ANALYSIS OF THE IMPACT OF MONETARY POLICY ON AGRICULTURAL, MANUFACTURING AND SERVICES SECTORS OUTPUT IN NIGERIA (1986-2012)

By

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Declaration

I hereby declare that this thesis titled, *"***Analysis of The Impact of Monetary Policy on Agricultural, Manufacturing and Services Sector Output in Nigeria (1986-2012)***"* was written by me in the Department of Economics under the supervision of Mohammed Shaibu Jibril (PhD) and M.M Usman (PhD). The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another Degree or Diploma at any University.

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Signature Date

Certification

This thesis titled, *"Analysis of The Impact of Monetary Policy on* Agricultural, Manufacturing And Services Sector *Output in Nigeria (1986-2012)"* by *Musa Yakubu* meets the regulation governing the award of the degree of Masters in Economics, Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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Dedication

This thesis is dedicated to the Almighty God.

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Abstract

There have been efforts by the Central Bank of Nigeria to influence output using monetary policy. In 1987, the MRR was reduced from15% to 12.75%, subsequently the lending rate increased, credit to private sector also increased. The contribution of manufacturing sector to GDP declined, while those of agriculture and services increased. Again in 2006, the MPR was set at 10% from MRR of 14%, subsequently the lending rate decreased, credit to private sector increased. The contribution of manufacturing sector to GDP further declined, while those of agriculture and services increased further. This study therefore examines the impact of monetary policy on selected sectoral output in Nigeria 1986-2012. The selected sectors are; agriculture, manufacturing and services because of their role in provision of food, employment, reduction in poverty and attainment of higher standard of living for the populace. The study employs the Cointegration test and VAR methodology. Cointegration test reveals that there is long run relationship between monetary policy variables, agricultural sector and manufacturing sector output and no long run relationship between monetary policy variables and services sector output. The result from impulse response function shows that monetary policy rate does not impact all the three sectoral outputs. This finding is not in conformity with apriori expectation. The lending rate was found to impact all the three sectors. Also the variance decomposition shows that inflation was the most important variable that explains variation in the agricultural sector output, followed by M1 and lending rate. In the manufacturing sector, M2 was the most important variable that explains variation in its output, followed by lending rate and M1. The most important variable that explains variation in services sector output was M1, followed by M2, credit to private sector and lending rate. The CBN should encourage Commercial banks and other credit institutions to improve upon their loan procedures so that farmers, manufacturers and services providers can have access to their credit facilities. Efforts should also be made to ensure that the credit is used for productive purposes.

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CHAPTER ONE

1.0 INTRODUCTION

Monetary policy as a technique of economic management for sustainable economic growth and development has been the pursuit of nations. Formal articulation of how monetary policy affects economic aggregates dates back to the time of Adam Smith and later championed by monetary economists (Fishers, Friedman, Tobin and others). Debate on the impact of monetary policy on the real output started since the exposition of the role of monetary policy in influencing macroeconomic objectives like economic growth, price stability, equilibrium in balance of payments and a host of other objectives. However, recently there seems to be increasing consensus among monetary economists and policy makers that monetary policy has real effects at least in the short run. Consequently, focus of monetary policy has shifted from the big question of whether money matters, to emphasizing other aspects of monetary policy and its relations to real economic activities. One aspect that has received considerable attention of recent is the sectoral effects of monetary policy shocks. Recent studies on the subject (Ibrahim 2005, Hayo and Uhlenbrock 1999, Ganley and Salmon 1997 and others) make it quite clear that different sectors of an economy respond differently to monetary shocks. This observation has profound implications for the macroeconomic management as the central bank will have to weigh the varying consequences on the different sectors of the economy. A comparison of the impact of monetary policy across different sectors may therefore provide valuable information for the monetary authorities on how monetary policy shocks are propagated through the economy (Alam and Waheed 2006).

Monetary policy action of the central bank begins when the authorities adjust the short term interest rate to increase or decrease the availability of credit in the economy. Monetary policy is therefore executed through increasing or decreasing the monetary policy rate (MPR). These actions are then passed through to the real economy such that a change in the planned monetary policy rate affects other interest rates within the economy. It is through this effect that spending behaviours of both consumers and businesses are altered. Central Bank's altering of the monetary policy rate is based on the assumption that "ceteris paribus" these changes will in turn impact on other short term interest rates within the financial

system. Therefore, a change in short term monetary policy rate is the first step in monetary policy transmission. This change is expected to affect consumption as well as investment spending of the economy through other retail rates determined by banking and non-banking institutions. For monetary policy to be potent, it must impact on consumption, investment, GDP and other economic variables (Lamin 2011).

Monetary policy is being executed by the Central Bank of Nigeria in order to promote economic growth of the nation through the attainment of its objectives such as price stability, favourable terms of trade, output growth and others. The attainment of the aforementioned objectives could help provide employment for the citizenry, eradicate poverty and ensure higher standard of living. The objective of output growth in particular, can be achieved through the contribution of the various sectors of the economy so as to avoid monoculturally dependent economy. These key sectors otherwise known as real sector play fundamentally important roles in the economy of any nation. Most economies of the world developed through effective investments in real sector. The attempt to strengthen the sectors of the economy by the government led to the implementation of financial liberalization policy in 1986 as part of the structural Adjustment Programme. The SAP was an economic reform program aimed at restructuring the economy and averting economic collapse. The key objective of Structural Adjustment Programme was to lay the basis for sustaining non-inflationary or minimal inflationary growth and improve the efficiency of the sectors. Therefore the financial liberalization policy entails the provision of an appropriate legal and regulatory framework for effective private participation in the economy. This was thought to be achieved through a well-developed and efficient financial sector that can speedily and cheaply mobilize needed funds for productive investments in the economy. However, as an instrument of monetary policy the central Bank of Nigeria CBN indirectly influences the level and direction of change in interest rate movement through its invention rate on various money market assets especially the Minimum Rediscount Rate (MRR). The MRR as the nominal anchor of CBN's interest rate policy continued to be used proactively in line with prevailing economic conditions (Mike 2011). .

Further, the MRR has undergone some fluctuations since 1987 to date as a result of the changes in the CBN policies which in turn have changed the overall economic conditions. In August 1987, MRR of 15.0% was reduced to 12.75% in December of 1987 with the objective

of stimulating investment and growth in the economy. However, in October 1996, interest rates were fully deregulated with the banks given freedom to determine the structure of interest rates in consultation with their customers. The CBN however, retain its discretionary power to intervene in the money market to ensure orderly developments in interest rates. Interestingly, the MRR was replaced with the Monetary Policy Rate (MPR). Again, the MPR was brought down to 10% from 14% MRR, with a lending rate of 13% and a deposit rate of 7% which stood as a standing facility intended to stem volatility in interest rates especially that of the interbank rates (Imoughele 2014).

It is observed that the financial sector credit concentrate more on the oil and gas sector, communication and general commerce to the disadvantage of the core real sectors such as agriculture, manufacturing and services sectors of the economy which are crucial in terms of provision of employment, poverty reduction, maintenance of balance of payment equilibrium and higher growth of the overall economy. A closer look at the credit flow to these sectors shows that in 2003, agriculture got 5.16%, manufacturing 24.46% and services sector 24.40%. These declined to 1.96%, 17.66% and 19.82% respectively in 2006. Again, in 2009 the credit flow to these sectors further declined to 1.12%, 12.30% and 11.80% respectively (Elijah 2012).

1.2 Problem statement

The main instrument of monetary policy used by the Central Bank of Nigeria in the execution of monetary policy is the monetary policy rate (MPR). This rate has been used by the CBN as the nominal anchor to influence the cost of funds in the economy. Decrease in MPR results to increased spending, investment, output and employment while an increase in MPR results in decreased spending, investment, output and employment.

Since after the deregulation of interest rate in Nigeria in 1986, it was the minimum rediscount rate (MRR) that showed the policy stance (direction) of the monetary authorities. In 1987, the MRR was reduced from15% to 12.75%, subsequently the lending rate increased, credit to private sector also increased. The contribution of manufacturing sector to GDP declined, while those of agriculture and services increased.

In December 2006, CBN replaced MRR with MPR as the anchor rate for interest rates in the economy with the objective of addressing the persistent problem of interest rate volatility to ensure that the money market rates were more responsive to policy interest rate changes, particularly the overnight interbank interest rate. MPR was meant to set floor for the interest rate regime in the money market (nominal anchor rate) so as to affect the supply of credit, and savings and thereby affect investment which increase growth in employment and output. At introduction, in 2006, the MPR was set at 10% from MRR of 14%, subsequently the lending rate decreased, credit to private sector increased. The contribution of manufacturing sector to GDP further declined, while those of agriculture and services increased further.The contribution of some of these sectors continue to decline while some increase marginally even with the execution of monetary policy. Even those with increased contribution to the GDP, their impact have not been felt in the economy; this is because poverty and unemployment rates have increased from 57.4% and 13.0% in the period 2002-06 to 60.0% and 18.5% respectively in 2007-11. This therefore raises concern on the actual impact of monetary policy sectoral output in Nigeria (Sanusi 2010).

1.3 Research Questions

i. Does monetary policy affect the agricultural, manufacturing and services sectors output in Nigeria?

ii. Is there long run relationship between monetary policy variables and the agricultural, manufacturing and services sectors output in Nigeria?

iii. Which monetary policy variable is more relevant to the agricultural, manufacturing and services sectors output?

1.4 Research Objectives

The major objective of the study is to examine the impact of monetary policy on the credit expansion and the impact thereof on the agricultural, manufacturing and services sector in Nigeria. In line with the major objective, the following specific objectives shall be achieved in the study:

i. To examine the effect of monetary policy on the agricultural, manufacturing and services sectors output in Nigeria.

ii. To assess the long run relationship between monetary policy variables and the agricultural, manufacturing and services sectors output in Nigeria.

iii. To identify the monetary policy variable that is more relevant to the agricultural sector output, manufacturing sector output and services sector output in Nigeria.

1.5 Justification of the study

This study will provide an insight into monetary policy execution with regards to how it affects the agricultural sector output, manufacturing sector output and services sector output in Nigeria. This study investigates the impact of monetary policy across three sectors; namely agriculture, manufacturing and services sectors. This is because a comparison of the impact of monetary policy across different sectors will provide valuable information for monetary authorities on how monetary policy shocks are propagated through different sectors of the economy. There are mixed evidences regarding monetary policy transmission on individual sectors, this study will ultimately contribute to the understanding of the monetary policy mix to be adopted in order to ensure balanced growth in different sectors the economy.

1.6 Scope and limitations

The study has been confronted with the limitation of availability of data on lending rate because lending rates of banks are divergent; the prime lending rate was taken as proxy. Also, quarterly data on some of the variables (credit to private sector, prime lending rate and cps) were not gotten; therefore their quarterly data were disaggregated using Eviews. Also, the study would be limited to studying the impact of monetary policy on agricultural, manufacturing and services sectors in Nigeria. The study would cover the period 1986-2012, a period concurrent with post SAP period which had a very huge influence on the financial markets in Nigeria.

1.7 Organisation of the study

This study is organized into five sections. The first section is an introduction. It gives a background of the study in general, the problem at hand and the objective of the research. The second section is the literature review; it links the work with theories of scholars. This section reviews the empirical literature of scholars in the field. The third section is the methodology; this section harmonises the work by choosing the methods that could help in achieving the set objective of the study. Chapter four would centre on the presentation and analysis of findings based on the statistical technique adopted in the study within the specified time frame. Chapter five contains the thesis; summary, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Conceptual Literature on Monetary Policy and Sectoral Output

Monetary Policy is the deliberate action of the CBN/ monetary authorities to influence the quantity, and availability of credit in order to achieve desired macroeconomic objective. It usually involves the use of interest rate (Monetary Policy Rate) to influence economic activity. The target of monetary policy could be to achieve economic growth, exchange rate, balance of payment or price stability (CBN 2011).

Omankhanlen (2011) defines Monetary policy as that branch of economic policy which attempts to achieve the broad objectives of policy – stability of employment and prices, economic growth, and balance in external payments through control of the monetary system and by operating on such magnitudes as the supply of money, the level and structure of interest rates and other conditions affecting the availability of credit. Like other arms of policy, monetary policy operates ultimately through its influence on expenditure flows.

Imoughele (2014) monetary policy is one of the macroeconomic instruments with which monetary authority in a country employs in the management of their economy to attain desired objectives. It entails those actions initiated by the Central Bank which aim at influencing the cost and availability of credits. The major policy instrument for monetary policy in Nigeria is the minimum rediscount rate (MRR) of the Central Bank. It was changed to monetary policy rate (MPR) in 2006. It is the nominal anchor which shows the stance of monetary authorities in Nigeria.

Sectoral output: it refers to the output of a collection of firms producing similar output within an economy (Black 2002). For example, Agricultural sector involves crop production, livestock, forestry, fishing etc for the purpose of production of food for man, feed for animals and raw materials for industries, services sector which includes transport, utilities, hotel and restaurants etc. manufacturing sector which include textiles, food processing, furniture etc.

Investopedia defines sector output as the output produced by one of the few general segments in an economy within which a large group of firms can be categorised. An

economy is usually broken down into different sectors which describe all the economic activities taking place in the economy.

Credit to Private Sector: Elijah (2012) noted that financial intermediation help to make credit available by mobilizing surplus fund from surplus spending unit who have no immediate needs of such fund and channel it in form of credit to investors (deficit spending unit) who have brilliant ideas on how to create additional wealth in the economy but lack the necessary capital to execute the ideals. According to World bank, credit to private sector could also be referred to as the financial resources provided to the private sector such as through loans, purchases of nonequity securities and trade credits and other accounts receivable that establish claim for repayment.

2.1.0 Monetary Policy Developments in Nigeria Since1986

The monetary policy process and practice is the sole duty of the Central Bank of Nigeria (CBN). The bank was founded in 1958 by the CBN act of 1958, though various amendments have taken place up to 2007. For instance, between 1968 and 1970, the banks power in terms of monetary policy management was shortened and kept under the supervisory watch of the finance ministry. The operational autonomy was brought back via the act of 1991 and later on, the amendment act of 1997 restored it back under finance ministry supervision (CBN, 2011). This status was changed in 1998 act as amended and then strengthened with the CBN act in 2007. The 2007 amendment act gave the CBN the autonomous power to conduct monetary policy rules in line with the international best practice. Moreover, before the consolidation of banking sector activity that took place in 2005, some changes in the monetary policy framework have been witnessed in Nigeria. This ranges from exchange rate targeting regime to adoption of direct control, and to indirect monetary policy/post SAP era, and the shift from short-term of one year to a two year medium-term policy framework. The policy objectives over these periods were essentially unchanged and also, aggregates of money remained the immediate target for realizing the final objective of inflation. These changes where done in order to cope with the new developments in the financial arena (Ibeabuchi 2007).

The structure of the Nigerian economy in the 1970s witnessed remarkable changes that immensely affected the monetary policy. The discovery of oil gave rise to increase in the

revenue generated by the oil sector which resulted in the growth of the Nigerian external reserve which eliminated the balance of payment problem.The favourable growth in the external account led the authorities to considerably engage in public expenditure, thereby intensifying the inflationary pressure. This situation led the monetary authorities to support a new policy framework (monetary target) that will contain the inflationary pressure (CBN, 2011).The negative price shock in the world oil market in the early 1980s resulted in a substantial reduction in export earnings that accrued to government. The aftermath of this was huge and recurring fiscal deficits, balance of payments and debt crises, due to unsustainable huge public sector expenditure and lack of alternative source of export earnings.

In an attempt to address the various macroeconomic problems in the economy, government adopted the demand management policy in 1982 when the problems were perceived as demand driven. In effect, various stabilisation measures were introduced. Such measures included imposition of tariffs and application of contradictory fiscal and monetary policies in order to reduce the level of aggregate demand and achieve fiscal and balance of payments equilibrium.

The overall balance of payments position which was negative between 1982 and 1984 became positive in 1985 period. All these have consequences for imports, savings and investment and growth particularly in developing countries such as Nigeria which depends heavily on imports for its capital goods and raw materials.The persistence of the macroeconomic problems in the economy even after the introduction of a number of stabilisation measures made the government to adopt the structural adjustment programme (SAP) in 1986. This was meant to further strengthen the existing demand management policies; restructure and diversify the productive base of the economy and reduce dependence on the oil sector and on imports; and to achieve fiscal and balance of payments viability, among other underlying objectives

It should be noted that with the introduction of SAP in Nigeria, the procedures hitherto used in allocating foreign exchange and which consequently serve as a mechanism for controlling demand for foreign exchange was abolished. Thus, the foreign exchange market was

deregulated. This policy was aimed at making foreign exchange available to whoever could afford the prevailing exchange rate.

2.1.1 The Short-Term Monetary Policy Regime (1986-2001)

Prolonged use on the direct instruments of monetary policy has had an adverse effect in the management of economic policies in Nigeria. The major problem faced by the CBN was lack of instrumental autonomy during the era, where policy issues on monetary aspect was directly received from the finance ministry. Also, the downward fall in the crude oil prices from $40 to $14 per barrel United State dollar within the early to mid-1980s resulted in a severe external sector imbalance. Hence, the Nigerian authorities resolve to shift its policy plan on money to a market oriented one in 1986. The idea was to have a free competitive market devoid of government intervention in the economic activities. This led to the adoption of the Structural Adjustment Programme (SAP) at that time as the demand for oil in the international market had crashed and coupled with the deteriorating economic condition in the country. The aim was to have a more vibrant and dynamic market for resource allocation which will bring back growth to the economy. Some reforms were put in place to achieve the target which include; deregulation of foreign exchange market, supporting appropriate price strategy in some part of the economy and public expenditure reorientation. With this development, and since the ultimate objectives of the monetary policy was not changed, expectations were high as the new policy will play a crucial role in the process of economic management. The one year or short term monetary plan was supported with a number of monetary goals. Open market operation continued to be the main monetary instrument and the government treasury bills were used. The adoption of the SAP programme led to the addition of several measures to drive the growth in excess liquidity. The federal government in 1989 ordered the withdrawal of public sector account from commercial banks. This, immediately reduce the liquidity from the system but from 1999, the authorities changed the policy due to shift of retail banking from central bank to commercial banks. Foreign currency account deposit was no longer accepted as collateral to access loan in naira. Other policy measures introduced by the authorities include;

-Limitation in the amount of credit given by banks to some sectors in the economy.

-Deregulation in the rate of interest policy.

-Reintroducing the use of stabilization securities in 1990.

-Adjustment of cash reserve ratio.

-Banks were compelled to buy special government treasury bills.

-Enhancement in the deposit money banks' reserve requirements.

The introduction of SAP ushered-in a structural change regime in the system characterized as perfectly competitive market and it used indirect instruments for monetary control. These structural changes encompass the liberalizations of key macroeconomic variables such as the interest rates, discount window operations, exchange rates and regulatory reforms. Consequently, the CBN relied on indirect techniques such as open market operations as the dominant instrument complimented by cash reserve requirement among others in the execution of its monetary programme. The surveillance activity by the bank was aimed at coherent management and a sound statement of financial position of the deposit money banks (CBN, 2011).

2.1.2 Medium Term Era of Monetary Policy 2002

In an attempt to deal with the issue of time variance and temporary shocks to the economy, the CBN introduced a policy framework of two years term from 2002. This new framework which is on course was established due to the fact that significant time variance affects the final goal of monetary policy action. Under this framework, policy rules on money are examined in every six month of the year in order to achieve medium to long-term monetary and financial market developments conditions. The main objective behind this policy since the commencement of this framework is to have single digit of inflation, exchange rate stability, employment and growth in the economy. The open market operation as the main tool of monetary policy was complimented by the short term funding of banks from the apex bank, reserve ratio, market for exchange rate and public sector injection/withdrawal of deposits from commercial banks. Also, attention was given to the finance sector for a better payment and competing system. The effective transmission of policies by the apex bank was not felt on the real sector only, but rather the new system of payments has ensured healthy and sound financial sector stability. There are some steps taken by the authorities in strengthening the deposit banks sectors of the economy to consolidate the policy and one of it is the amount of capital requirement as a basis for deposit money bank by the apex bank.

