

ISSN: 2315-7844

Website: www.arabianjbm.com/RPAM_index.php

Publisher: Department of Public Administration Nnamdi Azikiwe University, Awka, Nigeria and Zainab Arabian Research Society for Multidisciplinary Issues Dubai, UAE

EFFECTS OF MONETARY POLICY ON THE COMMERCIAL BANKS LENDING IN NIGERIA

Jegede Charles Ayodele (Ph.D)

*Department of Banking and Finance, Faculty of Management Sciences
Lagos State University, Ojo, Nigeria
E-mail: jegede_charles@yahoo.com*

Abstract

This paper empirically examines the effect of monetary policy on commercial bank lending in Nigeria between 1988 and 2008, using macroeconomic time series variables of exchange rate, interest rate, liquidity ratio, money supply, and commercial bank loan and Advances. Using Vector Error Correction Mechanism of Ordinary Least Square econometric technique as the estimation method. The findings indicate that there exists a long run relationship among the variables in the model. Specifically, the findings revealed that exchange rate and interest significantly influenced commercial banks lending, while liquidity ratio and money supply exert negative effect on commercial banks' loan and advances. The major conclusion drawn is that monetary policy instruments are not effective to stimulate commercial bank loans and advances in the long-run, while banks' total credit is more responsive to cash reserve ratio. Thus, monetary authority should make efforts to develop indirect monetary instruments and exercise appropriate control over the monetary sector.

Keywords: Monetary Policy, Commercial Bank loans and Advances, Money Supply, Interest Rate, Exchange Rate

Introduction

Monetary policy is one of the macroeconomic instruments with which nations (including Nigeria) do manage their economies (Ajie and Nenbe, 2010). According to Ubi, Lionel and Eyo (2012), monetary policy is an aspect of macroeconomics which deals with the use of monetary instruments designed to regulate the value, supply and cost of money in an economy, in line with the expected level of economic activity. It covers gamut of measures or combination of packages intended to influence or regulate the volume, prices as well as direction of money in the

economy per unit of time. Specifically, it permeates all the debonair efforts by the monetary authorities to control the money supply and credits conditions for the purpose of achieving diverse macroeconomic objectives. In Nigeria, the responsibility for monetary policy formulation rests with the Central Bank of Nigeria (CBN) and the Federal Ministry of Finance (FMF) (Ajie and Nenbe, 2010; Ajayi and Atanda, 2012; Abata et al., 2012).

In Nigeria as in other developing countries, the objectives of monetary policy include full employment, domestic price stability, adequate economic growth and external sector stability. The supplementary objectives of monetary policy include smoothening of the business cycle, prevention of financial crisis and stabilization of long term interest rates and real exchange rate (Mishra and Pradhan, 2008). In pursuing these objectives, the CBN recognises the existence of conflicts among the objectives necessitating at some points some sort of trade-offs (Uchendu, 2010). The Bank manipulates the operational target (monetary policy rate, MPR) over which it has substantial direct control to influence the intermediate target (broad money supply, M2) which in turn impacts on the ultimate objective of price stability and sustainable economic growth (Okafor, 2009; Uchendu, 2009).

Monetary policy and Commercial Banks are inextricately(???) linked together. In fact, the assessment of the Banking System (particularly in the area of loans and advances) can be evaluated through the performance of monetary policy tools, which can be broadly classified into two categories- the portfolio control approach and market intervention. Olokoyo (2011) expressed that commercial banks decisions to lend out loans are influenced by a lot of factors such as the prevailing interest rate, the volume of deposits, the level of their domestic and foreign investment, banks liquidity ratio, prestige and public recognition to mention a few. Many developing countries, including Nigeria have adopted various policy measures to achieve targeted objectives. Ajie and Nenbee (2010) contended that reserves of the banks are influenced by the Central Bank through its various instruments of monetary policy. These instruments include the cash reserve requirement, liquidity ratio, open market operations and primary operations to influence the movement of reserves. All these activities affect the banks in their operations and thus influence the cost and availability of loanable funds. Thus, monetary policy instruments are critical in the demand for and supply of reserves held by depository institutions and consequently on availability of credit.

