Y_t$, the real GDP ;

$\pi_t$, the inflation rate, it is approximated by the GDP deflator instead of the consumer price index. In this way, it is the price of GDP that serves as the basis for inflation (Avouyi-Dovi et al., 2003);

$r_t$, the nominal interest rate, which is an interest variable for assessing the degree of influence of uncertainty, and thus represents the opportunity cost of holding cash;

$\varepsilon_t$, the error term.

The equation [1] thus defines the demand for money by economic agents in an environment of uncertainty.

We retain as the explained variable M2, the monetary indicator in the BEAC zone (Ondo Ossa, 2002). The conduct of monetary policy then consists of the observation of one or more quantitative variables for the purposes of information and prevention of possible inflationary pressures. Thus, the choice of the measure of the monetary aggregate's preference for liquidity is a consequence of theoretical a priori (Avouyi-Dovi and Ali, 2003), which favours a portfolio approach and which also corresponds to the supply of money that can be easily controlled by the Central Bank.

For the explanatory variables, the analysis of the preference for liquidity is generally based on behaviours with regard to liquidity that do not depend on endogenous financial factors and vary with elements that affect effective demand, on the one hand, and the action of the monetary authorities on the interest rate, on the other. Such behaviour relates to the preferences of economic agents for holding money in an economy (transaction motives and precautionary motives).

Thus, the money supply held for transaction purposes is determined by the price level and the volume of spending. It also responds to precaution because households may hold unpaid money to meet unexpected expenses but also for altruistic needs. The latter preference for money stems from the property of perfect liquidity. The demand for money for precaution increases the level of income.

In addition to its function as a means of transaction, money is a financial asset in its own right. Its holding depends on its relative price compared to other assets. As a result, when the interest rate rises, agents may be tempted to direct their most liquid savings towards more remunerative investments that are not equivalent to money. The interest rate then evolves in the opposite direction to the cash balances. Thus, uncertainty about future interest rates can lead to idle cash balances among economic agents.

Inflation is also a key determinant of money demand (Blanchard and Fischer 1989). Economic agents therefore have the choice of holding money whose real value can erode rapidly and purchasing durable goods or being altruistic. The rate of inflation thus generally evolves with the cash balances. Being relatively low in the CEMAC zone (3 percent on average), inflation is not an important determinant of money demand.

All these factors lead to an account of the preference for holding money (M2) in the CEMAC zone based on real GDP, the interest rate, which includes the expected values of returns on financial and monetary assets, and inflation captured by the GDP deflator. All these variables reflect the need to hold money for transaction purposes on the one hand and, on the other, for trade-offs between relatively liquid and less liquid savings (Ondo Ossa, 2002; Avouyi-Dovi and Ali, 2003; Guéné, 2001).

In short, the logarithmic transformation of equation [1] using the Nerian logarithmic of equation [1] gives the form [2] below, that :

$$\ln M_t = \ln A + \phi \ln Y_t + \rho \ln(1+\pi_t) + \beta \ln(1+r_t) + \ln \varepsilon_t . \qquad [2]$$

Assuming that $m_t = \ln M_t$; $\chi = \ln A$; $y_t = \ln Y_t$ and $\vartheta_t = \ln \varepsilon_t$, the equation [2] takes the following form for estimation purposes:

$$m_t = \chi + \phi y_t + \rho \pi_t + \beta r_t + \vartheta_t , \qquad [3]$$

with :

$m_t$ , the preference for liquidity at period t ;

$y_t$ , the real GDP at period t ;

$\pi_t$ , the inflation rate at period t ;

$r_t$ , the nominal interest rate at period t ;

$\vartheta_t$ , the error term at time t.

$\phi, \rho \, et \, \beta$ are respectively the elasticity coefficients of gross domestic product (GDP), inflation and the interest rate that capture the influence of uncertainty on the preference for liquidity, the sign of which will make it possible to rule on the ability of economic agents to prefer to hold money for the purpose of directing needs towards purchases of securities and goods and services.

## I.2  Model estimation and presentation of results

We formulate the central hypothesis that uncertainty influences the liquidity preference behavior of economic agents within CEMAC.

The data used for the estimation come from World Bank statistics (World Development Indicators, Cd-rom, 2016), for all variables and for all countries. Also, for the sake of convenience and data availability for some countries, notably Equatorial Guinea, our analysis focuses on the period 1985-2016.

