

Full Length Research Paper

Banking crises and inflation dynamics in the West Africa Monetary Zone (WAMZ)

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Accepted 20 August, 2013

This paper examines the impact of banking crises on inflation in West Africa Monetary Zone (WAMZ) from 1970 to 2012. It adopts the modified monetarist theory of inflation that is based on dynamic panel estimation technique to analyze the dynamics of inflation and banking crises. The paper indicates that banking crises increases the rate of inflation in WAMZ. The study concludes that incessant banking crises can thwart the effectiveness of monetary policy and the achievement of single central bank and thus common currency among member states in WAMZ.

Key words: Banking crises, inflation, panel data analysis, WAMZ.

INTRODUCTION

Many central banks around the world have provided several policy prescriptions to tackle the effects of the recent global financial crisis. Many of these policy responses have been directed at satisfying the domestic mandate of maintaining price stability. The emerging literature has pointed out that the suspicions of remarkable increase in the central bank balance sheets would lead to higher inflation at the consumer level have so far proven unfounded. This may be due to the fact that some of the countries have not fully recovered from the crisis or well-anchored inflation expectations have mediated the effects. However, it has been argued that an extended period of too easy monetary policy is manifesting itself in excessive risk taking, bubbles in certain asset classes and price pressures can ultimately lead to higher inflation. Therefore, the possible effects of financial crisis on the dynamics of inflation have occupied the attention of many economists, central bankers, policy makers and practitioners.

Banking crisis points to a situation where bank runs and widespread failures induce banks to suspend the convertibility of their liabilities, or which compels the

government to intervene in the banking system on a large scale (IMF, 1998). In Africa, banking crises have become increasingly common (Goldstein and Turner, 1996) and more than 120 countries in the world have experienced banking crises (Laeven and Valencia, 2010). Large scale banking sector crises has raised wide spread concern as it disrupts the flow of credit to households and enterprises, reducing investment and consumption and possibly forcing viable firms into bankruptcy (Demirgüç-Kunt et al., 1998).

Once banking crises start, it spreads to other sectors in the economy. If problems in one bank are made public, depositors get scared and withdraw their money from the bank. This may cause the bank to fail, which generates bigger headlines, and scares even more depositors, who then withdraw their funds and more banks stand a chance of failing which eventually leads to massive run on the banks. Also, the crises are often preceded by prolonged periods of high credit growth which is often associated with large imbalances in the balance sheets of the private sector, such as maturity mismatches or exchange rate risk, this ultimately translates into credit risk for the bank-

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ing sector (Laeven and Valencia, 2010).

Moreover, banking crises affect output, investment, employment and key monetary indicators in an economy and thus complicates the conduct of monetary policy because it destabilizes money demand, money multipliers and diminishes the effectiveness of monetary instruments in an economy (Garcia-Herrero, 1997). Despite the fact that this type of crises may lead to substantial drag on aggregate economic activities and can thwart the effort of executing an effective monetary policy, a well managed crisis will stabilize bank panics which will lead to a healthy banking system generally (Kama, 2010). In recent years, the general presence of a "banking system safety net" in the form of bailout cost has typically prevented these modern crises from turning into the kinds of banking panics observed historically.

Moreover, a comparison of the size and complexity of the financial systems in WAMZ indicated more than 1,562 licensed financial institutions, of which 125 are commercial banks and the rest are other financial institutions, including some 400 community banks, over 600 foreign exchange bureaus and 167 insurance companies. About 60% of all these institutions operate in Nigeria. Commercial banks dominate financial intermediation with 92 of total financial assets or the equivalent of 22.1 billion US Dollar as at 2002. Nigeria accounted for 87 of total commercial banks assets, Ghana had a share of 10%, while the other countries combined accounted for about 3% (Lindgren and Odone, 2003). Also, seven Nigerian banks were in The Gambia, five in Ghana and five in Sierra Leone. This indicates that the issue of contagion cannot be overruled as bank runs in Nigeria can spill over to other countries in WAMZ.