From 2005, the policy rule of 2004/2005 was modified view of the challenges faced. A 3% minus/plus close band of exchange rate was placed, public sector injection or withdrawal of deposits from commercial banks and cash ratio requirements were placed on two weeks advance. These policy modifications have had a positive influence on the aggregates of money and to a large extent a balanced budget was attained in the economy during the period. GDP growth increased substantially which exceeded the set targets in 2003-2005 and inflationary outcome was 10 per cent as against the target of 11.57% as shown in the *Table 2.1* below. The outcomes from inflation and GDP growth in 2006 to 2007 were closest to their targets when compared with the previous years. Moreover, from 2008 to 2012, inflation outcome rises to 15% and later on drop down to 12% as against the targets of 9% to 9.50% over the period reviewed. This was due to the global financial crises that happened at that period coupled with some ease in monetary policies put by the CBN. This includes the suspension of open market operation from September 2008 to September 2010, and a cut of 10.25% monetary policy rate down to 6.0%. Also, fiscal expenditure by the government contributed to the surge in inflation as can be observed in the 2012 budget, where over 70% of the budget was allocated to recurrent expenditure. But some of the measures taken by the CBN were similar to the ones taken by central bankers worldwide to allow the financial system to recover from the global financial crises of 2008.

Table 2.1:Some Key Policy Variables (% except otherwise stated)

Year		M2	M1	Net Credit to private Sector	Inflation	Real GDP Growth
2002	Target	15.30	12.40	34.90	9.30	5.00
	Outcome	21.55	15.86	11.79	12.17	4.63
2003	Target	15.00	13.80	32.30	9.00	5.00
	Outcome	24.11	29.52	26.81	23.81	9.57
2004	Target	15.00	10.80	22.00	10.00	5.00
	Outcome	14.02	8.58	26.61	10.01	6.58
2005	Target	15.0	11.40	22.00	10.00	5.00
	Outcome	24.35	29.7	30.82	11.57	6.51
2006	Target	27.00	-	30.00	9.0	7.00
	Outcome	43.09	32.18	32.06	9.0	6.03
2007	Target	24.10	-	30.00	9.00	10.00
	Outcome	44.80	37.63	91.62	6.56	6.45
2008	Target	45.00	-	54.70	9.00	7.50
	Outcome	57.88	56.07	59.49	15.06	5.98
2009	Target	20.80	32.20	45.00	9.00	5.00
	Outcome	17.07	2.41	26.15	13.93	6.96
2010	Target	29.25	22.40	31.54	11.20	6.10
	Outcome	6.91	11.05	-3.81	11.80	7.98
2011	Target	13.75	-	23.34	44.28	7.40
	Outcome	15.43	21.54	44.28	10.30	7.43
2012	Target	24.64	-	47.50	9.50	7.30
	Outcome	16.39	9.59	6.83	12.00	6.58

Source: CBN Statistical Bulletin 2012.

The CBN was able to achieve the policy targets owing to the pro-active implementation of sound monetary policies, including zero tolerance on government borrowing from the central bank, increased coordination between the bank and the fiscal authorities, aggressive liquidity

mop-up operations-frequent OMO sales supported by discount window operation, restructuring of debt instruments into longer tenor debts, increased deregulation of forex market and occasional forex swap. Consequently, these reforms from the monetary point of view of financial system, a key component of which was banking consolidation, was intended to minimize macroeconomic instability arising from banking systemic distress; deepen capital market; minimize the counterfactual shocks of creating distortions in the money market and financial system; encourage investment inflows through effective participation of the industry in the global financial system among others. The banks now have the potentials of financing large investment transactions as single obligator limits have increased, while regulation and supervision have become more effective given that ownership has been diluted with more regulators having the legal authority to oversee them. The CBN now can focus on a fewer number of banks for effective supervision and zero tolerance towards infractions, and improved corporate governance as greater transparency is being enforced and deployment of IT infrastructure (eFASS and RTGS) has significantly helped the system (Ibeabuchi 2007).

Consequently, with the recent developments in the Nigerian economic conditions, particularly in the financial sector, it became imperative for the authorities to review the conduct of monetary policy and strengthen the machinery of monetary policy to achieve the set targets coupled with the fact that the objectives remained unchanged. Specific focus was on the relationship between the minimum rediscount rate (MRR) and other rates in the market that became weak and the significance of using the MRR as the anchor for other short-term interest rates was eroded. Therefore, in December 2006, the CBN introduced a policy framework with the objectives of addressing the persistent interest rate volatility and making the money market more responsive to monetary policy interest rate changes, especially the overnight interbank interest rate. Hence, the interest rate volatility containment was to be addressed through the application of some policy measures including averaging of reserve requirements over a maintenance period of two weeks, and the use of standing lending and deposit facilities to define an interest rate corridor around the monetary policy rate (MPR) which would drive interest rate in the money market. The standing lending facility provides access to liquidity for participants in the Real Time Gross Settlement System (RTGS), on an overnight basis, to assist them square-up their short positions in the

interbank market and ensure the smooth operation of the market. The standing deposit facility on the other hand, provides an investment outlet for the surplus reserves of operators in the RTGS, thereby increasing the incentives for resource mobilization.

The CBN standing facilities (Lending and Deposit Facilities) which constitute the hub of the new monetary policy implementation framework were designed to achieve interbank rate stability by influencing the short term money market rates. Hence, they provide the financial valves for absorbing surplus funds and injecting overnight funds on a lender of last resort basis. There is also the use of Repurchase Agreements (Repos). They are temporary purchases (repos) and sales (reverse repos) of eligible securities by the Bank to either supply or withdraw liquidity and ensure a healthy interbank market and curtail interest rate volatility. Repo transactions enable the Bank to provide temporary liquidity to needy operators in the discount window on a collateralized basis to ensure the smooth operations of the interbank market on a continuous basis. The transactions (repos and reverse repos) are usually between one to seven days executed between the Bank and any of the operators in the discount window. Under a repo agreement, CBN injects domestic currency against the purchase of a domestic asset through a contract specifying the resale at a given price at a future date (the repurchase rate). Reverse repo on the other hand, is the opposite of the repurchase agreement that result in the injection of liquidity into the system. This provides operators in the money market with excess reserves to invest through the discount window at an agreed interest rate. Thus, helps to influence the interbank interest rate from falling to unduly low levels in the period of liquidity surfeit in the banking system. In this agreement, CBN sells funds as assets against domestic currency, temporarily withdrawing liquidity, but enters into an agreement to buy back the asset at a future date. But from September 2008, the tenor of repos was extended to 365 days, due to the concerns on the impact of the global financial crises and the CBN's policy rate is applied to all these transactions. The medium term monetary policy framework outcome has been mixed over the period. The excessive fiscal operations of the government had led to the growth in monetary aggregate to exceed the target with substantial margin and also, inflationary rate was mixed as it remained single digit in 2006 and 2007 but reverted to double digits in 2008 due to the global food shortages and financial crises (CBN, 2011).

Monetary policy guides the Central Bank's supply of money in order to achieve the objectives of price stability (or low inflation rate), full employment, and growth in aggregate income. This is necessary because money is a medium of exchange and changes in its demand relative to supply, necessitate spending adjustments. To conduct monetary policy, some monetary variables which the Central Bank controls are adjusted in order to affect the goals which it does not control. The instruments of monetary policy used by the Central Bank depend on the level of development of the economy, especially its financial sector. The commonly used instruments in Nigeria are discussed below.

Interest Rate: This is variable that the study uses as the instrumental variable through which monetary policy transmission is propagated through the economy. The Central Bank provides credit to Deposit Money Banks, thus affecting the level of reserves and hence the monetary base. It lends to financially sound deposit money banks at a most favourable rate of interest, called the minimum rediscount rate (MRR). The MRR sets the floor for the interest rate regime in the money market (the nominal anchor rate) and thereby affects the supply of credit, the supply of savings (which affects the supply of reserves and monetary aggregate) and the supply of investment (which affects full employment and GDP).

Reserve Requirement: The Central Bank may require deposit money banks to hold a fraction (or a combination) of their deposit liabilities (reserves) as vault cash and or deposits with it. Fractional reserve limits the amount of loans banks can make to the domestic economy and thus limit the supply of money. The assumption is that deposit money banks generally maintain a stable relationship between their reserve holdings and the amount of credit they extend to the public (CBN 2010)

Open Market Operations: The Central Bank buys or sells ((on behalf of the Fiscal Authorities (the Treasury)) securities to the banking and non-banking public (that is in the open market). One such security is Treasury Bills. When the Central Bank sells securities, it reduces the supply of reserves and when it buys (back) securities-by redeeming them-it increases the supply of reserves to the deposit money banks, thus affecting the supply of money.

Exchange Rate: The balance of payments can be in deficit or in surplus and each of these affect the monetary base, and hence the money supply in one direction or the other. By selling or buying foreign exchange, the Central Bank ensures that the exchange rate is at levels that

do not affect domestic money supply in undesired direction, through the balance of payments and the real exchange rate. The real exchange rate when misaligned affects the current account balance because of its impact on external competitiveness.

Moral Suasion: The Central Bank issues licenses or operating permit to deposit money banks and also regulates the operation of the banking system. It can, from this advantage, persuade banks to follow certain paths such as credit restraint or expansion, increased savings mobilization and promotion of exports through financial support, which otherwise they may not do, on the basis of their risk/return assessment.

Direct Credit Control: The Central Bank can direct deposit money banks on the maximum percentage or amount of loans (credit ceilings) to different economic sectors or activities, interest rate caps, liquid asset ratio and issue credit guarantee to preferred loans. In this way the available savings is allocated and investment directed in particular directions.

Prudential Guidelines: The Central Bank may in writing require the deposit money banks to exercise particular care in their operations in order that specified outcomes are realized. Key elements of prudential guidelines remove some discretion from bank management and replace it with rules in decision making. Moral suasion and prudential guidelines are direct supervision or qualitative instruments. The others are quantitative instruments because they have numerical benchmarks (CBN 2011).

2.1.3 Overview of the Performance of the Selected Sectors of the Nigerian Economy

Agricultural Sector: Agriculture, since independence, held the key to Nigeria's rapid economic transformation, poverty alleviation, stable civil and good governance as well as national and food security. Agriculture employs about two-thirds of Nigeria's labour force, contributes over 40% of the Gross Domestic Product (GDP) and provides about 88% of non-oil earnings. The crops sector contributes 85% of the agricultural GDP, livestock (10%), Fisheries (4%) and Forestry (1%). Over 90% of the Nigerian agricultural output is accounted for by small-scale and subsistence farmers with less than two hectares farm holding. Generally, it is estimated that about 75% of Nigeria's total land area amounting to 68 million ha has agricultural use potential while about 33 million ha is actually under cultivation. Also, of the estimated 3.14 million ha irrigable land, only about 220, 000ha or 7% is utilized. With diverse and rich vegetation that can support heavy livestock population, it also has a surface and underground water of about 267.7 billion cubic meter and 57.9 billion cubic meters

respectively. The Nigerian agricultural sector has remained a resilient sustainer of the economy and the Nigerian people in terms of food supply, employment, national income generation and industrialization. It has also struggled to perform the above functions over the years in spite of declining effectiveness of policy attention since the 1980s.

The oil boom, heralded an era of decay and decline in agricultural output and in the overall contribution of the sector to the economy, evidenced by the Dutch Disease. It lost its foreign exchange earnings capacity, domestic revenue importance, and attracted policy neglect. This neglect turned a threat to national food security leading to massive and continuous food importation with an erosion of value addition gains of the sector as agricultural raw commodities were exported only for finished goods to be imported. Policy neglect affected key indicators of agricultural sector performance on gross domestic product (GDP), amount of guaranteed loan received by farmers under the agricultural credit guarantee scheme fund (ACGSF), total bank credit to the agricultural sector and the economy as a whole, capital expenditure of federal government on agriculture and all sectors of the economy and the share of labour force employed in agriculture. In spite of this, the sector still showed some resilience. Its share in both aggregate GDP and non-oil GDP continued to increase. Credit flow to the agricultural sector (an indicator of the sector's capacity to invest and grow) measured by the amount of guaranteed loan that flowed to the sector under the agricultural credit guarantee scheme fund and the total bank credit to the sector. The nominal flow of guaranteed credit increased but sharply declined in real terms over the sub- periods, from about N44.2 million in the 1981 – 85 sub-periods to about 36.5 million in the 1986-90 sub-periods and to only about 5.6 million in the 1996-2000 sub-periods (Amassoma 1997).

Manufacturing sector: manufacturing involves the conversion of raw materials into consumer goods or intermediate goods for further production. It includes processing, crafts etc. the manufacturing sector is also important because of its potential in creating employment and boosting agriculture to diversify the economy. The miniscule manufacturing sector share of the GDP reflects the abysmal performance of the sector over several years constrained by pervasive growth-inhibiting factors such as appalling state of physical infrastructure, inadequate finance heavy reliance on external sector for raw materials etc. The downward trend in the contribution of manufacturing sector to GDP prompted the adoption of strategies to encourage industrialization in Nigeria.

Structural Adjustment Programme (SAP) was adopted in June, 1986 and it received the blessings of Breton Wood institutions. SAP was considered as the recipe that would bring the desired transformation of the economy from agrarian to industrial. Specifically, this policy came into being in order to right the wrongs of earlier policies. It aims and objectives include promoting investment, stimulating non-oil exports and providing a base for private sector led development through privatization and commercialization of public investments. The SAP induced industrial policies include interest rate deregulation, debt conversion (equity) swap, privatization and commercialization and new export policy incentive.

In 1989, Trade and Financial Liberalization Policy were enacted purposely to foster competition and efficiency in the financial sector. The aims and objectives include stimulating competition among the domestic firms and between the domestic imports competing firms and foreign firms. The objective was to promote efficiency, reduction of both tariff and non –tariffs barriers, scrap the commodity marketing boards and market determination of exchange rate as well as deregulation of interest rates meant to foster efficiency and productivity.Generally, the manufacturing sector contributed 6.1% to GDP in the period 1981-1990, 4.9% in 1991-2000 and 3.9% in the period 2001-2009 (Udah 2010).

The Services Sector: The Nigerian services sector comprises of electricity; water, road, rail, ocean, and air transport; communication; hotel and restaurants; financial services; real estate; housing (dwelling); private non-profit activities; as well as repairs and other services. Some of the sub-sectors are dominated by public activities especially in electricity, water, rail and ocean transport, and communication services. Extensive government intervention has been the usual practice in the financial and telecommunication services sub-sectors due to their perceived strategic importance in the economy. By 1990, the contribution of the services sector had declined to 25%, reached its lowest of 18.9% in 1992. After 1994, the share of the services sector in GDP stabilized at about 20% after which it rose to almost 27% in 1998. Services share of value added fell from 30% in 1986 to 18.7% in 1992 while it reached a global minimum of 12.3% in 1998. The average between 1990-1998 was 21.3% but reached a peak of 27.4% in 1994.

Generally, the Nigerian service sector is one of the contributors to the GDP. It contributed 9.8% in the period 1981-1990 and rose to 11.5% in the period 1991-2000. The contribution of the service sector further increased to 15.5% in the period 2001-2009. The sharp increase in

the contribution of the services sector in the period 2001-2009 could be attributed to the boost in the telecommunication subsector (Ademola and Bankole 2001).

2.2.0 Theoretical Literature

2.2.1 The Classical View of Monetary Policy

The classical theory is based on the assertion that all markets in a capitalist society clear and that prices are flexible to ensure automatic adjustment back to the equilibrium. According to this doctrine, a change in money supply does not affect real variables like output, employment and income. Money is therefore considered neutral in the economy.

(a) The Cash Transactions theory

According to the transactions approach, the only reason for holding money is to facilitate transactions. Fisher's analysis commences with a simple identity sometimes called the equation of exchange.

$MV=PY$ ---------- (2.1)

Where M is money supply, V is velocity of money, P is price level and Y is output. According to this school of thought, money supply (M) does not have any impact on real output (Y) but that its impacts is on the price level (P) only (Jinghan 2009).

(b)The Cash Balance Approach

The Cambridge approach emphasises that there are alternatives to holding money in the form of shares and bonds. These assets yield a return which can be viewed as the opportunity cost of holding money. As interest rates rise, agents will economise on money holdings and vice versa. Another factor that will influence money holdings is the expected rate of inflation. If inflation is expected to be high, then the purchasing power of money will fall. This will prompt agents to buy securities or commodities as a hedge against inflation.

We can set out the Cambridge cash balance approach as follows:

$M^D = kPy$

$M^D = M^S$

Where

k = k(E(inf), **r**, u)

This sets out that M^D is some fraction k of nominal GDP where k depends on expected inflation, interest rates/returns and u, a set of unspecified factors which may influence money demand. Note that **r** is a vector of returns reflecting an appreciation that agents had a choice of assets such as shares and bonds (Jinghan 2010).

2.2.2 The Keynesian View of Monetary Policy

The Keynesian theory unlike the classical theory is based on the assumption that prices are sticky and therefore markets do not clear on their own. They assert that a nation could remain in low output and unemployment without the invisible hands guiding the economy back to full employment level of output. The traditional Keynesian view of the IS-LM model of the monetary policy transmission mechanism states that expansion in money supply leads to a fall in interest rate, thereby causing investment to rise and consequently a rise in output. This can be characterized by the following schematic showing the effects of monetary expansion:

M↑…… ir↓….. I↑ ….. Y↑

This indicates that an expansionary monetary policy leads to a fall in interest rate which in turn lowers the cost of capital, causing investment spending to rise, thereby leading to an increase in the aggregate demand and a rise in output.

The Keynesian transmission mechanism therefore starts from the premise that money and certain marketable fixed income securities (bonds) are close substitutes. He further states that if a difference exists between the desired and actual money balances, individuals try to dispose the excess money balance by buying bonds which help increase investment, aggregate demand and hence output (Jinghan 2010).

2.2.3 The Monetarist View

The monetarists posit that changes in money supply could affect the level of economic activity in both the real and nominal terms. Unlike keynes, Friedman's view is based on the premise that money is not just a close substitute for a small class of assets but rather a substitute for a large spectrum of financial assets and even non-financial assets such as securities, durable and semi-durable goods and services etc

$M^d/P = f(y_p, r_b-r_m, r_e-r_m, \pi_e-r_m)$ ----------(2.2)

Where M^d/P is the demand for real money balances, y_p is the individual wealth which corresponds to permanent income, r_b is the expected returns on bonds, r_m is the expected returns on money, r_e is the expected returns on equities, π_e is the expected inflation.

Expected inflation represents the returns on holding goods. This last element is the distinctive relationship Friedman adds, that agents hold durable goods as assets and will substitute them for money if they expect price inflation (i.e. capital gains on holding goods). This is the heart of the monetarists transmission channel. Friedman uses his restatement to elaborate upon Keynes theory of liquidity preference. He posits that excess money holding is not applied to the purchase of interest-bearing assets only but also consumer goods too. This is because consumer durable and semi-durable goods are also store of wealth too. That is, if the portfolio disequilibrium is disposed of in the purchase of consumer goods, there will be direct impact on aggregate demand and thus output (Palley 2001).

2.2.4 Neutrality and Non-Neutrality of Money

(i) Classical View

According to Hicks (1967), classical monetary theory has two main strands; one represented by Ricardo and currency school who believed in relying at all times (including deflation and unemployment) the quantity of money. In this strand of classical system, money is neutral in the economy because it has no effect in the determination of income, employment or output. This school of thought posit that income, employment and output are determined by other factors such as capital stock, technology, available resources etc.

The other strand of the classical system is that represented by Thompton, Tooke and Friedman who favoured a permissive monetary instability as the price of sustaining the level of economic activity and insulating the domestic economy from fluctuations in the balance of payments. This strand believe that 'money matters'. They believed that a monetary economy is governed by uncertainty: in a monetary affair, discretion is preferable to rule since the economy is hardly ever in full equilibrium and the equilibrating forces of market mechanism are slow or ineffective. This view is summarized by the neoclassical restatement of the quantity theory of money which admits the short-run non-neutrality of money (Maria and Annalisa 1994).