By manipulating these instruments, central banks affect the rate of growth of the money supply, the level of interest rate, security prices, credit availability and liquidity creation from the and of commercial bank. These factors, in turn can exert monetary imbalances or shocks on the economy by influencing the level of investment, consumption, imports, exports, government spending, total output, income and price level in the economy. Kashyap and Stein (2000) and Amidu and Wolfe (2008) studies cited in Ajayi and Atanda (2012) provided empirical evidence to support the effect of monetary policy changes on loan supply of less liquid banks, deposit base and induce banks ability to perform their expected roles within the financial system. Ogunyemi (2013) reported that some monetary policy instruments like minimum rediscounting rate (MRR); liquidity ratio, exchange rate in the recent time in Nigeria was not in favour of the increase in the volume of commercial banks loans and advances in Nigeria due to poor infrastructural facilities and high cost of operating in such a volatile environment.

Despite several empirical evidences that found the efficacy of monetary policy lies on the effectiveness of the real sector; how those monetary policies had influenced the volume of Commercial Banks loans and Advances in Nigeria remains unresolved and demands

investigation. This study, therefore empirically evaluate and investigates whether monetary policy influences Commercial Bank lending activities in Nigeria. This study employs the use of econometric techniques to determine the relationship and linkage between the monetary policy and Commercial Banks loan and Advances in Nigeria, which is poised to established the effects of monetary policy on Commercial Banks lending in Nigeria.

Literature Review and Empirical Studies

Monetary policy being a major economic stabilization weapon involves measures taken by the Central Bank to regulate and control the volume, cost, availability and direction of money and credit in an economy to achieve some specified macroeconomic policy objectives and to counter all undesirable trends in the economy. According to the United States Federal Reserve Board, (2006), monetary policy is the process by which the Government, Monetary Authority or Central Bank of a country controls the supply of money, availability of money and cost of money or interest rate to attain a set of objectives oriented towards the growth and stability of the economy. Monetary policy represents a combination of measures design to regulate and control volume of money and credits in order to achieve certain macroeconomic objectives. CBN Annual Report (2004) defined monetary policy as a measure introduce by the monetary authority on monetary targeting and the mopping up of excess liquidity, aimed at ensuring a non-inflationary macroeconomic environment. Similarly, CBN Annual Report (2009), refers to it as specific action taken by the Central Bank to regulate the value, supply and cost of money in the economy with a view to achieving Government.s macroeconomic objectives. In a nutshell, the aims of monetary policy are basically to control inflation, maintain healthy balance of payments position in order to safe guard the external value of the national currency, and promote adequate and sustainable level of economic growth and development.

Credit on the otherhands refers to the status of being trusted to pay money back to somebody who lends it to one (Oxford Advanced Learners Dictionary, 1998). It means a sum of money lent by a bank (Central Bank) to someone (Federal Government) who agrees to pay back with interest at a future date. Credit to the Federal Government enable it finance her budget deficits and carry out developmental projects in the country. Nwankwo (2000) in Olokoyo (2011) argued that credit constitutes the largest single income-earning asset in the portfolio of most banks, thus explained why banks spend enormous resources to estimate, monitor and manage credit quality. This is understandably, a practice that impact greatly on the lending behaviour of banks as large resources are involved. Commercial banks perform three major functions, namely, acceptance of deposits, granting of loans, and the operation of the payment and settlement mechanism. In terms of flow of funds, the banking system, clearly dominates and has an important impact on the level of economic development. Adedoyin and Sobodun (1991) assert that “lending is undoubtedly the heart of banking business. Therefore, its administration requires considerable skill and dexterity on the part of the bank management”.