One of the fundamental objectives of macroeconomic policies in many economies is to sustain high economic growth together with stability in prices. Single digit inflation is thus one of the primary convergent criteria in the attainment of single central bank and thus common currency among WAMZ. In contrary to this objective, inflation has been on the increase over the years in WAMZ. The increment in prices is more severe during the era of banking crises. The research questions that emanate from this study is that: to what extent has banking crises affects prices in WAMZ? What are the implications of banking crises in WAMZ? These among other issues are the major thrust of this paper.

This study would be of utmost importance as it looks at an important factor (banking crises) that can account for instability of a key macroeconomic variable (prices) which is very vital in determining the effectiveness of macroeconomic policies, the achievement of single central bank and thus common currency among member states in WAMZ. It improves on existing studies as most studies on price stability ignored the impact of banking crises. It also adds to existing studies by considering WAMZ as a monetary group. In a similar study, Martinez

periz (2002) only considered one Africa country (Kenya) out of seven countries (Chile, Colombia, Denmark, Japan, Kenya, Malaysia, and Uruguay). Indeed, there is a huge gap to be filled since no recent study on the impact of banking crises on prices has been done in WAMZ. This study intends to fill this gap by empirically investigating the impact of banking crises on inflationary process in the WAMZ.

The study is presented as follows. First, Key issues relating to banking crises and inflation in West African Zone (WAMZ) are discussed. Second, elaborate views of the relevant theoretical and empirical literatures relevant to the study are presented. Also, theoretical and methodological framework applied in the study and estimated result obtained from the study are discussed. The final section gives an intuitive summary, conclusion and policy recommendation based on the findings from the study.

LITERATURE REVIEW

In recent time, the determination of banking crises remains controversial and thus attracted a lot of research attentions. There are basically two views on banking crises; the direct and indirect indicator. These views have their pros and cons. The first view (direct indicator) posit that banking crises erupt when banks are forced to either close up, mergers, runs on financial institutions or government emerging measures to resuscitate distress (von Hagen and Ho, 2007). In line with the direct view, Demirgüç-Kunt and Detragiache (1998) noted that banking crises evolve when at least one of the following occur; the ratio of non-performing assets to total assets in the banking system exceeded 10%, the cost of the rescue operation was at least 2% of GDP, banking sector problems resulted in a large-scale nationalization of banks or extensive bank runs took place or emergency measures such as deposit freezes, prolonged bank holidays, or generalized deposit guarantees were enacted by the government in response to crisis. The event based view has been applied in various research studies.

However, the application of this view may be misguided, because it is mainly based on information about government actions undertaken in response to banking crises and bank distress which may lingers on for quite some time before government action is taken (Boyd et al., 2009). Also when the crises dates are compared in various studies differences in the timing of crises will be observed and different studies identify the onset of same crisis by a difference of more than two years.

The second view on banking crises (indirect indicator) focuses on an index of money market pressure that is; a weighted average of the ratio of reserves to bank deposits and of changes in short-term interest rates. The

standard deviations of the two variables are the weights (von-Hagen and Ho, 2007). Few studies (Kibritciouglu, 2002; Singh, 2012) have employed this view in determining banking crises. The indirect indicator has advantages over the schemes based on expert judgments (direct indicators) but there is the possibility that the indirect-indicator schemes pick up business-cycle effects instead of signs of banking crises (Kaehler, 2010). Many of the studies that are conducted in developed economies have shown that inflation tends to fall due to crises. This is anchored on the reasons that many of these countries have not fully recovered from the crisis, and therefore need some level of inflation to propel the economy or that the inflation expectations have been well-anchored to mediate the possible consequences. However, in economies where the monetary authorities may not have the required independence and credibility to effectively anchor the expected inflation, banking crises may thus exacerbate the inflation level. Under this condition, there may be the need for monetary authorities to absorb excess liquidity during banking and financial crisis.

Generally, studies have shown conflicting results on the impact of banking crises on inflation in various economies (Galati et al., 2011; Stock and Watson, 2010; Naghdi et al., 2012). The study conducted by Boyd et al. (2000) considered the effect of single and multiple periods of banking crises on inflation. They show that banking crisis leads to significant fall in broad money, but the impact does not translate to inflation in a single crises period. However, when considering multiple crises periods, banking crises have significant effect on inflation. The value of inflation tends to fall largely due to the crises. They noted that inflation rates are not significantly different in post-crisis periods and in pre-crisis periods.