(ii) Keynesian View

In the Keynesian system, the neutrality or non-neutrality of money is dependent on the 'state of the economy' (full employment level or below full employment level). Money is only neutral at full employment level of output or in a situation of liquidity trap. Growth in money supply at full employment level of output can only lead to a higher price level in the economy while during a situation of liquidity trap, an expansionary monetary policy will not lead to more investment because interest rate cannot fall beyond that level. On the other hand, once the economy is under full employment level of output, an increase in money supply has a non-neutral effect because it will lead to a fall in interest rate, increase in investment and hence output (Jinghan 2010).

2.2.5 Tobin's Asset Theory

This theory provides a mechanism by means of which monetary policy affects the economy through its effects on the valuation of equities. Tobin defines q as the market value of firms divided by the replacement cost of capital. If q is high, the market price of firms is high relative to the replacement cost of capital and new plant and equipment capital is cheap relative to the market value of business firms. Companies can then issue equity and get a high price for it relative to the cost of plant and equipment they are buying. Thus investment spending will rise because firms can buy a lot of new investment goods with only a small issue of equity. On the other hand, when q is low, firms will not purchase new investment goods because market value of firms is low relative to the cost of capital. If companies want

to acquire capital when q is low, they can buy another firm cheaply and acquire the old capital instead. Investment will then be low.

Monetary policy affect equity price because when money supply rises, the public finds that it has more money than it wants and so it tries to reduce the holdings of money by increasing their spending. One of the ways to do this is through the stock market, increasing their demand for equities and therefore raising their prices (Mishkin 1996).

2.2.6 Growth Theory

(a) Neoclassical Growth Theory

Neoclassical Growth theory is based on the following:

$$Y(t) = F\{k(t), A(t)L(t) \quad \text{.....(2.3)}$$

Where Y is output, k is physical capital, A is an index of overall productivity and L is labour force. with this assumptions, income growth can come from increases efficiency of productive inputs, A or augmentation of inputs k and L. positive growth rates can be sustained if and only if the decreasing returns to accumulation of k are offset by increase in labour force/ human capital L or if the marginal productivity of capital is constantly shifted upwards by technical progress in a balance growth e.g. there will be no depreciation of capital stock and assuming A(t) as constant, output will grow at the rate of human capital. Difference in time of the scale factor A(t) explain countries differences in growth experience. This exogenous source of growth has been interpreted as technical progress. Policy has little scope in affecting long run growth in this setting. Investment and savings impact on the level of per capita income but have no effect on the long run growth rate (Howard and Brian 2005).

(b) Harrod-Domar Theory

The Harrod-Domar theory assigns key role to investment in the process of economic growth. The model emphasizes on the dual character of investment; investment creates income (demand effect) and also investment augments the productive capacity of the economy (supply effect). According to this theory, as far as investment is taking place, real income and output continue to grow. According to this model, for an economy to maintain full employment level of income, from year to year, it is necessary that both real income and output should expand at the rate which productive capacity is expanding. Otherwise, any divergence between the two will lead to excess of idle capacity, thus forcing entrepreneurs to curtail their investment expenditure. This will lead to lower income and employment in the subsequent period moving the economy off the equilibrium path. According to this model therefore, full employment can only be maintained though expansion of net investment. This theory therefore advocate for policy intervention to ensure continuous expansion of net investment to ensure economic growth (Snowdon & Vane. 2005)

This study takes the Keynesian monetary policy theory as its anchor. The assumption is that Nigerian economy can be considered to be at less than full employment level of employment. It is expected that a reduction in the interest rate will make the credit to private sector to increase and therefore investment and hence, growth in the output of the sectors of the economy.

2.3.0 Empirical Literature

Nigerian Case Study

Author	Title	Dependent Variable	Independent Variable	Methodology	Finding and conclusion
Charles (2012)	Investigating the performance of monetary policy on manufacturing sector Nigeria 1980-2009	Manufacturing sector output	Inflation rate, company tax rate, M2	VEC,OLS and Granger causality	Money supply affects manufacturing sector performance
Imoughele and Ismail (2013)	Commercial bank credit accessibility and sectoral output performance in a deregulated financial market economy: Empirical Evidence from Nigeria	Manufacturing, Agric and services sectors	Interest Rate, Human Capital, Inflationary Rate, Broad Money supply	OLS and VEC	The result indicated that expansionary monetary policy in the previous period has direct and significant impact on the sectors output performance in Nigeria.

Alex (2011)	The effectiveness of monetary policy in achieving economic growth: case study of Nigeria 1980-2009	GDP	MPR, Exchange rate, treasury bill	OLS	MPR, exchange rate and treasury bill have negative impact on GDP
Imoughele and Ismaila (2014)	Empirical investigation of the impact of monetary policy on manufacturing sector performance in Nigeria	Manufacturing sector output	External reserve, Exchange rate, inflation and M2	Granger causality and VAR	Interest rate, exchange rate and external reserve negatively affect manufacturing sector output while M2 and inflation positively affect manufacturing sector
Aliyu and Yusuf (2012)	Impact of private sector credit on the real sector of Nigeria	GDP	Size of financial intermediaries, M2 and private sector credit	OLS	Private sector credit positively affects GDP
Tomola, Adebisi and Olawale	Bank lending, economic growth and the	Manufacturing sector output	inflation rate, maximum lending rate, exchange	VEC	The result show that bank lending affects manufacturing sector

(2011)	Performance of the manufacturing sector in Nigeria		rate, gross domestic product		output
Bernhard (2013)	Monetary Transmission Mechanism in Nigeria: A Causality Test	GDP and Investment	interest rate, the exchange rate and credit to private sector	Granger causality	The results suggest that exchange rate channel is active in Nigeria
Manasseh (2014)	Economic Growth in Nigeria: Evidence from the Appraisal of Financial Sector Reforms and its Causal Effects	GDP	banking sector, domestic credit to the private sector and foreign direct investment	OLS	The result showed a unidirectional causation running from per-capita GDP to domestic credit to private sector
Shittu (2012)	Financial Intermediation and Economic Growth in Nigeria	GDP	domestic credit to the private sector and M2	Granger causality	The paper established that financial intermediation has a significant impact on economic growth in

					Nigeria
Eme and Johnson (2012)	Effects of Exchange Rate Movements On Economic Growth in Nigeria	GDP	M2, exchange rate and inflation	Simultaneous equation	The estimation results suggest that there is no evidence of a strong direct relationship between changes in exchange rate and output growth
Anthony, Onu and Ajodo-ohiemi (2012)	Contributions of Financial Sector Reforms and Credit Supply to Nigerian Agricultural Sector (1978-2009)	Agricultural sector output	Private sector credit, interest rate, exchange rate	OLS and chow test	The result suggests that credit positively affects the agricultural sector output
Jameelah (2011)	The Impact of Exchange Rate Changes on Disaggregated	Agricultural sector output	exchange rate, M2 and inflation	OLS	real exchange rate has a positive and significant effect on forestry

	Agricultural Output in Nigeria: A Two-Stage-Least-Squares Approach				and livestock outputs, while money supply has negative effects in both cases. However, the effect of money supply is insignificant in the forestry equation
Owolabi and Adegbite	The effects of foreign exchange regimes on industrial growth in Nigeria	GDP	World Price Index, Per Capita Income, and Net Export. Exchange rate, M2	OLS	The result suggest that World Price Index, Per Capita Income, and Net Export. Exchange rate (broadly define, narrowly define and quasi money) were all found to have significant effects on

					the Economics Growth
Samuel, Tamarauntari and Micheal (2013)	Real Sector Responsiveness to Monetary Policy Shocks in Nigeria	GDP	monetary policy rate (MPR), maximum lending rate as proxy for interest rate (INTR), credit to the private sector (CPS	VAR model	The result suggest that monetary policy rate and bank lending rates are the most important monetary policy tools that can make or mar the Nigerian real sector
Ogunmuyiwa and Francis (2010)	Money Supply - Economic Growth Nexus in Nigeria	GDP	Real Interest rate, M2 and consumer price index	VAR model	The results revealed that although money supply is positively related to growth but the result is however insignificant in the case of GDP growth rates.

Other Countries

Author	Country	Title	Dependent Variable	Independent Variable	Methodology	Finding and conclusion
Ganley & Salmon (1997)	United Kingdom	Industrial impact of monetary policy shocks	Industrial output	Interest rate, real GDP, GDP deflator	VAR	There is difference of sensitivity of output to monetary policy shocks
Carlos & David (2006)	Spain	Industry effects of monetary policy in Spain	Industrial output	CPI, M3, interbank rate and exchange rate	VAR	There is significant differences in the sectoral responses to monetary policy
Alam & Waheed (2011)	Pakistan	Sectoral effects of monetary policy: evidence from	Sectoral output	CPI, Call money rate, exchange rate and interest rate	VAR	Result suggest there is significant difference in the transmission of monetary policy

		Pakistan				
Corazon (2014)	The Effect of Monetary Policy on Economic Growth in Kenya	Kenya	GDP	consumer price index, credit to the private sector, Central Bank Rate, treasury bills, lending rate and the nominal exchange rate	VAR	Findings from this study indicated that one standard deviation monetary policy shock proxied by the CBR has positive impact on GDP.
Dorothy, Ezra and Musa(2013)	Uganda	Sectoral effects of monetary policy in Uganda	Sectoral output of manufacturing, agricultural, and services	Exchange rate, interest rate, credit to private sector	VAR and Granger causality	The study reveals that the exchange rate channel is the most effective monetary policy transmission channel to all the three sectors studied, while the interest rates and bank credit channels

						remain relatively weak channels of monetary policy especially within the manufacturing sector.
Jinzhao (2012)	Real exchange rate and economic growth: Evidence from Chinese provincial data (1992–2008)	China	GDP	The real exchange Rate, consumer price index, Per capita GDP	OLS	The result suggest that exchange rate impact was not uniform across provinces.
Azlan (2011)	Structural Vector Autoregressive Analysis of Monetary Policy in Malaysia	Malaysia	GDP	interest rate, credit to private sector and asset price index	Structural VAR	The evidence suggests that interest rate, credit and asset price shocks all have significant real effects on the

						Malaysian economy.
Mansor and Ruzita (2005)	Exchange rate, monetary policy and manufacturing output in Malaysia	Malaysia	GDP	Interest rate, exchange rate, manufacturing sector, consumer price index	VAR	The response of manufacturing sector output seem to be significant.
Ekaterin (2013)	Effects of Monetary Policy Shocks across Time and across Sectors	United States	GDP	Real services output, services deflator, real goods (durable and nondurable) output, goods price deflator, and commodity prices	VAR	demonstrates that the effect of monetary policy shocks on output and prices depends on the shock's timing: In the United States, a monetary policy shock that takes place in the first half of the year has a larger effect on

						output than on prices, while the opposite is true in the second half of the year.
Ivo and Evert (2002)	Regional Effects of Monetary Policy in the Netherlands	Netherlands	Sectoral output and regional output	CPI, interst rate and GDP growth rate	VAR	The results support previous findings that the differential regional effects of monetary policy are significantly related to industrial composition. The result also show that sectoral effects account for much more of the variation in interest sensitivity than regional

						effects.
Guender (2006)	The Channels of Monetary Transmission: Some Sectoral Estimates from Germany	Germany	Sectoral output	interest rate, exchange rate, credit to private sector, money supply	VAR	The result show that the peak responses in activity occur after between 5 and 10 quarters, prices do not begin to fall until after the 8th quarter, or 2 years
Bernd and Birgit (1999)	Industry Effects of Monetary Policy in Germany	Germany	Sectoral output	M1, interest rate, exchange rate and World price index	VAR	The result show that almost half of the industries show an output reaction that is significantly different from that of the aggregate manufacturing and mining sector
Jeremy and Daniel	A sectoral model of the Australian	Australia	Sectoral output	Interest rate, real exchange	VAR	that construction and retail trade are

(2008)	economy			rate, inflation and GDP		the most interest-sensitive production components of activity
Gábor (2011)	The Sectoral Effects of Monetary Policy in Hungary: A Structural Factor Analysis	Hungary	Sectoral output	Interest rate, exchange rate, core price index and GDP	Structural factor analysis	The results suggest that the credit channel of monetary transmission is operating in Hungary as well. In addition, there appears some role for the interest sensitivity of demand and price rigidities.

2.3.1 Literature Gap

Although there have been various studies on monetary policy and sectoral output and even aggregate output, most of the studies have focused on either gross domestic product (GDP) or a single sector. The only work that seemed to have examined the impact of monetary policy on all the sectors was the work of Nwosa and Saibu (2011) and OLS methodology and Granger causality were used. Another work that tried to look at more than a single sector was that of Imoughele (2014), he concentrated on the credit channel but omitted the main anchor of monetary policy variables (MPR).

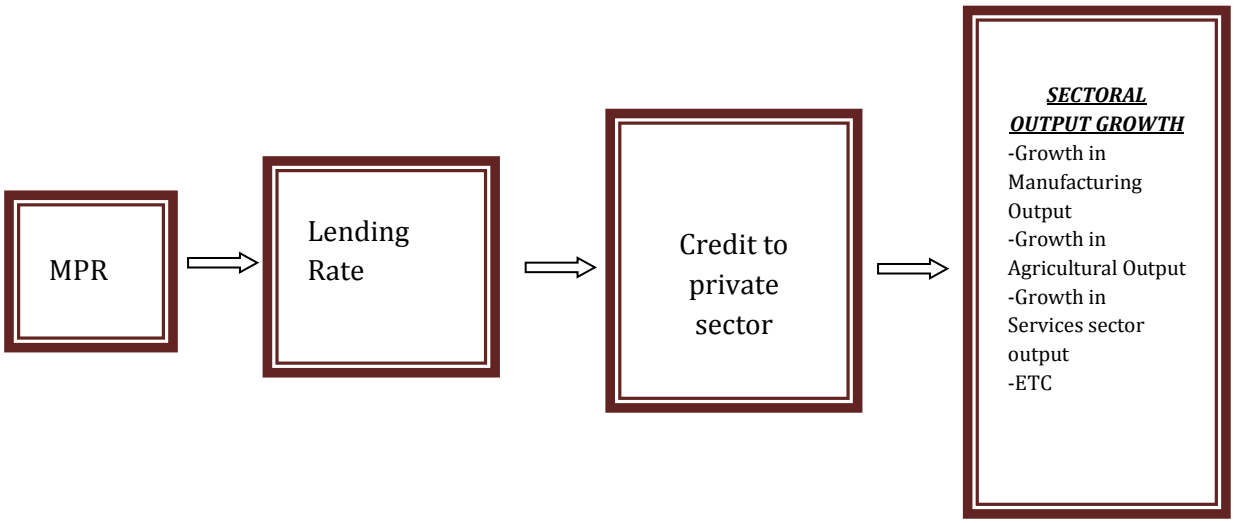
This study takes the credit channel of monetary policy in line with the study of Imoughele et al (2014) but adds the monetary policy rate (MPR) which is the nominal anchor of other interest rates in Nigeria. Unlike Nwosa and Saibu (2011) more variables (M1 and M2) are taken into consideration so as to identify not only a single variable to each sector but a combination of monetary policy variables that explain the variation of output in these sectors. This study also intends to fill the gap by updating the research to 2012. A combination of VAR and OLS shall be used to ascertain the impact of monetary policy in Nigeria.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Conceptual Framework

To achieve the objectives of monetary policy, the CBN sets its target parameters for its price-based nominal anchor. Under the current framework, the operating targets (interbank rates) link the bank's instrument (MPR) with the intermediate targets (credit) while AD (C+I) link the intermediate target with the final objective (output growth). But the objective of output growth itself originates from growth in sectoral output.



In Nigeria, it's the Central bank of Nigeria that changes the monetary policy which eventually will affect the real sector. The CBN sets her price-based nominal anchor using the MPR. The MPR is the official interest rate of the CBN which indirectly affects all other rates. A decision by CBN to change MPR affects the market interests in different ways. When the Central Bank makes an announcement on the MPR, it affects the expectation of people and economic agents about the future direction of the economy. Such decision affects the prices of borrowing money (interest rate). For example when the interest rate is reduced, the cost of borrowing money falls and businesses in the various sectors of the economy tend to invest more which eventually leads to increase in output of these sectors and therefore, economic growth (CBN 2011).

3.2 Tools of Data Analysis

3.2.1 Regression Analysis

Regression analysis is a method by which a functional relationship in the real world may be described in a mathematical model which can be used to explore, describe or predict the relationship among the variables. There is usually dependent and independent/explanatory variable(s).

$Y=B_0 +B_1X_1 + B_2X_2 + B_3X_3 \ldots\ldots\ldots\ldots + B_nX_n +Ɛ_i$……..(3.1)

Where: Y is the dependent variable, B_0 is the constant term, B_1, B_2, B_3, …….B_n are referred to as the coefficients, X_1, X_2, X_3 …….X_n are independent variables and $Ɛ_i$ = error term

Multiple regressions is a technique that allows additional factors to enter the analysis separately so that the effect of each can be estimated. It is valuable for quantifying the impact of various simultaneous influences upon a single dependent variable. Further, because of omitted variables bias with simple regression, multiple regression is often essential even when the investigator is only interested in the effects of one of the independent variables.

3.2.2 Vector Autoregression (VAR)

Vector autoregressive models are simply multivariate models which are not restricted to a theory and can be used as forecasting instruments. The component part (endogenous and explanatory variables) are believed to interact and hence should be included as part of the economic system which makes the VAR model closer to reality (Euger, 2010). The well-known strength of VAR modelling lies in generating stylized facts concerning the dynamic behaviour of a set of variables to orthogonal innovation to the model

The VAR model is usually represented as;

$X_t = a + B_1 X_{t-1} + B_2 X_{t-2} B_3X_{t-3} \ldots\ldots\ldots B_q X_{t-q}+U_t$ ----------(3.2)

Where:

B_i are K*K matrices of coefficients, a is a K*1 vector of constants and U_t is an unobservable zero mean white noise vector process with covariance matrix E.

3.2.3 Diagnostic Test

3.2.3.1 The unit Root Test

The starting point of an empirical analysis of this nature usually begins with the investigation of the properties of the time series. That is, a test of whether the variables in series are stationary at level or at first difference using Augmented Dicker-Fuller.

Many economic variables are non-stationary because of shocks, changes and fluctuations over time. For this reason, it is important to conduct preliminary diagnostics tests on the properties of the variables to avoid spurious results and unreliable predictions. Thus, the Augmented Dickey Fuller (ADF) test will be conducted to test for unit root.

$$Y_t = \alpha + Y_t + \beta Y_{t-1} + \sum_{j=1}^{k} \beta_1 \Delta Y_{t-i}^{i} \quad \text{---------- (3.3)}$$

$$Y_t = \alpha + \beta Y_{t-1} + \sum_{j=1}^{k} \beta_1 \Delta Y_{t-i}^{i} \quad \text{---------- (3.4)}$$

Where; Δ = first difference operator, t = the trend variable, Y_t = The variable under consideration, ε_t = a white noise error term. Thus, the null hypothesis for the ADF unit root test is: H_0**:** $\beta = 0$ (presence of unit root) and alternative hypothesis is H_1**:** $\beta \neq 0$ (absence of unit root).

3.2.3.2 Co-integration Test

The concept of co-integration is based on the pioneer work of Engle and Granger (1987). The notion of co-integration means movement of variables together. Many financial variables are non-stationary but tend to move together over time, implying that there exist some influences on the series that tie the two series to some long run relationship. In all, a set of variables is said to be co-integrated if a linear combination of them is stationary. Hence, the presence of co-integration between two variables will suggest the existence of a long run relationship and the absence of cointegration will suggest no long run relationship between the two variables. As such, the reason of testing for co-integration is to verify if such a relationship exists and, if it does, how many co-integrating vectors are present in the relationship.

3.3 Model Specification

The model as specified by Philip and Saibu (2012) is:

Y=f (INT, EXR, PSC, ASP, CPI, U) ……..….(3.5)

Where Y is sectoral output, Int is interest rate, Exr is exchange rate, Psc is credit to private sector, Asp is asset price Cpi is consumer price index and U is the error term.

The above model was modified and estimated in the following form:

Y=f(MPR, LENDR, CPS, M1, M2, INF, U) ……..……(3.6)

Where Y is sectoral output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, and INF is the inflation rate.