In order to avoid spurious regressions we proceed to preliminary tests, notably the stationarity of the variables through the Augmented Dickey-Fuller Stationarity Test (ADF), which shows that all the variables are integrated of order 1, (I(1)). Johansen's (1987) one-step cointegration test reveals the existence of a long-run cointegration relationship between the preference for liquidity and the relevant explanatory variables in the behaviour of economic agents faced with uncertainty (Appendix 1).

We then use the error-correction mechanism for estimating the relationship [3] to capture the present and future movements of the different variables (Appendix 2).

From the results obtained (Appendix 2), it emerges that economic agents in a situation of great uncertainty have a preference for holding liquidity, thus confirming our working hypothesis. Uncertainty thus has an amplifying effect on the preference for liquidity on economic agents, and two groups of countries stand out:

1°) the group composed of countries where the influence of uncertainty is not clear enough for agents' preference for liquidity because of their insensitivity to interest rate fluctuations (Gabon and Congo) ;

2°) the group made up of countries where the influence of uncertainty on the preference for liquidity is not sufficiently evident because of their sensitivity to interest rate variations (Cameroon, Equatorial Guinea and Chad). The elasticity of demand in these countries varies between 0 and -1, which means that when uncertainty increases, economic agents prefer to hold liquidity and can either be altruistic or purchase securities or goods and services.

## II  INTERPRETATION OF RESULTS

Analysis of the results leads us to admit that the interest rate constitutes an essential determinant of the preference for liquidity of economic agents, on the one hand, and an amplifier of the role of uncertainty, on the other.

## II.1  the interest rate: an essential determinant of the preference for liquidity

The capacity of economic agents to prefer liquidity is quite influenced by uncertainty, especially since their behaviour depends on it in their various choices.

Indeed, it is a question of assessing the role that the interest rate plays not only in the choice of savings, investment and/or investment instruments of households. It is also a question of seeing whether the characteristics of interest rates can make it possible to choose between short-term and long-term financial assets. Thus, agents' preferences can be understood through the mode of inventory management, the choice of portfolio and the level of wealth.

With regard to inventory management, the elasticity of cash demand shows that agents take a great deal of precaution with regard to future income and expenditure. As uncertainty increases, the preference for liquidity increases for the precautionary motive, which increases the degree of prudence as well as that of household distrust. Two types of behaviour then

appear: the intertemporal and/or altruistic behaviour of households, and that oriented towards the purchase of securities or goods and services.

The intertemporal behavior of households leads to caution, hence the race to the counter, especially since banks' risk-taking on financial markets makes financial assets very volatile. Thus, households are more risk averse and quite altruistic for the new generations. As a result, the elasticity of demand shows that households, while distrustful, hold more liquidity, save and consume less in an environment of uncertainty. In fact, households are turning away from formal financial circuits for informal and rotating savings and microfinance, which is developing more in the CEMAC zone, particularly in Cameroon, which explains the issue of sovereign bonds, which remain underdeveloped due to their low share in GDP. In addition, the high interest rate makes financial markets flood in, where the ratio of domestic credit to the private sector is more significant than banking (53 percent versus 11.8 percent respectively). In addition, there is a kind of financial exclusion which shows that very few households have a bank account or a loan from a formal institution.

On the other hand, the rise in interest rates may also lead to a lack of investment by households, preferring short-term loans for a decline in long-term loans that limits investment. As a result, immature and concentrated banking institutions are trying to manage risks, since the slowdown in credit distribution is experiencing contrasting developments in the different member countries. Banks offering mainly short-term financing remain less adapted to the long-term needs expressed by growth. Thus, banks with excess liquidity seek to reap the benefits of the superiority of their hedging strategies.

With regard to the choice of portfolio, companies choose between non-interest-bearing and less risky liquid cash and securities listed on the financial markets, which are remunerated but risky (variability of returns) with regard to the interest rate. Thus, when market risk increases, each agent tends to maintain its portfolio at a desirable level by holding a fairly large share of liquidity, even if it is attached to a degree of risk aversion.

With regard to the level of wealth, which increases explicitly with the desired amount of aggregate cash that agents can hold in liquid form, it represents the wealth constraint and is therefore the preferred scale variable for the preference for liquidity. It corresponds to the expected value of all future income, whatever its source (physical capital, financial capital and human capital).