Kaminsky and Reinhart (1999) noted that problems in the banking sector typically precede a currency crisis and the currency crisis deepens the banking crisis which distorts the stability of monetary policy. Also, banking crises will be more severe when currency crises happen simultaneously. This will thus lead to distortions in monetary policy. Martinz periz (2000 and 2002) empirically investigated the monetary impact of banking crises in Chile, Colombia, Denmark, Japan, Kenya, Malaysia, and Uruguay during 1975 to 1998. The study concluded that prices are relatively not stable over the years. This is as a result of the crises experienced in these countries considered. The study noted that banking crises are liable for price instability in most countries.

Reinhart and Rogoff (2008) noted that banking crises almost invariably lead to sharp declines in tax revenues and significant increases in government spending (a share of which is presumably dissipative). It may also jeopardize the effective functioning of payment systems, by undermining confidence in domestic financial institutions; they may cause a decline in domestic savings and/or a large scale capital outflow (Demirgüç-

Kunt et al., 1998). Mohanty and Klau (2001) showed that inflation is affected by several non-monetary factors, most notably frequent supply shocks. The supply side factors seem to play more than a passing role in the inflation process. Exchange rate and import prices turned out to be a significant and important determinant of inflation.

Naghdi et al. (2012) empirically investigated the impact of global financial crises on inflation in OPEC member countries. He found out that financial crisis affect economic variables such as economic growth, oil price and stock price index (that is financial markets), which in turn changes inflation. In other words crises caused an increase in oil price which in turn had a positive and significant influence on the inflation in OPEC countries. Alagidede et al. (2010) studied inflation persistence in WAMZ. They came to conclusion that; there is variability in inflation rate among WAMZ countries. Inflation rates for Ghana, Guinea-Bissau and Sierra Leone appeared to have been more volatile over the sample period and the mean inflation ranged from 8.5 to 30.9% during the period of study. Damian (2012) reported that financial crises have both positive and negative effects on inflation. The positive effect is as a result of it decreasing commodity prices and expands economic activity while the negative effects are as a result of the fact that it depreciates a country's currency.

Banking supervision in WAMZ

There is a possibility that banking crises in Nigeria is likely to spill-over to other countries in WAMZ given the fact that most Nigerian banks are in other WAMZ countries. Also, Nigeria banks accounts for a high fraction of banks total assets in WAMZ. Economic literature has shown that a good regulation and supervision minimizes the negative impact of moral hazard and price shocks in the banking system, thereby leading to a reduction in bank failures and banking system distress (Vitas, 1990). Banking supervision is the process of monitoring banks to ensure that they are carrying out their activities in a safe and sound manner and in accordance with prescribed laws, rules and regulations. Also, effective supervision of banks leads to healthy banking industry (Bench, 1993).

In The Gambia, as part of the financial sector reform, the Central Bank of The Gambia (CBG) introduced risk-based supervision. This enables the CBG to assess the risk profile of the banks as well as the contingent liabilities they may be exposed to. Plans are under way for The Gambia to go live on Basel II (Oshikoya et al., 2010). Unlike banks in Europe, Ghanaian banks do not hold derivative instruments nor are they involved in sub-prime lending. This coupled with the fact that the banks are adequately capitalized; the financial sector is quite sound and robust. The Bank of Ghana commenced risk-based supervision in 2007, which is a step toward full

implementation of Basel II .

Oshikoya et al. (2010) pointed out that in the aspect of supervision in Nigeria, the role of quality data is emphasized and the country operates on an Electronic Financial Analysis and Surveillance System (e-FASS) – a web-enabled analytical tool for the supervision of banks. The e-FASS, which was designed to enhance efficient on-line surveillance of financial institutions, was upgraded to further improve its performance for on-line submission of statutory returns and to capture the requirement for Risk-Based and Consolidated Supervision.

The central banks in the West African Monetary Zone (WAMZ) have signed an agreement for the establishment of a general framework for mutual assistance and the exchange of information in areas of licensing, supervision and regulation of financial institutions within the zone. This is to enforce and secure compliance with national laws, regulations or rules relating to supervisory and regulatory functions and duties of the national central banks.