3.3.1 Regression Model

The regression model for the three sectors of the economy, namely: agricultural sector, manufacturing sector and services sector could be specified as follows;

Model 1: Agricultural Equation

Agricultural OLS equation is hypothesized to respond to the variables in the model;

$Ag = \alpha + \delta MPR + \delta INT + \delta CPS + \delta M1 + \delta M2 + \delta INF + Ɛ$…….(3.7)

Where Ag is agricultural sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate.

Model 2: Manufacturing Sector Equation

Manufacturing OLS equation is hypothesized to respond to factors in the theoretical model;

$Mg = \alpha + \delta MPR + \delta INT + \delta CPS + \delta M1 + \delta M2 + \delta INF + Ɛ$…….(3.8)

Where Man is the manufacturing sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate.

Model 3: Services Sector Equation

Services OLS equation is hypothesized to respond to factors in the theoretical model:

$Serv = \alpha + \delta MPR + \delta INT + \delta CPS + \delta M1 + \delta M2 + \delta INF + Ɛ$…….(3.9)

Where Serv is the services sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate.

VAR Model

Each variable is expressed as a linear combination of lagged values of itself and lagged values of all variables in the group.

VAR Model 1: Agricultural Sector

$Ag = \alpha + \delta_1 MPR + \delta_{12} INT + \delta_{13} CPS + \delta_{14} M1 + \delta_{15} M2 + \delta_{16} INF + \varepsilon_{Ag}$.....(3.10)

Where Ag is agricultural sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate.

VAR Model 2 : Manufacturing Sector

$Man = \alpha + \delta_{21} MPR + \delta_{22} INT + \delta_{23} CPS + \delta_{24} M1 + \delta_{25} M2 + \delta_{26} INF + \varepsilon_{Mg}$…..…….(3.11)

Where Man is the manufacturing sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate.

VAR Model 3: Services Sector

$Serv = \alpha + \delta_{31} MPR + \delta_{32} INT + \delta_{33} CPS + \delta_{34} M1 + \delta_{35} M2 + \delta_{36} INF + \varepsilon_{Se}$……...(3.12)

Where Serv is the services sector output, MPR is monetary policy rate, INT is interest rate (prime lending rate), CPS is credit to private sector, M1 is narrow money supply, M2 is broad money supply, INF is the inflation rate

3.4.3 Expected Result

From all of the above equations: α_i is to take care of the constant variable, β_{1i} is the coefficient of monetary policy rate (MPR) is expected to be less than zero ($\beta_{1i} < 0$) because it is negatively related to sectoral output in Nigeria. β_{2i} is the coefficient of interest rate(prime lending rate), (INT) is expected to be to be less than zero ($\beta_{2i} < 0$) due to its negative relationship with sectoral output in Nigeria. B_{3i} is the coefficient of credit to private sector (CPS) is expected to be greater than zero ($B_{3i} > 0$) due to its positive relationship with the sectoral output in Nigeria. Whilst β_{4i} is the coefficient of narrow money supply (M1) and it is expected to be greater than zero ($\beta_{4i} > 0$) due to its expected positive relationship with the sectoral output in Nigeria. Also β_{5i} is the coefficient of broad money supply (M2) and it is expected to be greater than zero ($\beta_{5i} > 0$) due to its expected positive relationship with the sectoral output in Nigeria. B_{6i} is the coefficient of inflation (INF) and it is expected to be greater than zero ($\beta_{5i} > 0$) due to its expected positive relationship with the sectoral output in Nigeria.

$\beta_{1i}, \beta_{2i}<0$ while $\beta_{3i}, \beta_{4i}, \beta_{5i}, \beta_{6i}>0$

3.5 Estimation Technique

3.5.1 Unit Root and Cointegration Tests

Due to the non-stationary nature of time series data, unit root tests shall be conducted to reveal the qualities of the data to see if their properties make them suitable for econometric analysis. On this note the Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) test shall be conducted to test for the stationary of the data. After ascertaining the properties of the data, cointegration test shall be conducted to help us achieve the second objective which is to assess the long run relationship between the variables.

3.5.2 Regression Model (OLS Technique)

The OLS estimate shall be used to ascertain the relationship between monetary policy and sectoral output in Nigeria. It will help us to confirm the short run relationship we find in the Vector Autoregression result. It will also tell us more about the explanatory power of the variables included in the model.

3.5.3 Vector Autoregressive (VAR) MODEL

This study adopts the Unrestricted Vector Autoregressive Model (UVAR) or Vector Error Correction model (VEC if the variables are co-integrated) technique to isolate the effect of each variable in the model and how they estimate the parameters in the model. The model shall be used to estimate the dynamic response of the explanatory variables (Monetary policy rate, prime lending rate, credit to private sector, M1, M2 and inflation) on the dependent variables (sectoral output). a common lag length of three (3) for each VAR sectoral model was adopted for the models. The choice of this lag length has the advantage of whitening the errors for each of the individual VAR. This is in line with other similar studies in the literature. Dungey and Pagan (2000), Berkelmans (2005) and Crawford (2007) argued that a lag selection of three was capable of generating a smoother and more reasonable VAR estimate especially with quarterly data series on macroeconomic variables (Nwosa and Saibu 2012) .

This econometric tool of analysis will help us to achieve the first and third objectives. The Impulse Response Functions (IRF) which trace out how typical shocks affect a variable through time, this shall be used to achieve the first objective of the effect of monetary policy on sectoral output. While the Variance Decomposition shall be used to identify the monetary policy variable that is more relevant to each of the selected sectors, which is the second objective of the study.

3.6 Data and Variables

According to Thanabalasingam (2013), economists do not agree on what is the best monetary policy indicator. Some researchers propose interest rate (e.g., McCallum, 1983; Bernanke and Blinder, 1992) while others (Gordon and Leeper 1994) challenged this argument and find that the federal funds rate as well as monetary aggregates generate some dynamic responses. Other groups of literature suggest that the exchange rate plays an important role in describing the monetary policy transmission mechanism (e.g., Cushman and Zha, 1997; Fung, 2002).

In line with previous studies, purely secondary data (quarterly) was used for the purpose of analysis in this research work. The variables that were considered are; sectoral output (agricultural, manufacturing and services sectors). Other variables are: monetary policy rate, lending rate (proxied by prime lending rate), credit to private sector, CPI, M1 and M2. Their corresponding data will be obtained from the Central Bank of Nigeria (CBN) statistical bulletins (Ikechukwu 2011). To reduce the outliers between the variables, all variables will be expressed in logarithmic form with the exception of MPR, CPI and lending rate.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Unit Root Test

It has been shown in econometric studies that most macroeconomic time series are not stationary at levels. Giving this knowledge, testing for stationarity of variables to obtain a more reliable result becomes very essential. Stationarity test was therefore carried out using both Augmented Dickey-Fuller (ADF) and Phillip Perron (PP) approaches for unit root testing which are reported in table 4.1. In order to examine the unit root status of the variables.

Table 4.1: Unit Root Test using Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) Test

	Levels		First Difference		
Variable	ADF	PP	ADF	PP	Comment
AGRIC	-2.0298	-2.4899	-3.6036*	-11.5567*	I(1)
INF	-2.8926	-3.0711	-10.1986*	-10.1986*	I(1)
LENDR	-3.1685	-3.4290	-5.2099*	-12.6513*	I(1)
M1	-1.6846	-1.7219	-10.8937*	-10.8992*	I(1)
M2	-2.3036	-2.6070	-11.1233*	-11.1030*	I(1)
MAN	-1.7047	-12.2497	-3.7839*	-14.9475*	I(1)
MPR	-2.8735	-2.8046	-9.5550*	-9.8132*	I(1)
PSC	-1.4032	-1.4042	-10.2440*	-10.2439*	I(1)

Note: For the levels, we included trend and intercept, as the line plots of the series indicate; the 5% critical value is -3.518090. For their first differences, line graphs indicate that only intercepts can be included; the 5% critical value is -2.933158. * indicates the rejection of the null hypothesis that there is presence of unit root in the series.

The ADF test result shows that all the variables were stationary at first difference, that is, they are integrated of order one [I(1)] with the exception of MAN which is stationary at I(2) . This implies that

stationarity for MAN is only achieved after second difference The PP test results on the other hand shows that all the variables are stationary at first difference, that is, they are all integrated of order one [I(1)]. Going with the PP results, which showed that all the variables are I(1), the time series have to be differenced once to yield meaningful result.

4.2 Cointegration Tests

Both the ADF and PP standard test for stationarity were used to identify the order of integration of the series. The test indicates that all the variables in the model are integrated of order one [I(1)](See table 4.1.). This finding implies that a co-integration test needs to be carried out. This is because a long-run relationship may exist among them, which connotes that they may wander from one another in the short-run but in the long-run will move together. This will also tell us whether the restricted or unrestricted VAR is appropriate for estimating the model. To establish whether or not a long-run relationship exists among the variables, co-integration test using the Johansen's multivariate method was carried out and reported in table 4.2.

Table 4.2a Summary of Co-integration Test Result for AGRIC

Trace Rank Test					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	152.07	103.70	68.61	44.75	27.96
95% Quantiles	125.62	95.75	69.81	47.86	29.80

Maximum Eigen Values					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	48.37	35.09	23.86	16.79	12.69
95% Quantiles	46.23	40.08	33.88	27.58	21.13

Estimate of the identified Long run Equation

	AGRIC	MPR	LENDR	PSC	M1	M2	INF
CV	1.00	0.02	-0.09	-0.01	3.08	-2.24	0.03
t-stat		(0.59408)	(-3.52112)	(-0.10456)	(2.49042)	(-1.81058)	(6.52187)
Adj.α	-0.017	-0.95	-1.39	-1.39	0.07	-0.02	-2.85
t-stat	(-0.52670)	(-11.70094)	(-1.450288)	(-0.75460)	(2.01439)	(-0.66203)	(-0.64877)

Note: trace statistics indicates two co-integrating equation at 5% level. Max-Eigen value also indicates two co-integrating equation at 5% level.

Table 4.2a shows that Trace test indicates 2 co-integrating equations at 5% level. While the Maximum-Eigen test also indicates two co-integrating equations at 5% level between AGRIC and other variables in the model. The Trace value points out that the null hypothesis of no co-integration among the variables is rejected in favour of the alternative hypothesis that two co-integrating equations exist at 5% significant level because the value exceed the critical values. This means that there are at least two cointegrating equations, implying that a unique long-run relationship exists among the variables. This therefore implies that the correct model is VEC, which allows us to incorporate the long run information in the dynamic analysis of the relationship see APPENDIX AI for full estimate. Using the model information selection criteria (AIC, LR and FPE) it was observed that the optimal lag length that makes the residual of the model free from serial correlation is 2 (see APPENDIX BI).

Table 4.2b Summary of Co-integration Test Result for MAN

Trace Rank Test					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	139.63	91.47	60.92	38.37	21.71
95% Quantiles	125.62	95.75	69.81	47.86	29.80

Maximum Eigen Values					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	48.16	30.55	22.255	16.66	10.12
95% Quantiles	46.23	40.08	33.88	27.58	21.13

Estimate of the identified Longrun Equation

	MAN	MPR	LENDR	PSC	M1	M2	INF
CV	1.00	0.02	-0.50	-0.06	3.64	-3.15	0.002
t-stat		(1.29987)	(-3.19126)	(-1.66422)	(4.70610)	(-4.07825)	(1.04931)
Adj.α	-0.017	-0.44	-0.80	0.82	0.04	-0.004	-3.30
t-stat	(-2.89600)	(-0.69260)	(-1.09506)	(0.31704)	(1.54602)	(-0.19552)	(-0.92034)

Note: trace statistics indicates one co-integrating equation at 5% level. Max-Eigen value also indicates one co-integrating equation at 5% level.

Table 4.2b shows that Trace test indicates 2 co-integrating equations at 5% level. While the Maximum-Eigen test also indicates one co-integrating equation at 5% level between AGRIC and other variables in the model. The Trace value points out that the null hypothesis of no co-integration among the variables is rejected in favour of the alternative hypothesis that two co-integrating equations exist at 5% significant level because the value exceed the critical values. This means that there is at least one cointegrating equation, implying that a unique long-run relationship exists among the variables. This therefore implies that the correct model is VEC, which allows us to incorporate the long run information in the dynamic analysis of the relationship see APPENDIX AII for full estimate. Using the model information selction criteria (AIC, HQ, SC and FPE) it

was observed that the optimal lag length that makes the residual of the model free from serial correlation is 1 (see APPENDIX BII).

Table 4.2c Summary of Cointegration TestResult for SERV

Trace Rank Test					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	122.39	89.13	58.58	38.48	21.05
95% Quantiles	125.62	95.75	69.81	47.86	29.80

Maximum Eigen Values					
Hypothesis	r=0*	r≤1	r≤2	r≤3	r≤4
Trace statistics	33.26	30.55	20.10	17.28	10.14
95% Quantiles	46.23	40.08	33.88	27.58	21.13

Note: trace statistics indicates no co-integrating equation at 5% level. Max-Eigen value also indicates no co-integrating equation at 5% level.

Table 4.2c also shows that Trace test indicates no co-integrating equation at 5% level. While the Maximum-Eigen test also indicates no co-integrating equation at 5% level between SERV and other variables in the model. The Trace value points out that the null hypothesis of no co-integration among the variables is accepted against the alternative hypothesis that co-integration equations exist at 5% significant level because the critical value exceeds the values. This means that there exists no cointegrating equation, implying that there exists no unique long-run relationship among the variables. This therefore implies that the correct model is VAR since there is absence of longrun relationship (cointegration) see APPENDIX AIII for full estimate. Using the model information selection criteria (AIC, HQ, SC and FPE) it was observed that the optimal lag length that makes the residual of the model free from serial correlation is 1 (see APPENDIX BIII).

4.3 Multiple Regression Estimates for the Three Models

After estimating the VAR and VEC for the three models, Ordinary Least Square (OLS) regression was estimated to establish and confirm the exact short run relationship among the variables. The full estimates of the multiple regression OLS are found in the APPENDIX F1, F2 and F3

Table 4.3a: Ordinary Least Square (OLS) Estimate for AGRIC

Variable	Coefficient	t-statistics
C	0.601996	1.194406
PR	-0.000165	-0.019112
LENDR	-0.002772	-0.349656
PSC	0.031513	1.663282
M1	1.534910	3.837584
M2	-0.664645	-1.665442
INF	0.002183	1.406887

R-squared=0.977840 Adj. R-squared=0.976524 DWstat =0.640917 F-stat=742.8052

Table 4.3a represents the OLS result for the Agricultural sector of the Nigerian economy, AGRIC. From the table, it can be seen that all the variables have their expected signs except for M2. Both MPR and LENDR have negative relationship with AGRIC as expected but not statistically significant. PSC, M1 and INF all have the expected positive relationship but only M1 is statistically significant. M2 is the only coefficient with a negative relationship while it is expected to have a positive relationship but not statistically significant.

The OLS result for the agricultural model confirms the Impulse Response Function (IRF) with the exception of MPR which shows the expected sign while for M2, it captures the first period in the impulse response function.

Table 4.3b: Ordinary Least Square (OLS) Estimate for MAN

Variable	Coefficient	t-statistics
C	2.675172	1.869029
MPR	0.008511	0.347124
LENDR	-0.013788	-0.612479
PSC	-0.011705	-0.217558
M1	2.771391	2.439938
M2	-2.287977	-2.018819
INF	0.004649	1.054870

R-squared= 0.616509 Adj. R-squared=0.593727 DWstat =2.459386 F-stat=27.06167

Table 4.3b represents the OLS result for the manufacturing sector, MAN. The result shows that MPR, PSC and M2 have shown different relationship with manufacturing sector output MAN than the expected relationship. Though MPR is expected to be negatively related to MAN, it shows positive relationship but not significant. PSC and M2 are expected to have positive relationship, they show negative relationship but PSC is not statistically significant while M2 is statistically significant. M1 and INF have the expected relationship but INF is not statistically significant while M1 is statistically significant.

The OLS result from the manufacturing sector model confirms exactly the finding from the impulse response function.

Table 4.3c: Ordinary Least Square (OLS) Estimate for SERV

Variable	Coefficient	t-statistics
C	-1.515907	-6.021904
MPR	-0.010254	-2.377945
LENDR	0.001922	0.485440
PSC	0.048988	5.176893
M1	0.262592	1.314498
M2	0.608852	3.054604
INF	-0.002381	-3.071601

R-squared=0.994768 Adj. R-squared=0.994457 DWstat =0.855772 F-stat=320.043

Table 4.3c represents the OLS result for the services sector SERV. As it can be seen, all the coefficients are as expected except for LENDR and INF. LENDR is expected to have a negative relationship with services sector output but the coefficient is showing a positive relationship but not statistically significant. INF is expected to have a positive relationship with SERV but the coefficient is showing a negative relationship and statistically significant. All the other variables are showing the expected relationship with M2 and MPR statistically significant.

The OLS result confirms the impulse response function except for LENDR. While for MPR, it captures from the sixth period.

4.4 Vector Error Correction Estimates

The cointegrating vectors have been identified. In order to capture both the short run and long run relationships, the VEC of AGRIC was estimated with an optimal lag length of two, MAN with an optimal lag length of one while VAR for SERV was also estimated with an optimal lag length of one. The full estimates of the VAR/VEC are reported in appendix. However, the short run adjustment equation for AGRIC and MAN are reported in tables 4.4a and 4.4b.

Table 4.4a: Summary of Error Correction Result for AGRIC

Regressor	**Coefficient**	**t-values**
Intercept	0.086	5.1449
AGRIC(-1)	-0.020	-0.3247
AGRIC(-2)	-0.812	-13.7294
MPR(-1)	-0.003	-0.5785
MPR(-2)	0.001	0.24913
LENDR(-1)	0.005	1.1983
LENDR(-2)	0.006	1.6774
PSC(-1)	-0.003	-0.2017
PSC(-2)	0.003	0.2189
M1(-1)	-0.505	-2.1220
M1(-2)	-0.349	-1.4422
M2(-1)	0.791	2.8737
M2(-2)	0.317	1.0642
INF(-1)	-0.002	-1.4740
INF(-2)	0.002	1.4740
ECM	-0.090	-5.8242

Adj. R-squared=0.74 S.E =0.0880, f-stats=20.7260

Source: Computed by Author

The coefficient of the Error Correction Term ETC (-1) of the model from table 4.4a is -0.090, this implies that the system corrects its previous period disequilibrium at a speed of approximately 9% annually. It also implies that almost 9% of the deviation from long run equilibrium is smoothed in one year. In line with apriori expectation, the sign of ECT (-1) coefficient is significant and negative, indicating there is long run

causality from Monetary Policy rate, Lending Rate, Credit to Private Sector, Narrow money supply, Broad money supply, Inflation to Agricultural sector output. The low speed of adjustment could be attributed to other bottlenecks aside monetary or financial bottlenecks such as land tenure system, weather and climate and input delivery procedure.. The short run adjustment model suggests that changes in AGRIC in both the first and second quarters: AGRIC(-1) and AGRIC(-2) are negatively related to changes in AGRIC, although AGRIC(-1) is not statistically significant, AGRIC (-2) is significant. As it can be seen from the table above, MPR changes in the first quarter MPR(-1) is negatively related to AGRIC although not statistically significant, MPR changes in the second quarter MPR(-2) is positively related to AGRIC but also no statistically significant. Both changes in LENDR are positively related to AGRIC but not statistically significant. Changes in PSC in the first quarter is negatively related to AGRIC while changes in PSC in the second quarter PSC(-2) is positively related to AGRIC but both are not statistically significant. Changes in M1 in both quarters are negatively related to AGRIC but M1(-1) is statistically significant while M1(-2) is not. Changes in M2 in both first and second quarters are positively related to AGRIC with M2(-1) statistically significant while M2(-2) is not. Changes in INF in the first quarter INF(-1) has a negative relationship with AGRIC while that of the second quarter INF(-2) is positively related to AGRIC, but both are statistically not significant (see APPENDIX CI).