Chizea (1994) asserted that “there are certain aspects of fiscal and monetary policies which could affect the decision of the discerning and informed public to patronize the bank and the lending behaviour of commercial banks. Paramount amongst these measures is what he called the interest rate disincentive. Interest rates have been so low in the country that they are negative in real terms”. As inflation increased, the purchasing power of money lodged in deposit accounts reduce to the extent that savers per force pay an inflation tax. There is also the fear that the hike in interest rates would increase inflation rates and make a negative impact on the rate of investment. Usman (1999) also supported this position by stating that “a major regulation affecting

commercial banks lending in Nigeria is the restriction on the amount of interest they are allowed to pay on deposits in an effort to attract additional depositors and the interest they charge on their fund based activities” Usman (1999), commenting on the factors that affect commercial banks’ lending behaviour said that, “the sound and viable functioning of commercial banks in Nigeria is adversely affected by the choice of certain policy instruments for the regulation of banking operations. Such instruments include a rigidly administered interest rate structure, directed credit, unremunerated reserve requirements and stabilizing liquidity control measures like the stabilization securities of the past”.

Chodechai (2004) further stressed that “banks’ lending decisions are also influenced by the past relationship with the borrowers”. Past relationship according to him can help banks to obtain more private information, leading to a more accurate understanding of the borrower’s business and financial situation. Carletti et al (2006) however, discussing on multiple-lending is of the opinion that banks choose to share lending whenever the benefit of greater diversification, in terms of higher cost per project monitoring dominates the cost of free-riding and duplication of efforts.

Two fundamental propositions explain the effects of policy instruments on commercial banks lending abound in literature. The first is the Loan Pricing Theory argue that Banks cannot always set high interest rates, e.g. trying to earn maximum interest income. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship (Stiglitz and Weiss, 1981). If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behaviour or so called borrower moral hazard since they are likely to take on highly risky projects or investments (Chodecai, 2004). Second is Multiple-Lending Theory of suggests that banks should be less inclined to share lending (loan syndication) in the presence of well developed equity markets and after a process consolidation. Both outside equity and mergers and acquisitions increase banks’ lending capacities, thus reducing their need of greater diversification and monitoring through share lending. (Carletti et al, 2006; Ongene & Smith, 2000; Karceski et al, 2004; Degryse et al, 2004). The theory has a great implication for banks in Nigeria in the light of the recent 2005 consolidation exercise in the industry.

Bank Lending Channel of Monetary Policy Transmission

The monetary policy transmission mechanism refers to the routes through which monetary impulses are communicated to the real sector of the economy. Mishkin, (1995), argued that to be successful in conducting monetary policy, the monetary authorities must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanism through which monetary policy affects the economy. The bank lending channel represents the credit view of this mechanism. According to this view, monetary policy works by affecting bank assets (loans) as well as banks’ liabilities (deposits). The key point is that monetary policy besides shifting the supply of deposits also shifts the supply of bank loans. For instance, an expansionary monetary policy that increases bank reserves and bank deposits increase the quantity of bank loans available. Where many borrowers are dependent on bank loans to finance their activities, this increase in bank loans will cause a rise in investment (and also consumer) spending, leading ultimately to an increase in aggregate output, (Y). The schematic presentation of the resulting monetary policy effects is given by the following:

$M \uparrow \rightarrow \text{Bank deposits} \uparrow \rightarrow \text{Bank loans} \uparrow \rightarrow I \uparrow \rightarrow Y \uparrow$

(Note: M= indicates an expansionary monetary policy leading to an increase in bank deposits and bank loans, thereby raising the level of aggregate investment spending, I, and aggregate demand and output, Y,).

In this context, the crucial response of banks to monetary policy is their lending response and not their role as deposit creators. The two key conditions necessary for a lending channel to operate are: (a) banks cannot shield their loan portfolios from changes in monetary policy; and (b) borrowers cannot fully insulate their real spending from changes in the availability of bank credit. The importance of the credit channel depends on the extent to which banks rely on deposit financing and adjust their loan supply schedules following changes in bank reserves; and also the relative importance of bank loans to borrowers. Consequently, monetary policy will have a greater effect on expenditure by smaller firms that are more dependent on bank loans, than on large firms that can access the credit market directly through stock and bond markets (and not necessarily through the banks).