The upward trend in interest rates implies anticipating a rise in prices that may cause interest rates to fall. They are suppliers of money (buyers of securities) as long as the interest rate has not fallen to the level of their anticipation. Conversely, the fall in interest rates makes it possible to increase idle cash balances (preference for liquidity) when the prices of securities are not sufficiently reduced. Consequently, the level of interest rates results from the balance between sales of securities and purchases.

## II.2 The interest rate: an essential amplifier of the role of uncertainty

Interest rates are of great importance to savers, debtors and the economy as a whole. They are one of the instruments for transmitting monetary policy impulses to the real sector that the authorities can use to stabilize the economy in the event of shocks. For example, a rise in the interest rate can lead to an inflow of capital to compensate for banks' cash shortages. It can also lead to speculative behavior, which leads markets to form expectations about the magnitude of future interest rate increases. Speculation about the normalization of interest rates will intensify and increase uncertainty about them, since they can rise fairly quickly.

In addition, uncertainty about the interest rate is related to uncertainty about the macroeconomic variables that typically guide monetary policy, such as inflation and output. Financial behaviour affects risk premiums, and uncertainty about interest rates can lead to financial uncertainty, resulting in agents taking equity stakes in firms in need of financing.

On the other hand, even with interest rate uncertainty, agents simply hold the amount of cash that allows them to make future transactions. Such cash does not depend on the evolution of the interest rate. Thus, a rise in interest rates only results in a loss if it is possible to hold the security long enough for the interest gain to offset the capital loss. These are "abnormal" payments that exceed what agents typically hold in transaction balances, because if interest rates rise before spending, the agent faces a risk of capital loss that will be as great as the "duration" of the bond. Faced with the unexpected payment, the agent has no other means of obtaining cash than to resell the securities. It is then in the agent's interest to maintain liquidity beyond its needs for current transactions.

Ultimately, there are considerable negative effects on the economy if they combine a downward shift in asset price expectations with greater uncertainty about credit and payments. Behaviour in relation to liquidity therefore causes greater destabilization of the demand for money than that triggered by speculation alone, which suggests that two types of expectations are mutually reinforcing in periods of liquidity crisis, especially since the fall in asset prices forces some agents to sell securities as a matter of urgency.

## CONCLUSION

The present reflection has enabled us to define the behavior of preference for the liquidity of economic agents, especially private ones, in an uncertain environment such as the CEMAC zone.

The empirical model tested for this purpose indicates a sensitivity to the interest rate that reveals persistent uncertainty and thus reinforces the fears of private agents who prefer to keep their liquidity to themselves in view of the inflation expectations they formulate. The precautionary motive plays an important role in variations in the desire for liquidity. Precautionary behaviour is justified by the appearance of unusual liquidity needs linked to unexpected payments or payments made under poor conditions. The appearance of such needs leads to a behaviour similar to that of speculators, who anticipate buying or selling prices.

On the other hand, not all agents often have the same attitudes to uncertainty, which suggests relatively deviant behaviour in the use of liquidity or in the way it is obtained.

Overall, uncertainty about interest rates has negative effects that vary from country to country and focus attention on the role of central banks. Such uncertainty seems to be linked to that relating to monetary policy, which can help to mitigate these effects in an operational framework with appropriate strategies.

**Notes**

*(1) This expression, which is due to Keynes, is often presented as a mechanical relationship between interest rates, income and money demand (Brossard, 1998).*

*(2) A distinction is made between uncertainty and risk (Knight, 1921): while a situation of choice in an uncertain future is a situation of risk when it is possible to associate results with each probability distribution, we find ourselves in a situation of uncertainty when the decision-maker is unable to establish such distributions.*