Table 4.4b: Summary of Error Correction Result for MAN

Regressor	Coefficient	t-values
Intercept	0.035	0.35257
MAN(-1)	-0.049	-0.48929
MPR(-1)	0.002	0.05055
LENDR(-1)	0.030	0.96762
PSC(-1)	0.085	0.76940
M1(-1)	-8.291	-4.57575
M2(-1)	8.134	3.56027
INF(-1)	0.006	0.73794
ECM	-1.008	-5.96690

Adj. R-squared=0.63 S.E =0.7621, f-stats=23.1827

Source: Computed by Author

The coefficient of the Error Correction Term ECT (-1) of the model from table 4.4b is -1.008, this implies that the system corrects its previous period disequilibrium at a speed of approximately 100.8% annually. It also implies that almost 100.8% of deviation from the long run equilibrium is smoothed in one year. In line with apriori expectation, the sign of ECT (-1) coefficient is significant and negative, indicating there is long run causality from Monetary Policy rate, Lending Rate, Credit to Private Sector, Narrow money supply, Broad money supply, Inflation to Manufacturing sector output. The short run adjustment model suggests that past changes in manufacturing sector output MAN is negatively related to current manufacturing output, it is not statistically significant. This is true with lagged value of M1 only that M1 is statistically significant. Lagged values of MPR, LENDR, PSC, M2 and INF are positively related to current changes in manufacturing sector output (see APPENDIX CII).

For the services model SERV, since there is no long run relationship among the variables (cointegration), a VAR instead of a VEC was estimated and the full estimate can be seen in APPENDIX CIII.

4.5 Impulse Response to Generalized One Standard Deviation (SD) Innovations

Tables 4.5a, 4.5b, 4.5c show the impulse response to generalized standard deviation (SD) innovation of the three sectors of Nigerian economy within the period of ten quarters. The responses are for particular variables to a one-time shock in variable in the system. The detailed estimates of the impulse response are found in APPENDIX DI, DII and DIII.

Table 4.5a: Response of AGRIC

Period	AGRIC	MPR	LENDR	PSC	M1	M2	INF
T=1	0.074866	0.010881	0.003474	0.013292	-0.013623	-0.000582	0.040467
T=2	0.66469	0.011926	-0.005597	0.014462	0.004235	0.018988	0.045417
T=4	0.005687	0.006539	-0.014595	0.007741	0.015924	0.004987	0.060676
T=6	0.056226	0.014777	-0.027912	0.020215	0.029473	0.028435	0.074795
T=8	0.012499	0.006838	-0.030149	0.013017	0.032365	0.013693	0.079184
T=10	0.049406	0.012717	-0.035833	0.021104	0.039011	0.031580	0.083678

Table 4.5a represents the dynamic response of AGRIC to generalized one standard deviation (SD) shock to monetary policy rate (MPR) and other variables in the model within a horizon of 10 periods. As it can be seen from the table response of AGRIC, while MPR is expected to have negative impact on AGRIC because there should be a negative relationship between them. MPR shows a positive relationship with agricultural sector probably due to policy lag. LENDR is having a negative impact on AGRIC and this conforms to the apriori expectation. All the other variables have shown positive impact on AGRIC sector output; PSC and INF. Even the aggregate money supply (M1 and M2) have moved from negative impact in the first period to positive in the subsequent periods.

Table 4.5b: Response of MAN

Period	MAN	MPR	LENDR	PSC	M1	M2	INF
T=1	0.583207	0.051516	-0.007741	0.074243	0.081161	-0.414894	0.012674
T=2	-0.033198	0.051010	-0.043070	0.012382	-0.085226	0.200167	0.077106
T=4	0.042110	0.056648	-0.101510	-0.000897	0.077299	-0.049163	0.050851
T=6	0.053414	0.046544	-0.094065	-0.005548	0.071438	-0.057140	0.043574
T=8	0.053830	0.047028	-0.096526	-0.006550	0.077197	-0.067175	0.042320
T=10	0.054567	0.46679	-0.096240	-0.006563	0.076855	0.067467	0.012149

Table 4.5b represents the dynamic response of MAN to generalized one standard deviation (SD) shock to monetary policy rate (MPR) and other variables in the model within a horizon of 10 periods. The MPR has shown a positive impact on the manufacturing sector output MAN probably due to policy lag. This is against the apriori expectation of a negative impact of MPR on MAN. PSC and MAN have consistently shown a negative impact on manufacturing sector output MAN in all periods except the first period and first 2 periods respectively. Lending rate LENDR has shown negative impact, while M1 and INF have all shown positive impact on manufacturing sector output MAN.

Table 4.5c: Response of SERV

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
T=1	0.099275	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
T=2	0.072780	-0.002043	-0.006787	0.003828	0.022641	-0.006081	-0.003899
T=4	0.048954	-0.000273	-0.009654	0.007746	0.043592	-0.012070	-0.004922
T=6	0.040466	0.003869	-0.007340	0.010076	0.051210	-0.014148	-0.002911
T=8	0.036780	0.008164	-0.003866	0.012237	0.054136	-0.014378	-0.000480
T=10	0.034666	0.012091	-0.000395	0.014580	0.055113	-0.013519	0.001638

Table 4.5c represents the dynamic response of services sector SERV to generalized one standard deviation (SD) shock to monetary policy rate (MPR) and other variables in the model within a horizon of 10 periods. Although monetary policy rate (MPR) has shown a negative impact on the services sector SERV in conformity to the apriori expectation from the second to the fourth period, it changed to positive impact from the sixth to the tenth period. Lending rate (LENDR) has shown a negative impact on the services sector output throughout the periods as expected. Credit to private sector PSC and M1 have also shown a positive impact on SERV throughout the periods also as expected. While M2 and INF have consistently shown negative impact on services sector output. This is also against the apriori expectation.

The above findings are in line with the finding of Samuel (2013) who found out that lending rate impacted on economic growth and also in line with the finding of Ikechukwu (2011) who found out that MPR does not have the desired impact on the real sector.

4.6 Variance Decomposition

Variance decomposition provides information on the dynamic behavior of variables in the model. The full estimates of variance decomposition are found in the APPENDIX E1, E2 and E3. However, the variance decomposition of AGRIC, MAN and SERV are found in tables 4.6a, 4.6b and 4.6c respectively.

Table 4.6a: Variance Decomposition of AGRIC

Period	AGRIC	MPR	LENDR	PSC	M1	M2	INF
T=1	72.45651	1.530435	0.156027	2.283781	2.399048	0.004374	21.16983
T=2	66.92021	1.739997	0.289742	2.575979	1.358817	2.409552	24.70570
T=4	44.98068	1.621026	1.365041	2.274467	3.324825	3.769131	42.66483
T=6	38.56036	1.742715	3.636041	2.603604	4.223094	3.836120	45.39806
T=8	28.39958	1.430506	5.297016	2.507629	6.790605	4.259848	51.31484
T=10	26.32933	1.352854	6.417259	2.623443	7.386679	4.386679	51.40265

Table 4.6a represents the percentage contribution of innovations in each of the variables in the system to the variance decomposition of of AGRIC. Own shocks has significantly declined from 72.45% in the first period to 26.33 in the tenth period. It can also be observed from the table that INF constitutes a predominant source of variation in AGRIC. Aside own shock and INF, LENDR and M1 have also constituted major sources of variation in AGRIC with 0.16% and 2.40% in the first period which rose to 6.42% and 7.40% in the tenth period respectively. These are followed by M2, PSC and MPR with 0.01%, 2.30% and 1.53% in the first period which rose to 4.39%, 2.62% and 1.35% in the tenth period respectively.

Table 4.6b: Variance Decomposition of MAN

Period	MAN	MPR	LENDR	PSC	M1	M2	INF
T=1	64.51133	0.503348	0.011366	1.045438	1.249354	32.64870	0.030465
T=2	58.20800	0.765656	0.896550	0.326660	0.966395	36.19817	1.041555
T=4	50.88311	1.553359	3.691541	1.111596	5.552779	35.90815	1.299465
T=6	48.11902	2.003775	5.894893	1.032689	6.691039	34.56597	1.692620
T=8	45.53198	2.421997	7.871476	0.975068	7.778632	33.40227	2.018574
T=10	43.33395	2.786524	9.581820	0.922820	8.696949	32.36538	2.312559

Table 4.6b represents the percentage contribution of innovations in each of the variables in the system to the variance decomposition of MAN. Own shock has significantly declined from 64.51% in the first period to 43.33% in the tenth period. A major source of variation in the manufacturing sector output MAN is the M2 which contributed 32.65% in the first period to 36.20% in the second period, 35.91% in the fourth

period and 32.37% in the tenth period. LENDR has contributed about 0.01% in the first period and sharply increased to about 9.58% in the tenth period. Another source of variation in MAN is M1 whose contribution has swiftly increased from 1.25% in the first period to 8.70% in the tenth period. MPR and INF have marginally increased from 0.51% and 0.03% in the first period to 2.80% and 2.31% in the tenth period. The least contribution comes from PSC which declined from 1.05%in the first period to 0.92% in the tenth period.

Table 4.6c: Variance Decomposition of SERV

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
T=1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
T=2	96.01013	0.026444	0.291857	0.092862	3.248051	0.234319	0.096334
T=4	82.64235	0.028726	0.897286	0.445807	14.62360	1.102994	0.259237
T=6	70.79482	0.072861	1.036824	0.854301	25.06943	1.909625	0.262140
T=8	62.05554	0.292366	0.921323	1.295171	32.77687	2.445780	0.212952
T=10	55.60196	0.707660	0.765453	1.796658	38.22652	2.721026	0.180719

Table 4.6b represents the percentage contribution of innovations in each of the variables in the system to the variance decomposition of SERV. Own shock has contributed the major source of variation, which declined from 100% in the first period to 55.60% in the tenth period. A predominant source of variation aside own shock is the shock to M1 which rose swiftly from 0.00% in the first period to 38.23% in the tenth period. Contributions of the other variables (M2, PSC, LENDR, MPR and INF) have marginally increased from 0.00%, 0.00%, 0.00, 0.00% and 0.00% in the first period to 2.72%, 1.80%, 0.76%, 0.71% and 0.18% in the tenth period respectively.

The finding of this study is in conformity with those of Udede (2014), Imoughele (2011) and Nwosa and Philip (2011)

4.7 Robustness Tests for the Three Models

Figure 4.7a: Stability Test for Agricultural Sector Model

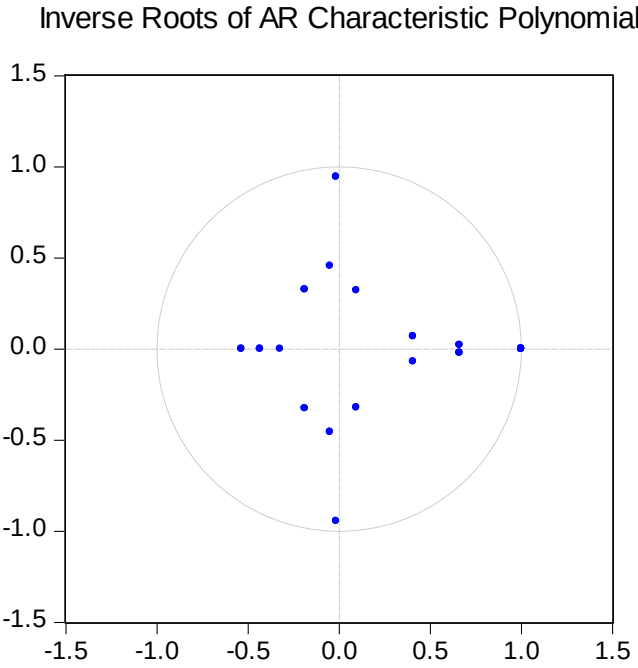


Figure 4.7a shows the stability test for the estimated VEC model for Agricultural sector model. A VAR model is said to be stable if the roots of the characteristic polynomial have a modulus of less than one and also lie within the radius of the circle. From the result it is evident that VEC satisfies the Stability conditions for all components of the model as none of the roots is outside the unit circle.

Table 4.7a: LM Residual Test for Serial Correlation for Agricultural Sector Model

H0: no serial correlation at lag order h

Date: 12/02/14 Time: 10:55

Sample: 1986Q1 2012Q4

Included observations: 105

Lags	LM-Stat	Prob
1	126.0981	0.0000
2	117.2833	0.0000
3	91.67495	0.0002
4	150.5926	0.0000
5	65.94801	0.0534
6	47.96202	0.5152
7	46.16648	0.5887
8	118.2520	0.0000
9	44.26304	0.6653
10	46.44457	0.5773
11	33.41635	0.9565
12	67.27971	0.0425

Probs from chi-square with 49 df.

Table 4.7a presents the test for the presence of serial correlation in the model within the period of the study. The result shows that there is no serial correlation in the model. This is because the probability value of the LM statistic is less than unity. Therefore, the null hypothesis of no serial correlation has been accepted.

Figure 4.7b: Stability Test for Manufacturing Sector Model

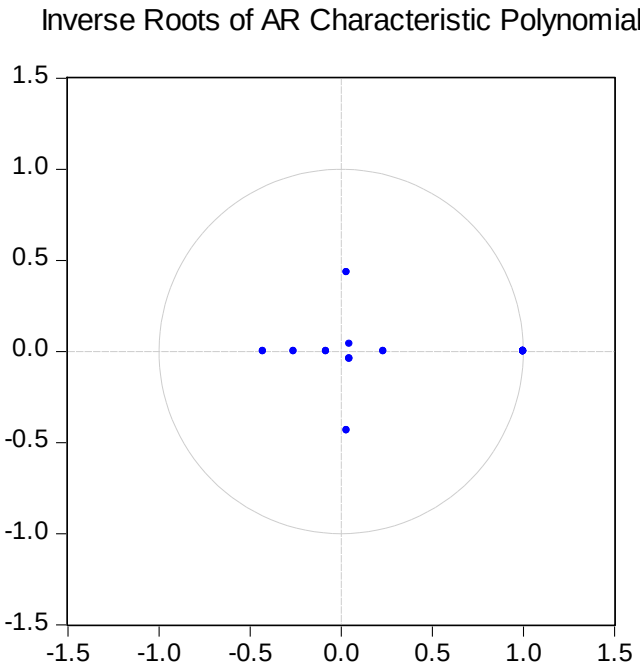


Figure 4.7b shows the stability test for the estimated VEC model for manufacturing sector. A VAR model is said to be stable if the roots of the characteristic polynomial have a modulus of less than one and also lie within the radius of the circle. From the result it is evident that the VEC satisfies the Stability conditions for all components of the model as none of the roots is outside the unit circle.

Table 4.7a: LM Residual Test for Serial Correlation

H0: no serial correlation at lag order

h

Date: 12/02/14 Time: 11:05

Sample: 1986Q1 2012Q4

Included observations: 106

Lags	LM-Stat	Prob
1	58.63636	0.1629
2	50.71049	0.4059
3	41.70663	0.7607
4	200.6118	0.0000
5	56.89358	0.2048
6	47.71365	0.5253
7	36.77425	0.9009
8	169.6768	0.0000
9	46.30914	0.5829
10	41.21920	0.7774
11	33.69156	0.9531
12	140.9457	0.0000

Probs from chi-square with 49 df.

Table 4.7b presents the test for the presence of serial correlation in the Manufacturing sector model within the period of the study. The result shows that there is no serial correlation in the model. This is because the probability value of the LM statistic is less than unity. Therefore, the null hypothesis of no serial correlation has been accepted. This implies that the model is suitable for policy.

Figure 4.7c: Stability Test for Services Sector Model

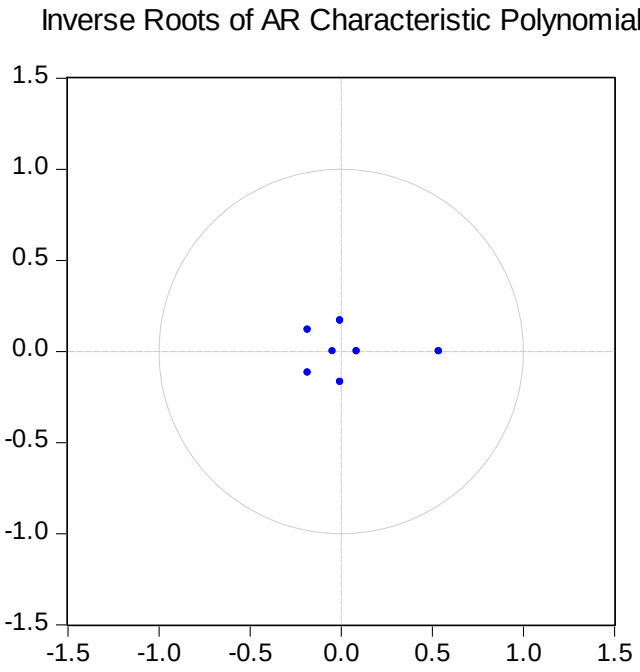


Figure 4.7b shows the stability test for the estimated VAR model for Services sector. A VAR model is said to be stable if the roots of the characteristic polynomial have a modulus of less than one and also lie within the radius of the circle. From the result it is evident that the VAR satisfies the Stability conditions for all components of the model as none of the roots is outside the unit circle.

Table 4.7c: LM Residual Test for Serial Correlation

H0: no serial correlation at lag order h

Date: 12/02/14 Time: 11:08

Sample: 1986Q1 2012Q4

Included observations: 106

Lags	LM-Stat	Prob
1	67.64451	0.0399
2	73.68212	0.0128
3	64.77271	0.0650
4	236.3035	0.0000
5	69.90852	0.0265
6	69.66420	0.0277
7	60.13733	0.1323
8	215.0702	0.0000
9	68.59343	0.0337
10	63.97483	0.0739
11	53.03332	0.3214
12	148.5193	0.0000

Probs from chi-square with 49 df.

Table 4.7c presents the test for the presence of serial correlation in the Manufacturing sector model within the period of the study. The result shows that there is no serial correlation in the model. This is because the probability value of the LM statistic is less than unity. Therefore, the null hypothesis of no serial correlation has been accepted. This implies that the model is suitable for policy.

4.8 Summary of Research Findings

From the econometric investigations on the relationship between monetary policy and sectoral output in Nigeria, the following major findings were made:

There is long run relationship between manufacturing sector output, agricultural sector output, and monetary policy variables in Nigeria over the study period. The Johansen cointegration test has confirmed this finding.

Monetary policy rate does not impact the agricultural, manufacturing and services sectors output but indirectly through lending rate as seen in the Impulse response results. This finding could be explained by fiscal dominance. Fiscal dominance is the single greatest threat to the smooth functioning of any monetary framework. Fiscal dominance may be defined as a situation in which the government adopts a stance that is incompatible with sustaining low inflation without recourse to distortionary measures. In circumstances of extreme fiscal dominance, the actions of the central banks become fully subsumed to the over-riding requirement of funding fiscal deficits, so that it loses control over the size and composition of its balance sheet. Its capacity to separate liquidity management objectives from its government funding obligations eliminates its capacity to conduct monetary policy beyond the very short run.

In the agricultural sector model, the main source of variation in output was CPI, followed by M1 and LENDR. Also in the manufacturing model, the main source of variation in output was M2, followed by LENDR and M1. While in the services sector model, M1 was found to be the main source of variation in output. This is followed by M2, PSC and LENDR.

The three models are robust and suitable for policy. The LM autocorrelation stability test and AR root stability test has confirmed this finding.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

In estimating the empirical result, this study used the Augmented Dickey Fuller and Philips Perron statistics for unit root test. The test conducted established stationarity of all the variables at first difference. The Johansen cointegration test was conducted for the variables in each model and it showed that there is cointegration in the Agricultural model and Manufacturing models at 5% critical level and no cointegration in the Services model with the aid of the trace statistics and the maximum eigenvalue. This helped us in achieving second objective of establishing the long run relationship among the monetary policy variables and sectoral output.

The study employed Vector Error Correction and ordinary least square method of estimation are used. Due to existence of cointegration among the variables, error correction term was computed from the residual of each model and it was included in the regression model in order to correct or adjust the short run disequilibrium among the variables. The ECM was statistically significant in agricultural sector and manufacturing sector models. The Impulse Response Function (IFR) was conducted from the VEC result to show the effect of monetary policy on sectoral output. The result shows that monetary policy does not impact on the agricultural, manufacturing and services sectors in Nigeria. The impact is indirectly through the lending rate. The Variance Decomposition was used to identify the monetary policy variable that is more appropriate in explaining the variation in the output of the three sectors. In the agricultural model, inflation was found to be the most important variable in explaining variation in agricultural output, followed by lending rate and M1 respectively. Also in the manufacturing sector output, M2 is the most important variable that explains variation in the sector followed by lending rate and M1. While in the service these sector output, M2 is the most important variable in explaining variation in the sectors output followed by M1 and lending rate. This has helped us to identify the variables that are relevant to each sector which is third objective of the study.