Review Of Empirical Studies

Several studies have been carried out by different scholars to explain how monetary policy influenced commercial banks lending practices and activities. However, some of the well known studies are the ones which incorporated various monetary tools in analyzing the effect of macroeconomic stability on banks' lending and activities. In a study carried out by Gertler and Gilchrist (1994) on how bank business lending responds to monetary policy tightening. Their study reveals that business lending does not decline when policy is tightened. They concluded that the entire decline in total lending comes from a reduction in consumer and real estate loans. However, Kashyap and Stein (1995) find evidence that business lending may respond to a tightening of monetary policy. They find that when policy is tightened, both total loans and business loans at small banks fall, while loans at large banks are unaffected. The differential response of small banks may indicate they have less access to alternative funding sources than large banks and so are less able to avoid the loss of core deposits when policy is tightened.

In Italy, Gambacorta and Iannotti (2005) studied the velocity and asymmetry in response of bank interest rates (lending, deposit, and inter-bank) to monetary policy shocks (changes) from 1985-2002 using an Asymmetric Vector Correction Model (AVECM) that allows for different behaviours in both the short-run and long-run. The study shows that the speed of adjustment of bank interest rate to monetary policy changes increased significantly after the introduction of the 1993 Banking Law, interest rate adjustment in response to positive and negative shocks are asymmetric in the short run, with the idea that in the long-run the equilibrium is unique. They also found that banks adjust their loan (deposit) prices at a faster rate during period of monetary tightening (easing) (see Somoye and Ilo, 2009).

Van den Heuvel (2005) in his study shows that monetary policy affects bank lending through two channels. They argued that by lowering bank reserves, contractionary monetary policy reduces the extent to which banks can accept reservable deposits, if reserve requirements are binding. The decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch to alternative forms of finance or liquidate assets other than loans.

A study by Punita and Somaiya in 2006 on the impact of monetary policy on profitability of banks in India between 1995 and 2000 provided some dissenting evidence that lending rate has a positive and significant influence on banks' profitability, which indicates a fall in lending rates will reduce the profitability of the banks. It was also found out that bank rate, cash reserve

ratio and statutory ratio significantly affect profitability of banks negatively. Their findings were the same when lending rate, bank rate, cash reserve ratio and statutory ratio were pooled to explain the relationship between bank profitability and monetary policy instruments in the private sector.

Amidu and Wolfe (2008) examined the constrained implication of monetary policy on bank lending in Ghana between 1998 and 2004. Their study revealed that Ghanaian banks lending behaviour are affected significantly by the country's economic also support and change in money supply. Their findings also support the finding of previous studies that the central bank prime rate and inflation rate negatively affect bank lending. Prime rate was found statistically significant while inflation was insignificant. Based on the firm level characteristics, their study revealed that bank size and liquidity significantly influence bank's ability to extend credit when demanded. A similar study was conducted for Ghana by Mohammed and Simon (2008).

Somoye and Ilo (2009) investigated the impact of macroeconomic instability on the banking sector lending behaviour in Nigeria between 1986 to 2005. Their study revealed the mechanism transmission of monetary policy stocks to banks operation. The result of cointegration and Vector Error correction suggests a long-run relationship between bank lending and macroeconomic instability.

This study will empirically analyze the effect of monetary policy on the commercial banks lending in Nigeria with the intension of determining the influence of monetary policy instruments on commercial bank loan and advances.

Methodology

The study employed secondary data and a time series analysis for the period of 1998-2008, which were obtained from sources like the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). The study make use of inferential analysis with the Augmented Dickey fuller (ADF) test for Units root and the co-integrated test is conducted through the Johansen Cointegration test (1988) to determine whether long-run relationship exist between the variables. In order to reconcile the short-run behaviour, an error correction Model (ECM) is used to determine an accurate predictions relationship between monetary policy and Commercial Banks loans and Advances. The following model is specified in an attempt to determine the effectiveness of monetary policy on Commercial Banks loans and Advances in Nigeria presented as :

$$CBLA = f(MS2, INTR, LR, EXR) \dots\dots\dots (1)$$

Putting it in an estimation form, we have

$$CBLA = a + b\text{Log}MS2 + c\text{INTR} + d\text{LR} + g\text{EXR} + U \dots\dots\dots (2)$$

Apriori = a and b > 0 while c, d, and g < 0

Where:

CBLA = Commercial bank loan and advances

MS = Money supply

INTR = Interest rate

LR = Liquidity ratio

EXR = Exchange rate

U = Stochastic error term

Empirical Results

Using the augmented Dickey-Fuller tests, the results as presented in Table 1 above revealed that only money supply (MS2) and liquidity ratio (LR) are stationary at the level while other series (variables) are stationary at first difference. That is, the result indicates that the variable, MS2 and LR are integrated of order zero – I(0) while other variables – EXR, INTR and CBLA are integrated of order one – I(1). Therefore, a co-integration test was carried out to confirm and determine the existence of a long-run relationship among the variables.

Cointegration Test

The Johansen cointegration test reveals that there is a long-run relationship between Commercial Bank loan and Advances (CBLA) and other variables captured in the model. The result indicates three co-integrating equation(s) at 5 per cent levels. The conclusion drawn from the result is that there exists a unique long-run relationship between LOG(MS2), LR, EXR, INTR and LOG(CBLA). Since there are three co-integrating vector, an economic interpretation of the long-run relationship between monetary policy and Commercial Bank loans and Advances in Nigeria can be obtained by normalizing the estimates of the unconstrained counteracting vector on Commercial Bank loans and Advances. The identified co-integrating equations can then be used as an error correction term in the error correction model (ECM). This series will form the error correction variable, similar to the residuals generated when using the Engle-Granger two-stage method.

Having established the extent and form of co-integrating relationships between the variables of the model, an over-parameterized error correction model as shown in Table 3 was estimated. At this level, the over-parameterized model is difficult to interpret in any meaningful way: its main function is to allow us to identify the main dynamic patterns in the model.

But this study will be concerned with the parsimonious model which is more interpretable. Table 4 shows the result of the parsimonious model. From Table 4, the lagged value of exchange rate (EXR) is negative and conforms to economic theory. The coefficient of lagged exchange rate (EXR(-1)) is statistically significant at 5 per cent level. The implication of this result is that a 1 per cent decrease in previous year's exchange rate will lead to 0.466763 per cent increase in commercial bank loans and advances, all things being equal. That is the higher the price of exchange rate, the lesser the volume of Commercial Bank loans and Advances, vice-versa. This result further supports the study by Ogunyomi (2011) who investigated monetary policy and Commercial Bank loan and Advances in Nigeria and concluded that exchange rate has significantly influenced the volume of Commercial Banks loans and Advances in Nigeria between 1975 to 2008.

The coefficient of lagged money supply (MS2) is -32.75372. This implies that there is a negative relationship between CBLA and MS2 in the short-run such that a unit change in MS2 will decrease the Commercial Banks and Advance, created by the Commercial Banks in Nigeria and vice-versa. This means that in this study broad money supply (MS2) had not encouraged an increase in the volume of Commercial Banks loans and Advances from 1988 -2008. This may not be unconnected with the high rate of inflation in the country.

The coefficient of lagged interest rate is 0.720626. This implies that there is a positive relationship between CBLA and interest rate in the short-run such that a one-unit increase in interest rate (INTR) will increase the CBLA by 0.720626, all other variables being held constant. The result shows that interest rate plays a significant role over the years in the volume of

Commercial Banks loans and advances in Nigeria. No wonder various banks has their individual rate of interest on loans and advances given to the public.

Furthermore, the coefficient of second lagged (LR) is -0.540669. This implies that there is negative relationship between CBLA and LR in the short-run such that a unit change in LR will decrease the loan and Advances, created by the Commercial Banks in Nigeria and vice-versa. This means that in this study liquidity ratio of Commercial Banks had not encouraged increase in the volume of Commercial Banks loan and Advances.

The strong significance of the coefficient of the error correction mechanism (ECM) supports our earlier arguments that the variables are indeed cointegrated. The ECM shows a relatively high speed of adjustment (39 per cent) of the short-run and long-run equilibrium behaviour of Commercial Banks loan and Advances (CBLA) and its explanatory variables.