*(3) Contagion occurs when instability in one market (or market segment) spreads to one or more other markets (Forbes and Rigobon, 1999; Kaminsky and Reinhart, 2000). There are two types of contagion and two approaches to contagion: in the strict sense and in the broad sense: - In the strict sense, contagion indicates a significant change in the propagation mechanisms of shocks caused by a country or a group of countries (Forbes and Rigobon, 2001), leading to new channels of propagation. In the broadest sense, contagion refers to an episode in which an event produces immediate significant effects in a number of countries and is followed by devastating consequences within a few hours or days (Kaminsky and Vegh, 2003). The focus here is on the speed, strength and extent of the transmission of initial instability, beyond what can be expected from normal interactions between markets or intermediaries. Compared with the approaches we have : 1°) The macroeconomic approach, which proceeds from the fundamental contagion induced by the real and financial interdependencies between countries. Basically two types of effects: A monsoon effect, whereby countries suffer simultaneous crises due to a common shock (drop in the price of oil, rise in US interest rates, etc.), which causes a withdrawal of funds from the country to the outside world. Such a shock affects all countries in a similar way, without there being a first affected country; an effect that is linked to "normal" interdependencies between countries. Countries are hit because of the existence of an external crisis because of the trade and financial links that existed between countries before the crisis; 2°) The microeconomic approach to contagion highlights the fact that the transmission of a crisis is more related to the behavior of investors than to changes in macroeconomic fundamentals.*

*(4) Indeed, three main definitions are commonly used: (1) the liquidity of a financial product, which reflects the ease with which it can be exchanged for cash without loss of value; (2) market liquidity, which is a related concept that refers to the capacity of the market to absorb transactions on a given volume of assets or securities without a significant effect on their prices; (3) finally, monetary liquidity, which refers to the quantity of fully liquid assets circulating in the economy. It is generally measured by a narrow or broad monetary aggregate or by the ratio of this value to nominal GDP.*

*There are several other concepts of liquidity: financing liquidity, which refers to the ease with which economic agents can obtain external financing; balance sheet liquidity for firms in the non-financial sector, which corresponds to the amount of liquid assets on the balance sheet; and for financial institutions, banking liquidity, which reflects a bank's ability to meet its immediate commitments.*

*(5) The "old" world is characterized by a system of banking intermediation in which only banks act as financial intermediaries and in which assets are recorded at historical cost, with depreciation, amortization and provisions obeying pre-established rules and arrangements. The "new" world characterized by securitized finance is manifested, for its part, by the financial intermediation that takes place on the markets through transactions in securities, positions and securities valued at market value on the books of financial intermediaries (Clerc, 2008).*

*(6) These two worlds differ both in their intermediation channels and in their methods of valuing assets, which depend on the existence of representative prices in deep and liquid markets, to which is added the dynamic interaction between liquidity and solvency following the valuation process of securitized assets.*

*(7) This manifests itself by buying (selling) assets that they find undervalued (or overvalued).*

*(8) Fundamental uncertainty is the sudden impossibility of assigning probabilities to different situations and is likely to trigger a "regime shift" (Adrian and Shin, 2008).*

*(9) Two types of returns on assets relating to cyclical factors are generally highlighted: that of financial assets, on the one hand, and that of productive assets, on the other. For the return on financial assets, this is the short-term interest rate relative to the money market, which generally leads to better quality adjustments than the long-term rate. For the return on productive assets, the literature, following Friedman and Schwartz (1982), uses the growth rate of nominal income and not the inflation rate. For this reason, the hypothesis of equality between the expected rate of income growth and the expected rate of return on productive assets is preferred (Prat, 1988).*

*(10) This relationship underlies monetarist models of money demand (Friedman, 1956) and at the same time serves as the theoretical basis for monetary policies using an aggregate of money as an intermediate objective (Goux, 2000). For Keynesians, on the other hand, the relationship between money and monetary income is often affected by changes in agents' expectations (expectations about interest rates, prices and the level of activity). For Friedman, this relationship is stable in the long term. As a result, it prevents any short-term monetary intervention in the economy, since such intervention would lead to a rise in prices. It also reflects the adoption of a model with several theoretical approaches: quantitative theory of money, stock management model and portfolio approach (Bordes and Al, 2001).*

**APPENDICES**

**Appendix 1: Johansen Cointegration Tests**

**1) For Cameroon**

Date: 12/12/16  Time: 17:09

Sample: 1985 2016,  Included observations: 30

Test assumption: Linear deterministic trend in the data

 Series: M2 DEFPIB PIB TXINT

 Lags interval: 1 to 1

| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
|---|---|---|---|---|
| 0.756886 | 88.87043 | 47.21 | 54.46 | None ** |
| 0.602964 | 46.44363 | 29.68 | 35.65 | At most 1 ** |
| 0.413419 | 18.73176 | 15.41 | 20.04 | At most 2 * |
| 0.086934 | 2.728417 | 3.76 | 6.65 | At most 3 |