Under the framework, the national central banks are required to exchange information on the state and development of the financial sector and the requirements of central bank laws and any amendment. The central banks are also required to exchange information on the activities of cross-border establishments and their parent financial institutions, with respect to issuing licenses to conduct operations and events which are likely to threaten the interest of depositors and creditors, as well as the stability of the financial system, also on supervision the framework would allow a central bank in-charge of a parent financial institution to have a supervisory role over a subsidiary of the financial institution on a consolidated basis . Given the effect of banking crises, there is need to determine if inflation rates responds significantly to banking crises in WAMZ. In order to achieve this, the study laid two central objectives; first to determine the relationship between banking crises and inflation in WAMZ and to empirically evaluate the impact of macroeconomic variables on inflation in WAMZ.

THEORETICAL FRAMEWORK AND METHODOLOGY

Martinez periz, (2000 and 2002) modified the monetary inflation model by incorporating banking crises in the model. According to the monetarists, the money supply is the “dominate, though not exclusive” determinant of both the level of output and prices in the short run, and of the level of prices in the long run (Friedman and Schwartz, 1963). The long-run level of output is not influenced by the money supply (Friedman and Schwartz, 1963). Inflation is always and everywhere a monetary phenomenon that arises from a more rapid expansion in the quantity of money than in total output, hence increases in money growth will lead to higher inflationary

rates in an economy. This implies that money growth is positively related to inflation. The modified monetarist inflation theory postulates that banking crises is an important determinant that accounts for variations in inflation.

When a country experiences significant signs of financial distress in the banking system, this will give rise to loss of depositor’s confidence in the banking industry which further leads to bank runs. Runs in banks which transcends to banking crises will lead to increase in demand for money from failed banks by the depositors, hence the amount of money in circulation increases which further gives rise to inflation because inflation is everywhere a monetary phenomenon and it only arises from persistent rise in money growth in an economy. This implies that banking crises exerts a positive effect on inflation in an economy.

On the other hand, Reinhart and Rogoff (2008) posit that banking crises almost invariably lead to sharp declines in tax revenues as well significant increases in government spending. If banking crises are financed by huge bail out cost from government, this tends to increase government expenditure which increases the aggregate demand and it is inflationary in nature, hence increases in government expenditure in terms of banks bailout cost increases inflation in an economy.

In addition, economic theories of inflation posit that increases in income are expected to positively drive up inflation. An increase in GDP indicates an increase in production which increases the amount of money in circulation and this drives inflation upward. Also, interest rates negatively impact on inflation. A reduction in interest rate attracts investors to move into production which in turn increases production. The increased production increases the amount of money in circulation and this drives up the commodity prices. Exchange rate is expected to have a positive impact on inflation because an appreciation in exchange rate increases production and raises the aggregate demand; this in turn raises current inflation.

Model specification

Studies have shown that the current value of prices depends on its past values and other explanatory variables; hence the specification for inflation follows a dynamic model specification. In order to capture expectations on inflation, we specify a dynamic panel model for prices in WAMZ. We employed a panel data analysis because it considers various cross sectional units (countries in WAMZ) over time. This study covers four countries in WAMZ (The Gambia, GHANA, Nigeria and Sierra Leone) from 1980 to 2011 . Based on the direct view of banking crises, we employed the banking crises dates as presented by Demirgüç-Kunt and Detragiache (2005), Jácome (2008), Laeven and

Table 1. Description of variables.

Variable	Mean	Std. Dev.	Min	Max
INFL	24.237	27.488	0.845	178.700
LM2	1.306	1.189	0.926	2.092
LY	1.573	1.311	1.901	2.162
INTR	13.41	8.261	2.67	54.670
AINT	15.10	11.10	2.750	78.630
EXC	248.913	730.161	0.001	3978.088
BC	0.171	0.377	0.000	1.000