The adjusted R^2 shows that about 65 per cent of the total variation in volume of Commercial Banks loan and Advances is determined by changes in the explanatory variables. Thus, it is a good fit. The F-statistics (22.09) indicates that all the variables are jointly statistically significant at 5 per cent level. The Durbin Watson statistics of 2.4 reveals that it is within the acceptable bounds, thus it is good for policy analysis.

Concluding Remarks

This paper investigated the possible effects of monetary policy on Commercial Banks lending in Nigeria. The analysis was done using the Bank Lending Channel Mechanism model, Loan Pricing Theory and Multiple Lending theory as the theoretical framework that incorporates the role of monetary policy. The paper has shown, using the error correction mechanism of the ordinary least squares regression technique, that the efforts of monetary policy at influencing the volume of Commercial Banks loan and Advances in Nigeria through exchange rate and money supply do not influenced volume of Commercial Banks loan and advances. The result is in consistent with the findings of Ogunyomi (2011) which conclude that Monetary Policy are ineffective for increasing the volume of Commercial Banks loan and Advances in Nigeria and executed in such a way that the objective it is to achieve is clearly and transparently defined in response to the dynamics of the domestic economic developments. Hence, we suggest that monetary authority should make efforts to develop indirect monetary instruments and exercise appropriate control over the monetary sector. The use of indirect monetary policy instruments influences the supply of bank reserves and by implication money supply in the economy which in turn directly generate price change in financial asset.

References

- Ajayi, F. O. And Atanda, A.A. (2012). Monetary Policy and Bank Performance in Nigeria: A Two-Step Cointegration Approach. *African Journal of Scientific Research*, 9(1): 462-476.
- Amidu, M. And Wolfe Simon (2008). The Impact of Monetary Policy on Banks, Credit in Ghana. IAABD 2008 Proceeding Track 1.
- Abata, M. A., et al. (2012). Fiscal/Monetary Policy and Economic Growth in Nigeria: A Theoretical Exploration. *International Journal of Academic Research in Economics and Management Sciences*, 1(5): 75-88.
- Ajie, H. A. and Nenbe, S.G. (2010). An Econometric Analysis of Monetary Policy and Stock Prices in Nigeria: 1986-2008. *International Journal of Economic Development Research and Investment*, 19(1): 175-192.

- CBN (1993): Perspectives of economic policy reforms in Nigeria, Research department, CBN, Lagos.
- CBN, (2004), „,Revised Guidelines for Discount Houses““ CBN Press.
- CBN (2009). 50 years of Central Banking in Nigeria. A publication of Central Bank of Nigeria.
- FRBSF, (2004), „U.S. Monetary Policy: An Introduction“ Federal Reserve Bank of San Francisco (FRBSF). [Htt://www.frbsf.org/publications/federal_reserve_monetary_policy.htm](http://www.frbsf.org/publications/federal_reserve_monetary_policy.htm)
- Federal Reserve Board, (2006), “Monetary Policy”
- Masha, S. N., Essien, M.L., Musa D., Akpan B. and Abeng, M.O. (2004). Theoretical Issues in Financial Intermediation, Financial Markets, Macroeconomic Management and Monetary Policy. In Nnanna, O. J., Englama, A. and Odoko, F.O. (eds), Financial Markets in Nigeria. Central Bnak of Nigeria Publication, 7-27.
- Mohammed, A. and Simon, W. (2008). The Impact of Monetary Policy on Banks’ Credit in Ghana. AERC Paper TI-I, Naairobi Kenya.
- Mishkin, F.S. (1995). Symposium on the Monetary Transmission Mechanism. *Journal of Economic Perspectives*. Vol. 9 No 4.
- Nnanna, J.O (2002), Monetary Policy and Exchange Rate Stability: A General Overview. *Nigerian Economic Society*.
- Nwankwo, G.O. (1991). The Money and Capital Market in Nigeria. Ibadan: Publisher
- Olokoyo, F.O. (2011). Determinants of Commercial Banks’ Lending Behaviour in Nigeria. *International Journal of Financial Research*, 2(2): 66-72.
- Ogunyomi, O.O. (2011). The Impact of Monetary Policy on Commercial Banks Loans and Advances in Nigeria: An Empirical Investigation (1975-2009). Available online at <http://www.researchgate.net/publication/228118448>
- Somoye, R.O.C. and Iio, B.M. (2009). The Impact of Macroeconomic Instability on the Banking Sector Lending Behaviour in Nigeria. *Journal of Money, Investment and Banking*, Issue 7.
- Ubi, P.S., Effiom, L. And Itam, E.E. (2012). Monetary Policy and Industrialization in an Emerging Open Economy: Lessons from Nigeria. *International Journal of Academic Research in Business and Social sciences*, 2(8): 270-288.