 *(**) denotes rejection of the hypothesis at 5%(1%) significance level

 L.R. test indicates 3 cointegrating equation(s) at 5% significance level

**2) For Congo**

Date: 12/12/16  Time: 15:40

Sample: 1985 2016,   Included observations: 30

Test assumption: Linear deterministic trend in the data

 Series: M2 DEFPIB PIB TXINT

 Lags interval: 1 to 1

| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
|---|---|---|---|---|
| 0.550430 | 58.51651 | 54.64 | 61.24 | None * |
| 0.422645 | 34.53258 | 34.55 | 40.49 | At most 1 |
| 0.324991 | 18.05363 | 18.17 | 23.46 | At most 2 |
| 0.188408 | 6.262741 | 3.74 | 6.40 | At most 3 * |

 *(**) denotes rejection of the hypothesis at 5%(1%) significance level

 L.R. test indicates 1 cointegrating equation(s) at 5% significance level

**3) For Gabon**

Date: 12/12/16  Time: 13:09

Sample: 1985 2016,  Included observations: 30

Test assumption: Linear deterministic trend in the data

 Series: M2 DEFPIB PIB TXINT

 Lags interval: 1 to 1

| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
|---|---|---|---|---|
| 0.567767 | 56.67000 | 53.12 | 60.16 | None * |
| 0.448738 | 31.50631 | 34.91 | 41.07 | At most 1 |
| 0.235195 | 13.63996 | 19.96 | 24.60 | At most 2 |
| 0.170167 | 5.595937 | 9.24 | 12.97 | At most 3 |

 *(**) denotes rejection of the hypothesis at 5%(1%) significance level

 L.R. test indicates 1 cointegrating equation(s) at 5% significance level

**4) For Equatorial Guinea**

Date: 12/12/16  Time: 17:29

Sample: 1985 2016, Included observations: 30

Test assumption: Linear deterministic trend in the data

 Series: M2 DEFPIB PIB TXINT

 Lags interval: 1 to 1

| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
|---|---|---|---|---|
| 0.491943 | 49.07914 | 47.21 | 54.46 | None * |
| 0.423196 | 28.76432 | 29.68 | 35.65 | At most 1 |
| 0.284630 | 12.25671 | 15.41 | 20.04 | At most 2 |
| 0.070958 | 2.208034 | 3.76 | 6.65 | At most 3 |

 *(**) denotes rejection of the hypothesis at 5%(1%) significance level

 L.R. test indicates 1 cointegrating equation(s) at 5% significance level

**5) For Chad**

Date: 12/12/16  Time: 17:29

Sample: 1985 2016, Included observations: 30

Test assumption: Linear deterministic trend in the data

 Series: M2 DEFPIB PIB TXINT

 Lags interval: 1 to 1

| Eigenvalue | Likelihood Ratio | 5 Percent Critical Value | 1 Percent Critical Value | Hypothesized No. of CE(s) |
|---|---|---|---|---|
| 0.566239 | 53.61230 | 53.12 | 60.16 | None * |
| 0.418577 | 28.55446 | 34.91 | 41.07 | At most 1 |
| 0.251468 | 12.28616 | 19.96 | 24.60 | At most 2 |
| 0.112988 | 3.596920 | 9.24 | 12.97 | At most 3 |