Valencia (2008) and Reinhart and Rogoff (2008). These crises periods are based on expert judgments and they are used as control variables to determine its effect on inflation. Following Martinz Periz (2000 and 2002) and Kaehler (2010) we adopted the modified monetarist inflation theory that is augmented with crises dummy. Inflation in this case will depend on a vector of explanatory variables and a control variable. The dummy control variable employed in this study is the banking crises which takes the value of 1 during crises and 0 otherwise. The empirical model is specified as:

$$\text{CPI}_{(i,t)} = \theta_1 + \theta_2 \text{CPI}_{(i,t-1)} + \theta_3 \text{[M2]}_{(i,t)} + \theta_4 \text{INTR}_{(i,t)} + \theta_5 \text{AINT}_{(i,t)} + \theta_6 \text{EXC}_{(i,t)} + \theta_7 \text{Y}_{(i,t)} + \theta_8 \text{BC}_{(i,t)} + \varepsilon_{(i,t)} \quad (1)$$

Where the index “i” represents panel members or number of cross sectional units and $t = 1, \dots, T$ denotes the time dimension. In this study, we considered four cross sectional units and all variables are in log form except those rates. “M2” is the nominal broad money stock, “Y” represents a measure of real income as a scale variable (Gross Domestic Product), “INTR” is the own interest rate on money (demand deposit), “AINT” is the alternative interest rate (treasury bill or savings rate), “EXC” is the exchange rate, and “CPI” captures the inflation rate (consumer price index). BC is a dummy variable that reflects the years of banking crises in WAMZ countries. The disturbance term “ $\varepsilon_{(i,t)}$ ” is assumed to be a white noise error process. The a priori expectations for the parameters are:

$$\theta_1 > 0, \theta_2 > 0, \theta_3 < 0, \theta_4 < 0, \theta_5 > 0, \theta_6 > 0 \text{ and } \theta_7 > 0$$

Estimation procedure

In estimating Equation 1, using fixed or random effect model, several econometrics problems may arise such as; first, time-invariant country characteristics (fixed effects), such as geography and demographics, may be correlated with the explanatory variables. Secondly, the presence of the lagged dependent variable gives rise to autocorrelation. Thirdly, the lagged dependent variable

may correlate with the error term. Due to the above problems, a Generalized Method of Moments “GMM” estimator is proposed.

In addition, Kaehler, (2010) asserted that using dynamic panel model estimated with the general method of moments (GMM) all estimated coefficients are highly significant in explaining variations in inflation. This study therefore employs dynamic panel model to ascertain the claims of Kaehler, (2010) in WAMZ. To determine the relationship in the above equation, we will employ a one-step system GMM estimator. The GMM estimator implies that the regression is time-differenced in order to remove cross-section specific effects. It estimates in a system the regression equations in differences and levels, each with its specific set of instruments. Relative to conventional instrumental variable methods, it improves substantially on the weak instruments problem through more formal checks of the validity of the instruments and provides for potentially improved efficiency. Data are sourced from WDI-Online (2010), IFS CD-ROM (2010), index mundi (online) and Central banks statistical bulletin for various countries.

RESULT AND DISCUSSION

This section of the paper empirically analyse the objectives of the paper, by employing various statistical and econometrics techniques. Table 1 presents a vivid description of the variables used in the study.

The lowest rate of inflation is 0.8% while the maximum is 178.7%. On the average, inflation stood at 24.2% with a standard deviation of 27.7. The average money growth and exchange rate in WAMZ is 1.3 and 248.9 with a standard deviation of 1.2 and 730.16 respectively. In addition, log of output growth rate on the average remained at 1.6 with a standard deviation of 1.3. The banking crisis variable has the mean of 0.17 with a standard deviation of 0.38.

Table 2 presents the result of the relationship between banking crises and inflation in WAMZ. The result shows the efficacy of the explanatory variables in the model and the instruments employed are valid. In addition, the immediate past value of inflation, interest rate, exchange

Table 2. A Panel regression result on inflation in WAMZ.