Appendix

Table 1: Augmented Dickey Fuller unit root test

Variables	ADF Statistics (Computed)		5% Critical Value		Remarks
	Level	Ist Difference	Level	Ist Difference	
Log CBLA	-2.824220	-5.761706	-3.658446	-3.673616	I(1)
Log MS2	-4.571559	-3.403271	-3.690814	-3.710482	I(0)
EXR	-1.919447	-3.918905	-3.658446	-3.673616	I(1)
INTR	-5.341324	-7.784744	-3.658446	-3.673616	I(1)
LR	-3.554010	-2.654317	-3.658446	-3.733200	I(0)

Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.904753	108.7475	69.81889	0.0000
At most 1 *	0.803196	64.07301	47.85613	0.0008
At most 2 *	0.751311	33.18760	29.79707	0.0196
At most 3	0.297251	6.748148	15.49471	0.6071
At most 4	0.002407	0.045788	3.841466	0.8305

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

Table 3: Result of the over-parameterized model/estimate

Vector Autoregression Estimates
 Date: 05/15/13 Time: 10:41
 Sample (adjusted): 1991 2008
 Included observations: 18 after adjustments
 Standard errors in () & t-statistics in []

	LOGCBL A	D(EXR(- 1))	LOGMS 2	LOG(MS 2(-1))	D(INTR)	D(LR)
LOGCBLA(-1)	0.192837 (0.29004) [0.66485]	17.45808 (6.56644) [2.65868]	0.015738 (0.03928) [0.40067]	-3.47E-13 (1.8E-13) [-1.95617]	0.924714 (1.92512) [0.48034]	0.585704 (3.84627) [0.15228]
D(EXR(-2))	0.017518 (0.01258) [1.39308]	-0.390599 (0.28470) [-1.37198]	-0.002896 (0.00170) [-	1.11E-14 (7.7E-15) [1.44514]	-0.032989 (0.08347) [-0.39524]	-0.133997 (0.16676) [-0.80353]

			1.70039]			
LOGMS2(-1)	-0.036618	44.41992	1.782064	1.000000	-0.829697	-10.82907
			(0.25460			
	(1.88007)	(42.5637)	)	(1.1E-12)	(12.4787)	(24.9315)
			[
	[-0.01948]	[1.04361]	6.99948]	[8.7e+11]	[-0.06649]	[-0.43435]
LOG(MS2(-2))	1.041759	-65.89671	-0.785017	3.62E-12	0.051225	6.595783
			(0.26463			
	(1.95415)	(44.2408)	)	(1.2E-12)	(12.9703)	(25.9139)
			[-			
	[0.53310]	[-1.48950]	2.96646]	[3.02977]	[0.00395]	[0.25453]
D(INTR(-1))	0.065864	0.444686	-0.004227	7.94E-15	-0.556533	-0.497337
			(0.00530			
	(0.03914)	(0.88618)	)	(2.4E-14)	(0.25981)	(0.51907)
			[-			
	[1.68265]	[0.50180]	0.79744]	[0.33173]	[-2.14211]	[-0.95812]
D(LR(-1))	5.39E-05	0.447633	0.002896	-6.70E-15	0.094533	-0.625914
			(0.00180			
	(0.01330)	(0.30105)	)	(8.1E-15)	(0.08826)	(0.17634)
			[
	[0.00405]	[1.48692]	1.60820]	[-0.82471]	[1.07107]	[-3.54952]
D(LR(-2))	-0.009482	0.250961	0.002448	-1.36E-15	-0.031291	-0.199864
			(0.00196			
	(0.01445)	(0.32720)	)	(8.8E-15)	(0.09593)	(0.19166)
			[
	[-0.65604]	[0.76699]	1.25063]	[-0.15395]	[-0.32619]	[-1.04281]
C	-2.432238	52.31771	-0.088154	0.000000	-2.165514	53.58259
			(0.28689			
	(2.11851)	(47.9619)	)	(1.3E-12)	(14.0613)	(28.0935)
			[-			
	[-1.14809]	[1.09082]	0.30728]	[0.00000]	[-0.15401]	[1.90729]
R-squared	0.918710	0.489004	0.997166	1.000000	0.488937	0.703016
Adj. R-squared	0.861807	0.131307	0.995183	1.000000	0.131192	0.495128
Sum sq. resids	4.648144	2382.371	0.085240	1.74E-24	204.7704	817.3893
S.E. equation	0.681773	15.43493	0.092326	4.17E-13	4.525156	9.040958
F-statistic	16.14523	1.367090	502.6944	2.43E+25	1.366720	3.381696
Log likelihood	-13.35576	-69.51021	22.63297		-47.42455	-59.88259
Akaike AIC	2.372862	8.612246	-1.625886		6.158283	7.542510