5.2 Conclusion

The empirical analysis presented in the previous chapter allows us to draw some conclusions about each of the research questions raised at the beginning of this study. First, on the question of whether monetary policy affect the selected sectoral output in Nigeria, we can conclude on the basis of evidence provided by the theory, and the Impulse response Function (IRF) tables show that although the monetary policy variable is found not to conform with apriori expectation, lending rate affect the selected sectoral outputs (agricultural, manufacturing and services) in Nigeria. Second, on the question whether there is long run relationship between the sectoral output and the monetary policy. The Johansen cointegration test confirms that there is long run relationship between monetary policy variables, agricultural sector and manufacturing sector output while there is no long run relationship between services sector output and monetary policy variables. On the third question of which monetary policy variable is relevant to each of the selected sectors, the Variance Decomposition shows that indeed, some variables are more important than others in explaining variation of output in the various sectors studied. In the agricultural sector, inflation was the most important variable followed by M1 and lending rate. The role of inflation in the agriculture could be understood because rise in prices of agricultural products could largely determine the output produced by the farmers in the next farming season. In the manufacturing sector, M2 was the found to be most important variable followed by lending rate and M1. While in the services sector, the lending rate was found to be less active because M1, M2 and PSC were found to be more active, followed by the other variables.

Basically, these findings are in accord with the empirical literatures reviewed in this study.

5.3 Recommendations

Arising from the empirical findings, the following recommendations are proffered.

(i) Commercial banks and other credit institutions should be encouraged to improve upon their loan procedures so that farmers, manufacturer and services providers can have access to their credit facilities. The insistence of banks on collateral, high lending rates and others are repellent to bank customers such as producers in these sectors. This is because of the importance of the credit to the sectors as shown by the strength of lending rate. The impact of the lending rate cut across all the three sectors.

(ii) Secondly, to encourage the growth of output in the agricultural sector, low and stable inflation rate should be maintained in the economy. This is because of the effect rise in prices have on agricultural production

which encourage growth in output of the sector. While money supply should be emphasized to stimulate output growth in manufacturing and services sector. In general, low and stable growth in monetary aggregates should be encouraged. This will ensure mild increase in price and encourage producers in these sectors.

(iii) Lastly, beneficiaries should be closely monitored to ensure that the loans are used for the Purposes. Stakeholders in agricultural, manufacturing and services sector mostly the government should put a mechanism to ensure effective implementation of credit collected by the sectors. This will check the incessant cases of loan diversion. The loans could be given in tranches such that implementation of the previous tranche would ensure access to the subsequent tranche.

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APPENDICES

APPENDIX AI: COINTEGRATION TEST FOR AGRIC MODEL

Date: 11/24/14 Time: 16:38
Sample (adjusted): 1987Q2 2012Q4
Included observations: 103 after adjustments
Trend assumption: Linear deterministic trend
Series: AGRIC MPR LENDR PSC M1 M2 INF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.374773	152.0724	125.6154	0.0005
At most 1 *	0.288711	103.6995	95.75366	0.0127
At most 2	0.206741	68.60985	69.81889	0.0622
At most 3	0.150436	44.75448	47.85613	0.0950
At most 4	0.115881	27.96221	29.79707	0.0802
At most 5	0.085886	15.27634	15.49471	0.0539
At most 6 *	0.056835	6.026967	3.841466	0.0141

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.374773	48.37290	46.23142	0.0291
At most 1	0.288711	35.08968	40.07757	0.1640
At most 2	0.206741	23.85537	33.87687	0.4661
At most 3	0.150436	16.79227	27.58434	0.5978
At most 4	0.115881	12.68587	21.13162	0.4816
At most 5	0.085886	9.249377	14.26460	0.2660
At most 6 *	0.056835	6.026967	3.841466	0.0141

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

AGRIC	MPR	LENDR	PSC	M1	M2	INF
4.924103	0.096789	0.422382	-0.026649	-21.51505	17.58778	0.009186
5.998963	-0.083399	0.511338	0.213985	-18.99209	13.98588	-0.162175

-0.182267	-0.271911	0.103433	0.225323	8.808468	-8.538546	0.067385
-0.381847	0.361707	-0.059726	0.653357	-11.76109	12.20328	0.016421
-2.694802	-0.075794	0.330489	0.059460	4.441946	-2.048585	-0.032124
2.228266	0.190057	-0.008085	-0.623294	6.017201	-7.548280	-0.043659
-0.904792	0.205370	-0.188988	-0.305534	-2.033489	3.557394	-0.012141

Unrestricted Adjustment Coefficients (alpha):

D(AGRIC)	-0.003431	-0.020003	-0.010566	-0.008049	0.009113	0.001737	-0.000536
D(MPR)	-0.192115	0.014657	0.088675	-0.469412	-0.056391	-0.090842	-0.129704
D(LENDR)	-0.283175	-0.170653	-0.305966	0.101823	-0.444552	-0.117566	-0.090107
D(PSC)	0.050542	0.008315	-0.021366	-0.022861	-0.004288	0.152510	-0.052934
D(M1)	0.013551	-0.001201	-0.006419	0.001886	0.004100	-0.002028	-0.012857
D(M2)	-0.004126	0.000735	-0.002476	0.002344	0.006573	-2.90E-05	-0.011379
D(INF)	-0.578875	-0.288889	-2.905201	-1.058233	0.980784	0.105602	0.177090

1 Cointegrating Equation(s): Log likelihood -233.7135

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.019656	0.085778	-0.005412	-4.369334	3.571773	0.001865
	(0.01692)	(0.01774)	(0.03081)	(0.67110)	(0.67430)	(0.00456)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.016893
	(0.03226)
D(MPR)	-0.945993
	(0.81190)
D(LENDR)	-1.394381
	(0.95843)
D(PSC)	0.248876
	(0.33130)
D(M1)	0.066727
	(0.03475)
D(M2)	-0.020315
	(0.03021)
D(INF)	-2.850442
	(4.39292)

2 Cointegrating Equation(s): Log likelihood -216.1687

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.085462	0.018651	-3.664444	2.845239	-0.015062
		(0.01148)	(0.02204)	(0.42129)	(0.41859)	(0.00327)
0.000000	1.000000	0.016112	-1.224198	-35.86095	36.96208	0.861161
		(0.67442)	(1.29500)	(24.7568)	(24.5983)	(0.19203)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.136891	0.001336
	(0.04749)	(0.00078)
D(MPR)	-0.858068	-0.019817

	(1.27960)	(0.02106)
D(LENDR)	-2.418122	-0.013176
	(1.50264)	(0.02474)
D(PSC)	0.298759	0.004198
	(0.52212)	(0.00860)
D(M1)	0.059521	0.001412
	(0.05476)	(0.00090)
D(M2)	-0.015908	-0.000461
	(0.04761)	(0.00078)
D(INF)	-4.583476	-0.031936
	(6.91888)	(0.11390)

3 Cointegrating Equation(s): Log likelihood -204.2410

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.090787	-2.549040	1.438925	-0.222013
			(0.27727)	(4.82567)	(4.76293)	(0.04132)
0.000000	1.000000	0.000000	-1.210598	-35.65067	36.69696	0.822145
			(1.17629)	(20.4725)	(20.2064)	(0.17529)
0.000000	0.000000	1.000000	-0.844073	-13.05150	16.45547	2.421568
			(3.20382)	(55.7604)	(55.0355)	(0.47743)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.134965	0.004209	-0.012770
	(0.04652)	(0.00180)	(0.00402)
D(MPR)	-0.874230	-0.043929	-0.064479
	(1.27742)	(0.04944)	(0.11045)
D(LENDR)	-2.362355	0.070020	-0.238516
	(1.47713)	(0.05716)	(0.12772)
D(PSC)	0.302653	0.010008	0.023390
	(0.52191)	(0.02020)	(0.04513)
D(M1)	0.060691	0.003157	0.004446
	(0.05446)	(0.00211)	(0.00471)
D(M2)	-0.015457	0.000213	-0.001623
	(0.04757)	(0.00184)	(0.00411)
D(INF)	-4.053954	0.758021	-0.692720
	(6.39760)	(0.24758)	(0.55317)

4 Cointegrating Equation(s): Log likelihood -195.8449

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	-2.496799	1.399924	-0.203349
				(3.29047)	(3.30109)	(0.03719)
0.000000	1.000000	0.000000	0.000000	-36.34727	37.21701	0.573272
				(10.6783)	(10.7128)	(0.12068)
0.000000	0.000000	1.000000	0.000000	-13.53720	16.81807	2.248044
				(38.5963)	(38.7210)	(0.43621)
0.000000	0.000000	0.000000	1.000000	-0.575418	0.429581	-0.205579
				(5.30132)	(5.31844)	(0.05991)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.131891	0.001298	-0.012290	-0.011828
	(0.04600)	(0.00278)	(0.00399)	(0.00428)
D(MPR)	-0.694987	-0.213718	-0.036443	-0.278457
	(1.20556)	(0.07293)	(0.10452)	(0.11229)
D(LENDR)	-2.401236	0.106850	-0.244598	-0.031385
	(1.47601)	(0.08929)	(0.12797)	(0.13748)
D(PSC)	0.311383	0.001739	0.024756	-0.019319
	(0.52212)	(0.03159)	(0.04527)	(0.04863)
D(M1)	0.059971	0.003839	0.004333	-0.000832
	(0.05450)	(0.00330)	(0.00473)	(0.00508)
D(M2)	-0.016352	0.001060	-0.001763	0.001241
	(0.04758)	(0.00288)	(0.00413)	(0.00443)
D(INF)	-3.649871	0.375251	-0.629515	-1.392403
	(6.33258)	(0.38309)	(0.54905)	(0.58985)

5 Cointegrating Equation(s): Log likelihood -189.5019

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	6.264826	5.731105
					(5.30749)	(1.08400)
0.000000	1.000000	0.000000	0.000000	0.000000	108.0380	86.96439
					(80.3176)	(16.4040)
0.000000	0.000000	1.000000	0.000000	0.000000	43.19470	34.42360
					(31.8437)	(6.50373)
0.000000	0.000000	0.000000	1.000000	0.000000	1.550758	1.162090
					(1.15039)	(0.23496)
0.000000	0.000000	0.000000	0.000000	1.000000	1.948455	2.376825
					(2.19724)	(0.44876)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.156449	0.000607	-0.009278	-0.011287	0.495781
	(0.04789)	(0.00277)	(0.00437)	(0.00423)	(0.18944)
D(MPR)	-0.543025	-0.209444	-0.055080	-0.281810	9.906407
	(1.27481)	(0.07380)	(0.11631)	(0.11257)	(5.04344)
D(LENDR)	-1.203255	0.140544	-0.391518	-0.057818	3.466253
	(1.50242)	(0.08698)	(0.13708)	(0.13267)	(5.94392)
D(PSC)	0.322938	0.002064	0.023338	-0.019574	-1.183722
	(0.55260)	(0.03199)	(0.05042)	(0.04880)	(2.18621)
D(M1)	0.048921	0.003529	0.005688	-0.000588	-0.329248
	(0.05755)	(0.00333)	(0.00525)	(0.00508)	(0.22768)
D(M2)	-0.034065	0.000562	0.000409	0.001631	0.054632
	(0.04996)	(0.00289)	(0.00456)	(0.00441)	(0.19765)
D(INF)	-6.292890	0.300913	-0.305377	-1.334086	9.153330
	(6.63552)	(0.38416)	(0.60542)	(0.58593)	(26.2517)

6 Cointegrating Equation(s): Log likelihood -184.8773

Normalized cointegrating coefficients (standard error in parentheses)

AGRIC	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.637828
						(0.12376)
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	-0.870095

						(0.20312)
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	-0.693511
						(0.15299)
0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-0.098669
						(0.05383)
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.792739
						(0.14955)
0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.812996
						(0.15261)

Adjustment coefficients (standard error in parentheses)

D(AGRIC)	-0.152578	0.000937	-0.009292	-0.012369	0.506233	-0.379881
	(0.04958)	(0.00298)	(0.00437)	(0.00557)	(0.19254)	(0.16329)
D(MPR)	-0.745444	-0.226709	-0.054345	-0.225189	9.359794	-8.858193
	(1.31763)	(0.07928)	(0.11604)	(0.14798)	(5.11683)	(4.33961)
D(LENDR)	-1.465224	0.118200	-0.390567	0.015460	2.758833	-1.713937
	(1.55213)	(0.09339)	(0.13670)	(0.17431)	(6.02748)	(5.11193)
D(PSC)	0.662770	0.031050	0.022105	-0.114632	-0.266041	-0.233724
	(0.55193)	(0.03321)	(0.04861)	(0.06198)	(2.14333)	(1.81777)
D(M1)	0.044402	0.003143	0.005704	0.000676	-0.341450	0.306265
	(0.05959)	(0.00359)	(0.00525)	(0.00669)	(0.23141)	(0.19626)
D(M2)	-0.034129	0.000557	0.000410	0.001649	0.054458	-0.025789
	(0.05176)	(0.00311)	(0.00456)	(0.00581)	(0.20100)	(0.17047)
D(INF)	-6.057581	0.320984	-0.306231	-1.399907	9.788759	-5.135549
	(6.87382)	(0.41357)	(0.60538)	(0.77197)	(26.6934)	(22.6388)

APPENDIX AII: COINTEGRATION TEST FOR MANUFACTURING MODEL

Date: 11/24/14 Time: 17:26
Sample (adjusted): 1987Q2 2012Q4
Included observations: 103 after adjustments
Trend assumption: Linear deterministic trend
Series: MAN MPR LENDR PSC M1 M2 INF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.373498	139.6314	125.6154	0.0053
At most 1	0.256651	91.46821	95.75366	0.0951
At most 2	0.196655	60.91952	69.81889	0.2082
At most 3	0.149333	38.36556	47.85613	0.2863
At most 4	0.093573	21.70689	29.79707	0.3151
At most 5	0.072264	11.58770	15.49471	0.1778
At most 6 *	0.036800	3.861911	3.841466	0.0494

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.373498	48.16314	46.23142	0.0307
At most 1	0.256651	30.54870	40.07757	0.3886
At most 2	0.196655	22.55395	33.87687	0.5648
At most 3	0.149333	16.65868	27.58434	0.6094
At most 4	0.093573	10.11919	21.13162	0.7334
At most 5	0.072264	7.725788	14.26460	0.4073
At most 6 *	0.036800	3.861911	3.841466	0.0494

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

MAN	MPR	LENDR	PSC	M1	M2	INF
3.851037	-0.073637	0.541326	0.533847	-22.45941	20.86875	0.018488
0.074318	0.090382	-0.036761	-0.545817	-3.538071	3.406804	-0.022146
-1.327426	0.471218	-0.132616	0.459338	-11.09372	11.76097	0.017196
2.642137	-0.040979	0.147120	0.460233	-13.33392	11.89320	-0.054980
0.830214	0.193059	-0.440021	-0.233269	-3.307616	3.214591	0.033274
1.222935	0.144783	-0.067557	-0.534186	8.231490	-8.604977	-0.022049
-1.390824	0.220883	-0.003208	-0.226957	-0.078177	1.465528	-0.002128

Unrestricted Adjustment Coefficients (alpha):

D(MAN)	-0.044782	0.041340	-0.009154	-0.031142	-0.002611	-0.004551	-0.001392
D(MPR)	-0.115505	0.081653	-0.479211	0.205554	-0.091182	-0.044677	-0.116859
D(LENDR)	-0.208182	0.012709	0.254847	0.369683	0.251329	-0.059080	-0.148183
D(PSC)	0.021320	0.020806	-0.007060	-0.037057	-0.025204	0.139860	-0.038318
D(M1)	0.011487	0.008203	0.007024	0.003261	-0.012223	-0.000979	-0.007605
D(M2)	-0.001234	-0.001092	0.005437	0.003841	-0.013395	0.000729	-0.005373
D(INF)	-0.857215	2.888758	0.120528	1.434131	-0.699626	0.419703	0.472524

1 Cointegrating Equation(s): Log likelihood -358.3243

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	-0.019121	0.140566	0.138624	-5.832042	5.418996	0.004801
	(0.02190)	(0.02350)	(0.04382)	(0.91190)	(0.91726)	(0.00290)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.172456
	(0.05938)
D(MPR)	-0.444816
	(0.63529)
D(LENDR)	-0.801718
	(0.73218)
D(PSC)	0.082106

	(0.25864)					
D(M1)	0.044238					
	(0.02846)					
D(M2)	-0.004751					
	(0.02455)					
D(INF)	-3.301167					
	(3.52982)					

2 Cointegrating Equation(s): Log likelihood -343.0499

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.130734	0.022793	-6.478695	6.044701	0.000114
		(0.03123)	(0.06319)	(1.14488)	(1.13950)	(0.00413)
0.000000	1.000000	-0.514230	-6.057731	-33.81846	32.72297	-0.245116
		(1.19385)	(2.41529)	(43.7602)	(43.5548)	(0.15784)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.169384	0.007034
	(0.05639)	(0.00171)
D(MPR)	-0.438748	0.015885
	(0.63434)	(0.01920)
D(LENDR)	-0.800773	0.016479
	(0.73230)	(0.02216)
D(PSC)	0.083652	0.000311
	(0.25852)	(0.00782)
D(M1)	0.044848	-0.000104
	(0.02823)	(0.00085)
D(M2)	-0.004832	-7.87E-06
	(0.02454)	(0.00074)
D(INF)	-3.086480	0.324215
	(3.28151)	(0.09932)

3 Cointegrating Equation(s): Log likelihood -331.7730

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	-1.520741	-4.744191	4.029853	-0.061206
			(0.48861)	(8.28642)	(8.18814)	(0.03631)
0.000000	1.000000	0.000000	0.013635	-40.64099	40.64821	-0.003920
			(0.58888)	(9.98689)	(9.86845)	(0.04376)
0.000000	0.000000	1.000000	11.80671	-13.26747	15.41187	0.469043
			(3.44271)	(58.3854)	(57.6929)	(0.25583)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.157232	0.002720	-0.024547
	(0.05948)	(0.00709)	(0.00816)
D(MPR)	0.197369	-0.209927	-0.001977
	(0.63085)	(0.07517)	(0.08649)
D(LENDR)	-1.139064	0.136567	-0.146959
	(0.76497)	(0.09115)	(0.10488)
D(PSC)	0.093024	-0.003016	0.011713
	(0.27342)	(0.03258)	(0.03748)

D(M1)	0.035523	0.003206	0.004985
	(0.02967)	(0.00353)	(0.00407)
D(M2)	-0.012049	0.002554	-0.001349
	(0.02583)	(0.00308)	(0.00354)
D(INF)	-3.246471	0.381010	-0.586211
	(3.47044)	(0.41350)	(0.47579)

4 Cointegrating Equation(s): Log likelihood -323.4436

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	-5.028533	4.387118	-0.040369
				(2.03846)	(2.04008)	(0.01178)
0.000000	1.000000	0.000000	0.000000	-40.63844	40.64501	-0.004107
				(7.33935)	(7.34519)	(0.04240)
0.000000	0.000000	1.000000	0.000000	-11.05990	12.63814	0.307268
				(15.6842)	(15.6966)	(0.09062)
0.000000	0.000000	0.000000	1.000000	-0.186976	0.234928	0.013702
				(3.72195)	(3.72492)	(0.02150)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.239514	0.003997	-0.029129	-0.065008
	(0.06865)	(0.00689)	(0.00817)	(0.01418)
D(MPR)	0.740471	-0.218351	0.028264	-0.231747
	(0.74276)	(0.07452)	(0.08835)	(0.15340)
D(LENDR)	-0.162310	0.121418	-0.092571	0.169127
	(0.88722)	(0.08901)	(0.10553)	(0.18323)
D(PSC)	-0.004885	-0.001498	0.006261	-0.020272
	(0.32520)	(0.03263)	(0.03868)	(0.06716)
D(M1)	0.044139	0.003072	0.005465	0.006383
	(0.03531)	(0.00354)	(0.00420)	(0.00729)
D(M2)	-0.001902	0.002397	-0.000784	0.004202
	(0.03071)	(0.00308)	(0.00365)	(0.00634)
D(INF)	0.542701	0.322240	-0.375222	-1.318957
	(4.05525)	(0.40684)	(0.48237)	(0.83752)