Variable	Coefficient
Constant	-4.278*** (3.190)
INFL(-1)	0.3387*** (6.206)
M2	-0.0127 (-0.271)
Y	0.6677*** (2.745)
INTR	-0.5322*** (-3.606)
AINT	0.9824*** (5.804)
EXC	-0.0580*** (-4.007)
BC	0.2160*** (2.851)

Number of observation: 115

Sargan over-identification Test: 253.683***

Wald (joint) test: 258.799 ***

Note: *, ** and *** signifies 10, 5 and 1% respectively. t-statistic in parenthesis.

rate, output and banking crises are the major determinants of current rate of inflation in WAMZ. Immediate past value of inflation exerts a positive and significant impact on current inflation rate in WAMZ. The positive impact is statistically significant at 1% level of significance. This corroborates with empirical studies on inflation (Kaehler, 2010; Egwaikhide et al., 1994). A 100% increase (decrease) in expected inflation will increase (decrease) current inflation rate by 33.8%. This implies that the public expectations on inflation increase current inflation in WAMZ. There is a negative relationship between broad money and inflation in WAMZ and this is not statistically significant. The negative relationship is not also consistent with a-priori expectation and findings from some studies (Ocran, 2007).

Income increment tends to increase inflation in WAMZ. There is a positive and significant relationship between income and inflation rate in WAMZ. Our findings shows that a 100% increase (decrease) in income leads to 66.7% rise (fall) in inflation. This implies that increased income stimulates production, which tends to increase the aggregate demand and thus bring about increased inflation in WAMZ. This finding is in line with our a-priori expectation and in tandem with finding of Kaehler (2010). Own interest rate exerts a negative impact on inflation in WAMZ. The own interest rate captures the opportunity cost of holding money and it is expected to have a negative effect on inflation. The relationship between own interest rate and inflation is statistically significant at 1% level of significance. This implies that individuals tend to borrow more money at low interest rate. This increases the money in circulation and hence leads to inflation. From the Keynesian perspective at low interest rate, businesses borrow more money to invest in their business which boosts production and raises the aggregate demand which in turn increases inflation in the

economy. Also, 100% increase (decrease) in own interest rate leads to a 53.2% decrease (increase) in inflation rate. This is consistent with the findings of Ocran (2007). On the other hand, alternative interest rate is positively related to inflation in WAMZ. The relationship is statistically significant, however, it refutes the claims of Ocran (2007) of a negative relationship between interest rate and inflation. A 100 percent increase (decrease) in alternative interest rate will increase (decrease) inflation by 98.2%.

In addition, the exchange rate exhibits a negative but significant effect on inflation in WAMZ. 100% depreciation (appreciation) in exchange rate will increase inflation by 5.8%. The result from the empirical study also identifies banking crises as a major determinant of inflation in WAMZ. More interestingly, banking crisis has a positive impact on inflation. The relationship is statistically significant at 5% level of significance. This conforms to a priori expectation and is consistent with the findings of Boyd (2000) and Kaehler (2010). A 1% rise (fall) in banking crises will give rise to 21.6% rise (fall) in inflation rate. This implies that the more pronounce the crises, the more inflation rate tends to rise. This is evident in the fact that during crises, banks experience a large run on banks, hence most people withdraw their money and this increases the money in circulation which leads to inflation.

Overall, the one-step differenced GMM estimation satisfies the Sargan test, implying that the estimation procedures properly model the relationship between banking crises, monetary variables and inflation in WAMZ without evidence of a simultaneity bias or omitted variables. The specification tests on residual autocorrelations (AR) suggest that the differenced residuals exhibit first-order autocorrelation and no second-order autocorrelation. In particular, the null

hypothesis of no first-autocorrelation can be confidently rejected. Also the Wald test shows that the explanatory variables are jointly significant in the equation. The model has a good fit.

CONCLUSION AND POLICY RECOMMENDATIONS

The primary purpose of this study is to establish the impact of banking crises on prices in WAMZ and to determine the relationship between monetary variables and prices in WAMZ. The study employed a one-step dynamic panel estimation technique to estimate the impact of banking crises on prices. The result reveals that banking crises exerts a positive and significant impact on money demand in WAMZ.

Conclusively, an increase in banking crises will tend to increase inflation on average by 21.6% in WAMZ. This implies that banking crises strengthens changes in prices in WAMZ; this is statistically significant at 1% significant level. The results have important policy implications for policy makers in WAMZ. First, it reiterates the fact that banking crises in WAMZ can destabilize the monetary aggregates which in turn can thwarts the achievement of single monetary zone. With crisis and increased inflation, this poses substantial drag on the real economy as it reduces the amount of financial intermediation undertaken and consequently a decline in investment and aggregate economic activities.

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