Schwarz SC	2.768583	9.007966	-1.230165		6.554004	7.938230
Mean						
dependent	13.33701	6.989444	13.66265	13.39075	-0.466667	1.838889
S.D. dependent	1.833991	16.56043	1.330196	1.317726	4.854804	12.72400
<hr/>						
Determinant resid covariance (dof adj.)		1.37E-50				
Determinant resid covariance		2.24E-52				
Log likelihood		891.5591				
Akaike information criterion		-92.83990				
Schwarz criterion		-90.06986				
<hr/>						

Table 4: Parsimonious model

Error Correction:	D(LOGMS2			
	D(EXR,2)	)	D(INTR,2)	D(LR(-1),2)
CointEq1	-0.392787 (0.21385) [-0.90149]	0.001141 (0.00093) [1.22772]	0.125649 (0.05707) [2.20170]	0.644742 (0.08501) [7.58459]
D(EXR(-1),2)	-0.466763 (0.23097) [-2.02089]	0.000813 (0.00100) [0.81029]	-0.104628 (0.06164) [-1.69750]	-0.135325 (0.09181) [-1.47397]
D(LOGMS2(-1))	-32.75372 (54.5452) [-0.60049]	0.712793 (0.23700) [3.00756]	-2.501782 (14.5559) [-0.17187]	1.132431 (21.6817) [0.05223]
D(INTR(-1),2)	0.720626 (0.87950) [0.81936]	0.002333 (0.00382) [0.61040]	-0.222070 (0.23470) [-0.94617]	2.548894 (0.34960) [7.29085]
D(LR(-2),2)	-0.540669 (0.36234) [-1.49216]	0.002403 (0.00157) [1.52662]	0.082626 (0.09669) [0.85451]	0.115943 (0.14403) [0.80499]
C	-0.562491 (1.81246) [-2.63225]	0.085796 (0.06572) [1.30554]	0.997889 (4.03615) [0.24724]	1.012934 (6.01203) [0.16848]
R-squared	0.788364	0.518739	0.733158	0.932755
Adj. R-squared	0.655801	0.299984	0.611867	0.902189

Sum sq. resids	4672.590	0.088215	332.7559	738.3006
S.E. equation	20.61021	0.089552	5.500049	8.192572
F-statistic	22.09992	2.371322	6.044589	30.51601
Log likelihood	71.86013	20.59813	-49.40262	-56.17663
Akaike AIC	9.160015	-1.717427	6.517955	7.314897
Schwarz SC	2.454090	-1.423352	6.812031	7.608972
Mean dependent	0.619412	0.273632	0.358824	1.482353
S.D. dependent	23.89121	0.107034	8.828279	26.19543

Determinant resid covariance (dof adj.)	1302.726
Determinant resid covariance	228.3642
Log likelihood	-142.6508
Akaike information criterion	20.07657
Schwarz criterion	21.44892