5 Cointegrating Equation(s): Log likelihood -318.3840

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	0.871231	0.232022
					(0.62270)	(0.06294)
0.000000	1.000000	0.000000	0.000000	0.000000	12.23112	2.197237
					(5.75242)	(0.58142)
0.000000	0.000000	1.000000	0.000000	0.000000	4.905195	0.906372
					(2.38403)	(0.24096)
0.000000	0.000000	0.000000	1.000000	0.000000	0.104197	0.023830
					(0.21134)	(0.02136)
0.000000	0.000000	0.000000	0.000000	1.000000	-0.699187	0.054169
					(0.14330)	(0.01448)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.241681	0.003493	-0.027980	-0.064399	1.384941

	(0.06963)	(0.00741)	(0.01026)	(0.01455)	(0.40693)
D(MPR)	0.664770	-0.235954	0.068386	-0.210477	5.182274
	(0.75170)	(0.07996)	(0.11080)	(0.15711)	(4.39278)
D(LENDR)	0.046346	0.169939	-0.203161	0.110500	-3.957141
	(0.88835)	(0.09449)	(0.13094)	(0.18567)	(5.19131)
D(PSC)	-0.025810	-0.006364	0.017351	-0.014393	0.103337
	(0.32960)	(0.03506)	(0.04858)	(0.06889)	(1.92610)
D(M1)	0.033991	0.000712	0.010844	0.009234	-0.368000
	(0.03512)	(0.00374)	(0.00518)	(0.00734)	(0.20524)
D(M2)	-0.013022	-0.000189	0.005110	0.007327	-0.035644
	(0.03018)	(0.00321)	(0.00445)	(0.00631)	(0.17639)
D(INF)	-0.038139	0.187170	-0.067371	-1.155755	-9.113688
	(4.09427)	(0.43551)	(0.60348)	(0.85573)	(23.9259)

6 Cointegrating Equation(s): Log likelihood -314.5211

Normalized cointegrating coefficients (standard error in parentheses)

MAN	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.068287
						(0.01821)
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	-0.101419
						(0.07069)
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	-0.015487
						(0.05067)
0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.004248
						(0.01917)
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.185571
						(0.04363)
0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.187935
						(0.04419)

Adjustment coefficients (standard error in parentheses)

D(MAN)	-0.247247	0.002834	-0.027673	-0.061968	1.347480	-1.240973
	(0.07170)	(0.00768)	(0.01030)	(0.01638)	(0.42293)	(0.40232)
D(MPR)	0.610132	-0.242423	0.071405	-0.186610	4.814512	-5.232231
	(0.77407)	(0.08291)	(0.11121)	(0.17689)	(4.56614)	(4.34363)
D(LENDR)	-0.025905	0.161385	-0.199169	0.142060	-4.443456	4.409058
	(0.91464)	(0.09796)	(0.13141)	(0.20902)	(5.39539)	(5.13247)
D(PSC)	0.145230	0.013886	0.007903	-0.089104	1.254591	-1.292450
	(0.32928)	(0.03527)	(0.04731)	(0.07525)	(1.94240)	(1.84775)
D(M1)	0.032795	0.000570	0.010910	0.009757	-0.376054	0.358197
	(0.03618)	(0.00388)	(0.00520)	(0.00827)	(0.21344)	(0.20304)
D(M2)	-0.012131	-8.39E-05	0.005061	0.006938	-0.029644	0.030818
	(0.03110)	(0.00333)	(0.00447)	(0.00711)	(0.18344)	(0.17450)
D(INF)	0.475131	0.247936	-0.095725	-1.379955	-5.658908	4.565820
	(4.21117)	(0.45104)	(0.60502)	(0.96236)	(24.8413)	(23.6308)

APPENDIX AIII: COINTEGRATION TEST FOR SERVICES MODEL

Date: 11/24/14 Time: 17:42
Sample (adjusted): 1987Q2 2012Q4

Included observations: 103 after adjustments
Trend assumption: Linear deterministic trend
Series: SERV MPR LENDR PSC M1 M2 INF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.275962	122.3889	125.6154	0.0774
At most 1	0.256663	89.12900	95.75366	0.1310
At most 2	0.177254	58.57865	69.81889	0.2816
At most 3	0.154424	38.48254	47.85613	0.2814
At most 4	0.093738	21.20558	29.79707	0.3450
At most 5	0.071446	11.06757	15.49471	0.2074
At most 6	0.032776	3.432517	3.841466	0.0639

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.275962	33.25987	46.23142	0.5742
At most 1	0.256663	30.55036	40.07757	0.3885
At most 2	0.177254	20.09611	33.87687	0.7500
At most 3	0.154424	17.27696	27.58434	0.5562
At most 4	0.093738	10.13801	21.13162	0.7316
At most 5	0.071446	7.635053	14.26460	0.4170
At most 6	0.032776	3.432517	3.841466	0.0639

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

SERV	MPR	LENDR	PSC	M1	M2	INF
-9.239946	-0.131109	-0.233945	0.312638	-0.086811	7.874867	-0.080512
-0.926706	0.218244	0.147777	0.063427	-16.28497	17.23582	0.001780
-0.870551	-0.381224	0.250350	-0.148111	3.236419	-2.285210	-0.002165
-9.219362	-0.038033	-0.029644	1.105703	-5.747389	13.84613	0.017036
6.188549	0.202819	-0.293593	-0.252534	-8.661297	3.493847	0.043274
1.572747	-0.167547	0.303864	0.666174	-11.37020	9.528713	-0.035511
1.120159	0.269991	0.003657	-0.186544	-1.518404	1.170244	-0.016478

Unrestricted Adjustment Coefficients (alpha):

D(SERV)	-0.002097	0.003782	-0.007226	0.001840	-0.009465	-0.008494	-0.002621
D(MPR)	0.181680	-0.283877	0.257520	-0.235831	-0.097310	0.024550	-0.151661

D(LENDR)	0.453074	-0.066011	-0.366265	-0.000612	0.257804	0.032179	-0.144022
D(PSC)	-0.106793	0.009999	-0.045230	-0.189729	0.014713	-0.040507	0.008673
D(M1)	-0.008982	0.012748	-0.005145	-0.010133	-0.003905	0.010437	-0.005274
D(M2)	-0.007451	-0.001676	-0.006945	-0.009035	-0.005968	0.010098	-0.002433
D(INF)	2.388731	1.326452	-0.570525	-1.171827	-1.327809	-0.075080	0.234996

1 Cointegrating Equation(s): Log likelihood -267.9105

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.014189	0.025319	-0.033835	0.009395	-0.852263	0.008713
	(0.01146)	(0.01154)	(0.02059)	(0.46565)	(0.46556)	(0.00176)

Adjustment coefficients (standard error in parentheses)

D(SERV)	0.019375
	(0.05471)
D(MPR)	-1.678709
	(1.50865)
D(LENDR)	-4.186384
	(1.76670)
D(PSC)	0.986765
	(0.59483)
D(M1)	0.082992
	(0.07005)
D(M2)	0.068851
	(0.05869)
D(INF)	-22.07174
	(7.88252)

2 Cointegrating Equation(s): Log likelihood -252.6353

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.014818	-0.035802	1.007477	-1.860755	0.008109
		(0.01127)	(0.02292)	(0.48202)	(0.47778)	(0.00191)
0.000000	1.000000	0.740040	0.138602	-70.34035	71.07398	0.042587
		(0.42604)	(0.86609)	(18.2140)	(18.0537)	(0.07227)

Adjustment coefficients (standard error in parentheses)

D(SERV)	0.015871	0.001100
	(0.05483)	(0.00150)
D(MPR)	-1.415638	-0.085774
	(1.48449)	(0.04070)
D(LENDR)	-4.125210	-0.073808
	(1.77411)	(0.04864)
D(PSC)	0.977499	0.016184
	(0.59771)	(0.01639)
D(M1)	0.071178	0.003960
	(0.06902)	(0.00189)
D(M2)	0.070404	0.000611
	(0.05895)	(0.00162)
D(INF)	-23.30098	-0.023693
	(7.78978)	(0.21357)

3 Cointegrating Equation(s): Log likelihood -242.5873

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	-0.032367	1.624309	-2.490848	0.007535
			(0.02663)	(0.53672)	(0.52997)	(0.00237)
0.000000	1.000000	0.000000	0.310175	-39.53500	39.60636	0.013915
			(0.51547)	(10.3873)	(10.2566)	(0.04581)
0.000000	0.000000	1.000000	-0.231843	-41.62658	42.52150	0.038744
			(0.70204)	(14.1469)	(13.9690)	(0.06239)

Adjustment coefficients (standard error in parentheses)

D(SERV)	0.022162	0.003855	-0.000760
	(0.05450)	(0.00268)	(0.00218)
D(MPR)	-1.639822	-0.183947	-0.019983
	(1.46426)	(0.07197)	(0.05858)
D(LENDR)	-3.806358	0.065821	-0.207444
	(1.73645)	(0.08535)	(0.06947)
D(PSC)	1.016874	0.033426	0.015138
	(0.59830)	(0.02941)	(0.02394)
D(M1)	0.075656	0.005921	0.002697
	(0.06909)	(0.00340)	(0.00276)
D(M2)	0.076450	0.003259	-0.000243
	(0.05873)	(0.00289)	(0.00235)
D(INF)	-22.80430	0.193805	-0.505644
	(7.79910)	(0.38333)	(0.31203)

4 Cointegrating Equation(s): Log likelihood -233.9488

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	1.882933	-2.743931	0.011049
				(0.59476)	(0.59333)	(0.00322)
0.000000	1.000000	0.000000	0.000000	-42.01345	42.03171	-0.019760
				(8.97641)	(8.95483)	(0.04860)
0.000000	0.000000	1.000000	0.000000	-39.77405	40.70866	0.063915
				(10.7650)	(10.7391)	(0.05828)
0.000000	0.000000	0.000000	1.000000	7.990481	-7.819288	0.108568
				(6.75847)	(6.74221)	(0.03659)

Adjustment coefficients (standard error in parentheses)

D(SERV)	0.005200	0.003785	-0.000814	0.002689
	(0.07658)	(0.00269)	(0.00219)	(0.00678)
D(MPR)	0.534386	-0.174978	-0.012992	-0.260106
	(2.02679)	(0.07109)	(0.05785)	(0.17932)
D(LENDR)	-3.800716	0.065844	-0.207426	0.191033
	(2.44158)	(0.08564)	(0.06969)	(0.21602)
D(PSC)	2.766055	0.040642	0.020762	-0.235838
	(0.78924)	(0.02768)	(0.02253)	(0.06983)
D(M1)	0.169079	0.006306	0.002998	-0.012442
	(0.09590)	(0.00336)	(0.00274)	(0.00848)
D(M2)	0.159751	0.003602	2.47E-05	-0.011398

	(0.08140)	(0.00286)	(0.00232)	(0.00720)		
D(INF)	-12.00081	0.238372	-0.470906	-0.380252		
	(10.8176)	(0.37943)	(0.30877)	(0.95708)		

5 Cointegrating Equation(s): Log likelihood -228.8798

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	-0.819323	0.013251
					(0.02940)	(0.00354)
0.000000	1.000000	0.000000	0.000000	0.000000	-0.911626	-0.068891
					(0.72238)	(0.08689)
0.000000	0.000000	1.000000	0.000000	0.000000	0.054294	0.017403
					(0.49409)	(0.05943)
0.000000	0.000000	0.000000	1.000000	0.000000	0.348046	0.117913
					(0.29766)	(0.03580)
0.000000	0.000000	0.000000	0.000000	1.000000	-1.022133	-0.001169
					(0.01467)	(0.00176)

Adjustment coefficients (standard error in parentheses)

D(SERV)	-0.053376	0.001865	0.001965	0.005079	-0.013382
	(0.08314)	(0.00288)	(0.00273)	(0.00681)	(0.11231)
D(MPR)	-0.067821	-0.194714	0.015577	-0.235532	7.638841
	(2.23502)	(0.07748)	(0.07332)	(0.18302)	(3.01918)
D(LENDR)	-2.205284	0.118131	-0.283115	0.125928	-2.379124
	(2.66408)	(0.09236)	(0.08740)	(0.21815)	(3.59877)
D(PSC)	2.857106	0.043626	0.016443	-0.239554	0.663070
	(0.87234)	(0.03024)	(0.02862)	(0.07143)	(1.17840)
D(M1)	0.144913	0.005514	0.004144	-0.011456	-0.131410
	(0.10583)	(0.00367)	(0.00347)	(0.00867)	(0.14296)
D(M2)	0.122819	0.002392	0.001777	-0.009891	0.109084
	(0.08944)	(0.00310)	(0.00293)	(0.00732)	(0.12082)
D(INF)	-20.21802	-0.030932	-0.081071	-0.044935	-5.419562
	(11.7473)	(0.40725)	(0.38538)	(0.96194)	(15.8689)

6 Cointegrating Equation(s): Log likelihood -225.0622

Normalized cointegrating coefficients (standard error in parentheses)

SERV	MPR	LENDR	PSC	M1	M2	INF
1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.125399
						(0.03467)
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.055891
						(0.06140)
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.009971
						(0.05294)
0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.070272
						(0.02555)
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.138739
						(0.03977)
0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.136879
						(0.03969)

Adjustment coefficients (standard error in parentheses)

D(SERV)	-0.066734	0.003289	-0.000616	-0.000579	0.083195	-0.023352
	(0.08236)	(0.00299)	(0.00319)	(0.00769)	(0.12789)	(0.14495)
D(MPR)	-0.029210	-0.198827	0.023037	-0.219177	7.359702	-7.422038
	(2.24774)	(0.08166)	(0.08699)	(0.20981)	(3.49030)	(3.95595)
D(LENDR)	-2.154675	0.112740	-0.273337	0.147365	-2.745010	4.466015
	(2.67914)	(0.09733)	(0.10368)	(0.25008)	(4.16019)	(4.71520)
D(PSC)	2.793398	0.050413	0.004134	-0.266539	1.123643	-3.526872
	(0.87473)	(0.03178)	(0.03385)	(0.08165)	(1.35829)	(1.53950)
D(M1)	0.161327	0.003766	0.007315	-0.004503	-0.250077	0.106247
	(0.10495)	(0.00381)	(0.00406)	(0.00980)	(0.16297)	(0.18471)
D(M2)	0.138700	0.000700	0.004845	-0.003164	-0.005728	-0.121436
	(0.08829)	(0.00321)	(0.00342)	(0.00824)	(0.13710)	(0.15539)
D(INF)	-20.33610	-0.018353	-0.103885	-0.094951	-4.565892	21.39735
	(11.8155)	(0.42925)	(0.45726)	(1.10292)	(18.3473)	(20.7950)

APPENDIX BI: VAR SELECTION CRITERIA FOR AGRIC MODEL

VAR Lag Order Selection Criteria
Endogenous variables: D(AGRIC) D(MPR) D(LENDR) D(PSC) D(M1) D(M2) D(INF)
Exogenous variables:
Date: 11/24/14 Time: 17:01
Sample: 1986Q1 2012Q4
Included observations: 104

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-555.5108	NA	0.000264	11.62521	12.87112*	12.12996*
2	-488.3019	116.3230*	0.000188*	11.27504*	13.76687	12.28455
3	-457.0509	49.88133	0.000272	11.61636	15.35411	13.13063

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX BII: VAR SELECTION CRITERIA FOR MANUFACTURING MODEL

VAR Lag Order Selection Criteria
Endogenous variables: MAN MPR LENDR PSC M1 M2
INF
Exogenous variables:
Date: 11/24/14 Time: 17:35
Sample: 1986Q1 2012Q4
Included observations: 105

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-683.3764	NA	0.002702*	13.95003*	15.18854*	14.45190*
2	-652.3489	53.78103	0.003843	14.29236	16.76939	15.29610

3	-613.0719	62.84322	0.004751	14.47756	18.19310	15.98317

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX BIII: VAR SELECTION CRITERIA FOR SERVICES MODEL

VAR Lag Order Selection Criteria
Endogenous variables: SERV MPR LENDR PSC M1 M2
INF
Exogenous variables:
Date: 11/24/14 Time: 17:43
Sample: 1986Q1 2012Q4
Included observations: 105

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-480.2801	NA	5.64e-05*	10.08153*	11.32004*	10.58340*
2	-453.1153	47.08576	8.64e-05	10.49743	12.97446	11.50117
3	-410.3319	68.45340*	9.99e-05	10.61585	14.33139	12.12146

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX CI: VEC ESTIMATE FOR AGRIC MODEL

Vector Error Correction Estimates
Date: 11/24/14 Time: 17:08
Sample (adjusted): 1986Q4 2012Q4
Included observations: 105 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
AGRIC(-1)	1.000000
MPR(-1)	-0.016208 (0.02728) [-0.59408]
LENDR(-1)	0.089560 (0.02544) [3.52112]
PSC(-1)	0.006077 (0.05812)

	[0.10456]
M1(-1)	-3.083482
	(1.23814)
	[-2.49042]
M2(-1)	2.240143
	(1.23725)
	[1.81058]
INF(-1)	-0.029576
	(0.00453)
	[-6.52187]
C	-3.005233

Error Correction:	D(AGRIC)	D(MPR)	D(LENDR)	D(PSC)	D(M1)	D(M2)	D(INF)
CointEq1	-0.092249	0.340541	-0.910601	0.037764	0.020203	0.012342	1.909550
	(0.01584)	(0.33862)	(0.44230)	(0.12563)	(0.01425)	(0.01209)	(1.60203)
	[-5.82415]	[1.00568]	[-2.05878]	[0.30060]	[1.41803]	[1.02104]	[1.19196]
D(AGRIC(-1))	-0.019918	0.611738	-0.336808	0.921723	0.015852	-0.065009	-3.387525
	(0.06135)	(1.31148)	(1.71304)	(0.48657)	(0.05518)	(0.04681)	(6.20470)
	[-0.32469]	[0.46645]	[-0.19661]	[1.89434]	[0.28728]	[-1.38865]	[-0.54596]
D(AGRIC(-2))	-0.811658	-1.322031	-1.258979	-0.405540	0.096382	0.020420	3.706973
	(0.05912)	(1.26386)	(1.65085)	(0.46890)	(0.05318)	(0.04512)	(5.97944)
	[-13.7294]	[-1.04602]	[-0.76262]	[-0.86487]	[1.81246]	[0.45262]	[0.61995]
D(MPR(-1))	-0.002827	0.027035	0.039505	-0.022405	-0.004789	-0.004321	-0.895430
	(0.00489)	(0.10449)	(0.13648)	(0.03877)	(0.00440)	(0.00373)	(0.49434)
	[-0.57851]	[0.25874]	[0.28945]	[-0.57797]	[-1.08938]	[-1.15838]	[-1.81137]
D(MPR(-2))	0.001207	0.069242	0.081413	0.022113	-0.002106	-0.001443	0.438089
	(0.00485)	(0.10361)	(0.13534)	(0.03844)	(0.00436)	(0.00370)	(0.49019)
	[0.24913]	[0.66829]	[0.60156]	[0.57524]	[-0.48304]	[-0.39018]	[0.89370]
D(LENDR(-1))	0.004686	-0.095208	0.048643	-0.026177	-0.002835	-0.002904	-0.008672
	(0.00391)	(0.08361)	(0.10921)	(0.03102)	(0.00352)	(0.00298)	(0.39557)
	[1.19826]	[-1.13871]	[0.44541]	[-0.84386]	[-0.80581]	[-0.97297]	[-0.02192]
D(LENDR(-2))	0.006345	0.007839	0.033294	-0.000949	-0.002726	-0.002671	-0.029400
	(0.00378)	(0.08086)	(0.10562)	(0.03000)	(0.00340)	(0.00289)	(0.38257)
	[1.67738]	[0.09694]	[0.31521]	[-0.03164]	[-0.80122]	[-0.92533]	[-0.07685]
D(PSC(-1))	-0.002696	0.460402	-0.102082	-0.018037	0.010136	0.009960	-0.237342
	(0.01337)	(0.28575)	(0.37325)	(0.10602)	(0.01202)	(0.01020)	(1.35192)
	[-0.20167]	[1.61119]	[-0.27350]	[-0.17013]	[0.84302]	[0.97644]	[-0.17556]
D(PSC(-2))	0.002968	0.526517	0.014963	0.027721	0.011721	0.001382	-0.059519
	(0.01356)	(0.28985)	(0.37860)	(0.10754)	(0.01220)	(0.01035)	(1.37129)
	[0.21891]	[1.81653]	[0.03952]	[0.25779]	[0.96111]	[0.13356]	[-0.04340]
D(M1(-1))	-0.504841	3.741553	8.033345	0.259723	-0.164253	0.021831	-17.48996