 *(**) denotes rejection of the hypothesis at 5%(1%) significance level

 L.R. test indicates 1 cointegrating equation(s) at 5% significance level

## Appendix 2 : Results of regressions with annual data

| Dynamique | Variables | Cam | Congo | Gabon | Guin. Equat. | Tchad |
|---|---|---|---|---|---|---|
| **Long terme** | **m2 (-1)** | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| | **Defpib (-1)** | 2.128 (6.618) | 5.187 (8.907) | -1.551 (-18.03) | -0.895 (-1.212) | -1.113 (-7.824) |
| | **Pib (-1)** | -2.503 (-12.88) | -4.832 (-11.66) | | -0.445 (-1.724) | |
| | **Txint (-1)** | -0.298 (-2.505) | -0.0284 (-0.800) | 0.244 (0.387) | -1.400 (-3.989) | -1.496 (-5.476) |
| **Court terme** | **D(m2 (-1))** | 0.067 (0.346) | 0.847 (0258) | -0.052 (-0.204) | -0.068 (-0.389) | 0.110 (0.615) |
| | **D(Defpib (-1)** | 1.887 (3.054) | 0.643 (0.569) | 0.0168 (0.084) | -0.047 (-0.169) | 0.561 (1.601) |
| | **D (Pib (-1))** | -0.291 (-0.643) | -0.383 (-0.342) | | -0.103 (-1.766) | |
| | **D (Txint (-1))** | -0.060 (-1.229) | 0.014 (0.439) | 0.098 (0.244) | -0.286 (-0.957) | -0.406 (-1.123) |
| **Force de Rappel** | | -0.507 (-5.299) | -0.503 (-2.049) | -0.358 (-2.956) | -0.256 (-3.522) | -0.413 (-2.497) |

**REFRENCES**

[1]. Adrian T. et H. S. Shin (2008). Liquidité et contagion financière.  Banque de France, *Revue de la stabilité financière-Numéro spécial liquidité, 11*, p. 1-7.

[2]. Avouyi-Dovi S., A. Diop, E-C. Fonteny, E. Gervais, P. Jacquinot, J-S. Mésonnier et J-G. Sahuc (2003). Estimation d'une fonction de demande de monnaie pour la zone euro : une synthèse des résultats. *Bulletin de la banque de France, 111*, mars ;

[3]. Awana C. (2013). Politique monétaire et incertitude dans la CEMAC.  *Revue d'Economie Appliquée*, *1*(1), janvier-juin, p. 199-221.

[4]. Bloom N. Ayhan Kose M. et M. E. Terrones (2013). Le poids de l'incertitude. *Finances et Développement*, mars, p. 38-41.

[5]. Bordes C., H. Chevrou-Séverac et V. Marimoutou (2001). Une Europe monétaire à plusieurs vitesses ? La demande de monnaie dans les grands pays de la zone euro (1979-1999). *Economie et Prévision, 147*, p. 51-71.

[6]. Brossard O. (1998). Comportement vis-à-vis de la liquidité et instabilité conjoncturelle : une réflexion sur la préférence pour la liquidité. *Cahiers d'économie politique, 30-31,* p. 123-146.

[7]. Clerc L. (2008). La liquidité en période de turbulences financières.  Vue d'ensemble, Banque de France, Revue de la stabilité financière-Numéro spécial liquidité, 11, p. I-VI .

[8]. Creel J. (2001). *Préférence pour la liquidité, effet de richesse et théorie budgétaire du niveau des prix.*  Document de travail, OFCE, Septembre.

[9]. Crockett A. (2008). de marché et stabilité financière.  Banque de France. *Revue de la stabilité financière-Numéro spécial liquidité, 11,* p.13-18.

[10]. Diamond D. W. et Ph. H. Dybvig (1983). Bank runs, deposit insurance and liquidity. *Journal of political economy, 91*(3), June, p. 401-419.

[11]. Gilles P. (1992). Incertitude, risque et asymétrie d'information sur les marchés financiers. *Revue française d'économie, 7*(2), p.53-115.

[12]. Goux J. F. (2000). Existe-t-il vraiment une relation cointégrante de demande de monnaie M3 en France ? *Revue Economique,  51*(4), p. 885-911.

[13]. Grishchenko O. (2011). Asset pricing in the production economy subjet to monetary shocks. *Journal of Economics and Business, 63*, p. 187-216.

[14]. Guéné S. (2001). Agrégats et politiques monétaires dans la zone euro.  *Economie et Prévision, 147*, p. 187-199.

[15]. Guillard M. (1999). *La monnaie dans les modèles de choix intertemporels : quelques résultats d'équivalences fonctionnelles.* Document de travail, EPEE, Université d'Evry-Val-d'Essonne.

[16]. Jeanne O. (2010).  La trappe à liquidité globale. *Revue économique, 61*(3), p. 395-406.

[17]. Johansen S. (1988). Statistical analysis of cointegrating vectors. *Journal of Economic Dynamics and Control, 12*, p. 231-254.

[18]. Knight F. H. (1921). *Risk, uncertianty and profit », Boston, Houghton Mifflin Company ; reprint, Chicago (III),* The University of Chicago Press.