	(0.23792)	(5.08633)	(6.64374)	(1.88706)	(0.21401)	(0.18156)	(24.0638)
	[-2.12193]	[0.73561]	[1.20916]	[0.13763]	[-0.76751]	[0.12024]	[-0.72682]
D(M1(-2))	-0.349088	1.872317	-6.851971	4.331334	0.008549	0.004049	-13.36851
	(0.24205)	(5.17476)	(6.75925)	(1.91987)	(0.21773)	(0.18472)	(24.4822)
	[-1.44220]	[0.36182]	[-1.01372]	[2.25606]	[0.03926]	[0.02192]	[-0.54605]
D(M2(-1))	0.791823	-11.44875	-11.87564	0.470404	0.151139	-0.126511	41.08709
	(0.27554)	(5.89063)	(7.69432)	(2.18546)	(0.24785)	(0.21027)	(27.8691)
	[2.87373]	[-1.94355]	[-1.54343]	[0.21524]	[0.60980]	[-0.60165]	[1.47429]
D(M2(-2))	0.316738	-7.880301	6.105086	-6.052623	0.035840	0.013353	32.53057
	(0.29761)	(6.36249)	(8.31066)	(2.36052)	(0.26770)	(0.22712)	(30.1015)
	[1.06427]	[-1.23856]	[0.73461]	[-2.56410]	[0.13388]	[0.05879]	[1.08070]
D(INF(-1))	-0.001630	0.021214	-0.015051	0.000887	0.001562	0.001334	0.052603
	(0.00109)	(0.02336)	(0.03051)	(0.00867)	(0.00098)	(0.00083)	(0.11050)
	[-1.49197]	[0.90824]	[-0.49334]	[0.10237]	[1.58927]	[1.60046]	[0.47603]
D(INF(-2))	0.001595	0.026370	-0.012144	0.000742	-0.000375	6.38E-05	0.003336
	(0.00108)	(0.02313)	(0.03021)	(0.00858)	(0.00097)	(0.00083)	(0.10944)
	[1.47398]	[1.13998]	[-0.40192]	[0.08645]	[-0.38536]	[0.07732]	[0.03048]
C	0.086158	0.878330	0.419067	0.033144	0.051367	0.067782	-2.513867
	(0.01675)	(0.35801)	(0.46764)	(0.13283)	(0.01506)	(0.01278)	(1.69380)
	[5.14487]	[2.45334]	[0.89614]	[0.24953]	[3.41001]	[5.30385]	[-1.48416]
R-squared	0.777439	0.150178	0.094816	0.103066	0.136277	0.094205	0.107908
Adj. R-squared	0.739928	0.006950	-0.057743	-0.048102	-0.009294	-0.058457	-0.042445
Sum sq. resids	0.688468	314.6614	536.8588	43.31174	0.557050	0.400952	7043.114
S.E. equation	0.087952	1.880298	2.456038	0.697602	0.079114	0.067120	8.895848
F-statistic	20.72599	1.048521	0.621502	0.681798	0.936152	0.617084	0.717696
Log likelihood	114.9419	-206.6092	-234.6567	-102.4979	126.0622	143.3248	-369.7954
Akaike AIC	-1.884608	4.240176	4.774414	2.257102	-2.096422	-2.425235	7.348484
Schwarz SC	-1.480195	4.644589	5.178827	2.661515	-1.692009	-2.020822	7.752897
Mean dependent	0.055917	0.019048	0.057238	0.000908	0.059288	0.059646	0.061903
S.D. dependent	0.172465	1.886866	2.388058	0.681406	0.078749	0.065240	8.712860

Determinant resid covariance (dof adj.)	2.79E-05
Determinant resid covariance	8.77E-06
Log likelihood	-431.6277
Akaike information criterion	10.48815
Schwarz criterion	13.49597

APPENDIX CII: VEC ESTIMATE FOR MANUFACTURING MODEL

Vector Error Correction Estimates
Date: 11/24/14 Time: 17:36
Sample (adjusted): 1986Q3 2012Q4
Included observations: 106 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
MAN(-1)	1.000000
MPR(-1)	-0.021505 (0.01654) [-1.29987]
LENDR(-1)	0.048731 (0.01527) [3.19126]
PSC(-1)	0.060248 (0.03620) [1.66422]
M1(-1)	-3.638261 (0.77309) [-4.70610]
M2(-1)	3.149517 (0.77227) [4.07825]
INF(-1)	-0.002979 (0.00284) [-1.04931]
C	-4.278038

Error Correction:	D(MAN)	D(MPR)	D(LENDR)	D(PSC)	D(M1)	D(M2)	D(INF)
CointEq1	-1.008354 (0.16899) [-5.96690]	0.401487 (0.43242) [0.92846]	-0.776783 (0.55710) [-1.39435]	-0.086412 (0.16238) [-0.53217]	0.049578 (0.01784) [2.77896]	0.027863 (0.01512) [1.84238]	0.790681 (2.03269) [0.38898]
D(MAN(-1))	-0.048569 (0.09926) [-0.48929]	-0.337934 (0.25401) [-1.33042]	0.209675 (0.32724) [0.64075]	0.044730 (0.09538) [0.46897]	-0.019765 (0.01048) [-1.88609]	-0.010821 (0.00888) [-1.21805]	0.084666 (1.19399) [0.07091]
D(MPR(-1))	0.001940 (0.03837) [0.05055]	0.094614 (0.09819) [0.96354]	0.035065 (0.12650) [0.27718]	-0.003731 (0.03687) [-0.10118]	-0.003993 (0.00405) [-0.98574]	-0.004126 (0.00343) [-1.20147]	-0.980593 (0.46158) [-2.12444]
D(LENDR(-1))	0.029985 (0.03099) [0.96762]	-0.072478 (0.07930) [-0.91403]	0.018744 (0.10216) [0.18348]	-0.000430 (0.02978) [-0.01445]	-0.003877 (0.00327) [-1.18507]	-0.003555 (0.00277) [-1.28202]	-0.044321 (0.37274) [-0.11891]
D(PSC(-1))	0.084762 (0.11017) [0.76940]	0.423432 (0.28190) [1.50207]	-0.003769 (0.36317) [-0.01038]	-0.006150 (0.10585) [-0.05810]	0.008269 (0.01163) [0.71096]	0.004056 (0.00986) [0.41142]	-0.292287 (1.32512) [-0.22057]
D(M1(-1))	-8.291810 (1.81212) [-4.57575]	1.381904 (4.63697) [0.29802]	13.12872 (5.97382) [2.19771]	-1.784680 (1.74119) [-1.02498]	-0.259541 (0.19131) [-1.35667]	-0.021183 (0.16217) [-0.13062]	-17.00700 (21.7968) [-0.78025]

D(M2(-1))	8.134096	-8.632505	-17.66849	2.432374	0.248338	-0.034710	37.91493
	(2.28468)	(5.84619)	(7.53167)	(2.19526)	(0.24120)	(0.20446)	(27.4810)
	[3.56027]	[-1.47660]	[-2.34589]	[1.10801]	[1.02961]	[-0.16976]	[1.37968]
D(INF(-1))	0.006133	0.010614	-0.003082	0.000238	0.001465	0.000942	0.008835
	(0.00831)	(0.02127)	(0.02740)	(0.00799)	(0.00088)	(0.00074)	(0.09997)
	[0.73794]	[0.49910]	[-0.11249]	[0.02983]	[1.66922]	[1.26590]	[0.08837]
C	0.035083	0.465216	0.328994	-0.040094	0.061464	0.064218	-1.177101
	(0.09951)	(0.25462)	(0.32803)	(0.09561)	(0.01050)	(0.00891)	(1.19689)
	[0.35257]	[1.82709]	[1.00294]	[-0.41935]	[5.85098]	[7.21143]	[-0.98347]
R-squared	0.656590	0.095606	0.062902	0.022511	0.124295	0.082743	0.062789
Adj. R-squared	0.628268	0.021017	-0.014385	-0.058107	0.052072	0.007093	-0.014507
Sum sq. resids	51.14236	334.8679	555.7899	47.21707	0.569993	0.409602	7399.334
S.E. equation	0.726113	1.858022	2.393699	0.697692	0.076657	0.064982	8.733945
F-statistic	23.18268	1.281770	0.813878	0.279228	1.720992	1.093762	0.812315
Log likelihood	-111.7797	-211.3732	-238.2259	-107.5473	126.5477	144.0610	-375.4299
Akaike AIC	2.278862	4.157985	4.664640	2.199005	-2.217881	-2.548320	7.253395
Schwarz SC	2.505003	4.384127	4.890781	2.425146	-1.991740	-2.322179	7.479536
Mean dependent	0.035124	0.018868	0.056698	0.002097	0.060020	0.060238	0.061319
S.D. dependent	1.190939	1.877861	2.376666	0.678264	0.078734	0.065214	8.671273

Determinant resid covariance (dof adj.)	0.001672
Determinant resid covariance	0.000899
Log likelihood	-681.0715
Akaike information criterion	14.17116
Schwarz criterion	15.93003

APPENDIX CIII: VAR ESTIMATE FOR SERVICES MODEL

Vector Autoregression Estimates
Date: 11/25/14 Time: 18:07
Sample (adjusted): 1986Q2 2012Q4
Included observations: 107 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	SERV	MPR	LENDR	PSC	M1	M2	I
SERV(-1)	0.719468	0.168098	-1.925359	0.367946	0.093005	0.044148	-11.
	(0.06298)	(1.15601)	(1.42942)	(0.42938)	(0.04985)	(0.04166)	(5.2
	[11.4230]	[0.14541]	[-1.34695]	[0.85693]	[1.86566]	[1.05966]	[-2.2
MPR(-1)	-0.002853	0.829169	0.068517	0.027499	0.002282	0.001624	-0.1
	(0.00324)	(0.05940)	(0.07345)	(0.02206)	(0.00256)	(0.00214)	(0.2
	[-0.88159]	[13.9581]	[0.93278]	[1.24629]	[0.89087]	[0.75844]	[-0.6
LENDR(-1)	-0.002151	0.108955	0.763107	0.017775	0.002071	0.001622	-0.0
	(0.00272)	(0.04991)	(0.06171)	(0.01854)	(0.00215)	(0.00180)	(0.2
	[-0.79087]	[2.18311]	[12.3656]	[0.95888]	[0.96247]	[0.90152]	[-0.3

PSC(-1)	0.003164	0.113352	0.096472	0.946997	0.002682	0.003601	0.1
	(0.00496)	(0.09105)	(0.11258)	(0.03382)	(0.00393)	(0.00328)	(0.4
	[0.63784]	[1.24498]	[0.85690]	[28.0028]	[0.68314]	[1.09731]	[0.3
M1(-1)	0.426085	-0.769839	-0.907686	-0.469719	0.836176	-0.062398	5.5
	(0.10669)	(1.95814)	(2.42127)	(0.72731)	(0.08444)	(0.07057)	(8.9
	[3.99377]	[-0.39315]	[-0.37488]	[-0.64583]	[9.90241]	[-0.88419]	[0.6
M2(-1)	-0.179702	0.427913	2.500587	0.159049	0.077849	1.021154	3.7
	(0.06977)	(1.28060)	(1.58348)	(0.47565)	(0.05522)	(0.04615)	(5.8
	[-2.57554]	[0.33415]	[1.57917]	[0.33438]	[1.40969]	[22.1256]	[0.6
INF(-1)	-0.000480	-0.001598	0.003736	0.000719	0.000252	-7.07E-05	0.8
	(0.00060)	(0.01097)	(0.01356)	(0.00407)	(0.00047)	(0.00040)	(0.0
	[-0.80396]	[-0.14570]	[0.27553]	[0.17639]	[0.53181]	[-0.17901]	[16
R-squared	0.997115	0.824945	0.684368	0.897007	0.998494	0.998953	0.8
Adj. R-squared	0.996942	0.814442	0.665431	0.890828	0.998403	0.998891	0.8
Sum sq. resids	0.985559	332.0024	507.6213	45.80346	0.617402	0.431229	687
S.E. equation	0.099275	1.822093	2.253045	0.676783	0.078575	0.065668	8.2
F-statistic	5760.906	78.54147	36.13751	145.1573	11047.38	15907.95	80.
Log likelihood	98.94815	-212.4052	-235.1209	-106.4333	123.9695	143.1696	-374
Akaike AIC	-1.718657	4.101031	4.525625	2.120249	-2.186345	-2.545226	7.1
Schwarz SC	-1.543799	4.275889	4.700483	2.295107	-2.011487	-2.370368	7.3
Mean dependent	4.462044	13.96184	19.21748	11.92868	5.950360	6.552415	21.
S.D. dependent	1.795299	4.229902	3.895173	2.048299	1.966364	1.971566	19.

Determinant resid covariance (dof adj.)	3.38E-05
Determinant resid covariance	2.11E-05
Log likelihood	-486.6668
Akaike information criterion	10.01246
Schwarz criterion	11.23647

APPENDIX DI: IMPULSE RESPONSE OF AGRIC MODEL

Response of MPR: Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	1.880298	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.884104	-0.142942	0.237652	-0.399037	-0.356587	0.134792	0.071294
3	1.976329	-0.049438	0.500551	-0.645745	-0.474649	0.215750	0.078781
4	1.995782	0.041620	0.503409	-0.653703	-0.560306	0.135419	0.081974
5	2.043032	0.117163	0.508912	-0.718842	-0.655799	0.089931	0.075543
6	2.047459	0.154861	0.523423	-0.774059	-0.671561	0.044835	0.105543

7	2.058298	0.187016	0.535548	-0.812973	-0.692897	0.009934	0.117869
8	2.060846	0.211430	0.526759	-0.836621	-0.708838	-0.018863	0.094758
9	2.063667	0.230486	0.523656	-0.859279	-0.730085	-0.036745	0.086817
10	2.068942	0.241286	0.524752	-0.876055	-0.739144	-0.045898	0.110934

Response of LENDR:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	-0.196756	2.448144	0.000000	0.000000	0.000000	0.000000	0.000000
2	-0.086485	2.427368	-0.113008	0.078796	-0.462924	0.052161	-0.093389
3	0.094208	2.355029	-0.110074	-0.001539	-0.222490	0.105726	-0.163311
4	0.140611	2.205010	0.027815	0.045021	-0.356017	0.269399	-0.106131
5	0.186002	2.097086	0.036821	0.129266	-0.325519	0.451352	-0.094811
6	0.187595	2.017189	0.084293	0.232646	-0.326804	0.558385	-0.157658
7	0.191752	1.942813	0.107200	0.312574	-0.298457	0.661333	-0.167160
8	0.194600	1.877572	0.136997	0.373269	-0.284141	0.740853	-0.118864
9	0.194423	1.829432	0.151584	0.431264	-0.245244	0.793981	-0.116137
10	0.184476	1.797297	0.157250	0.474832	-0.228615	0.827229	-0.163246

Response of PSC:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	-0.025896	-0.096037	0.690475	0.000000	0.000000	0.000000	0.000000
2	-0.047859	-0.149791	0.699917	0.028979	0.017935	0.036842	0.071833
3	-0.025703	-0.138781	0.698343	0.044141	-0.144728	0.023411	0.033674
4	-0.027852	-0.126098	0.691554	0.050971	-0.105541	0.017637	0.016125
5	-0.029334	-0.123660	0.727818	0.035909	-0.130206	0.015373	0.060527
6	-0.024335	-0.125921	0.723108	0.038376	-0.113278	0.013632	0.077181
7	-0.028311	-0.119655	0.721119	0.039501	-0.120848	0.002973	0.034789
8	-0.030370	-0.117154	0.716377	0.034974	-0.128794	0.002999	0.023955
9	-0.025913	-0.118316	0.721355	0.029365	-0.134352	0.007337	0.062076
10	-0.023359	-0.118526	0.723738	0.031846	-0.123754	0.005555	0.070841

Response of M1:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.010639	-0.002145	0.013888	0.077125	0.000000	0.000000	0.000000
2	0.001807	-0.004326	0.021243	0.070633	0.006528	0.009790	0.002699
3	-0.004369	-0.009139	0.029293	0.072981	0.011686	0.004837	0.010100
4	-0.004338	-0.007076	0.025427	0.075046	0.014493	0.000921	0.007307
5	-0.006532	-0.004831	0.022893	0.073598	0.011540	-0.002892	0.000862
6	-0.006748	-0.003094	0.022366	0.070871	0.011070	-0.004589	0.004527
7	-0.006245	-0.001970	0.022806	0.069226	0.011417	-0.006240	0.010400
8	-0.006472	-0.000528	0.022039	0.068675	0.012514	-0.008604	0.006943
9	-0.007199	0.000849	0.021001	0.067563	0.011051	-0.010302	0.001898
10	-0.006843	0.001425	0.020842	0.065978	0.009415	-0.010405	0.005252

Response of

M2:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.008458	-0.004187	0.012788	0.056054	0.033323	0.000000	0.000000
2	-0.000314	-0.007755	0.017958	0.050443	0.030064	0.006243	-0.003943
3	-0.004253	-0.010919	0.017925	0.051935	0.034686	0.003507	-0.000243
4	-0.004237	-0.008557	0.016626	0.052384	0.035671	0.000111	0.003307
5	-0.005618	-0.006647	0.014815	0.051360	0.036548	-0.003336	0.000406
6	-0.006562	-0.004569	0.013831	0.049282	0.035867	-0.006192	-0.002265
7	-0.006460	-0.003211	0.013269	0.047273	0.034827	-0.007743	0.000649
8	-0.006076	-0.002088	0.013128	0.045986	0.035025	-0.009183	0.002964
9	-0.006312	-0.000924	0.012662	0.045280	0.035242	-0.010877	0.000408
10	-0.006568	-1.46E-05	0.012108	0.044294	0.034172	-0.011860	-0.001502

Response of INF:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	1.254702	1.581083	0.443723	0.479379	0.004636	8.639172	0.000000
2	-0.399232	1.849171	0.521956	1.237498	1.517161	8.545895	-0.110650
3	0.273317	2.065841	0.563104	1.957422	2.656082	8.236770	-0.016724
4	-0.027993	2.051730	0.252793	1.719124	2.635763	7.888581	-0.011906
5	-0.098838	2.289449	0.150939	1.401522	2.678372	7.545743	-0.113551
6	-0.172611	2.548989	0.027824	1.185768	2.659013	7.191417	-0.037458
7	-0.164625	2.771820	-0.055863	0.955115	2.589405	6.924531	0.053258
8	-0.177461	2.952570	-0.125649	0.773248	2.561967	6.685421	0.008516
9	-0.180808	3.101212	-0.174668	0.614184	2.486255	6.508739	-0.057276
10	-0.167998	3.206453	-0.207202	0.481850	2.416562	6.394109	-0.004316

Response of AGRIC:

Period	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.010881	0.003474	0.013292	-0.013623	-0.000582	0.040467	0.074866
2	0.011926	-0.005597	0.014462	0.004235	0.018988	0.045417	0.066469
3	0.007707	-0.007005	0.007954	0.016940	0.021395	0.046539	-0.003280
4	0.006539	-0.014595	0.007741	0.015924	0.004987	0.060676	0.005687
5	0.014748	-0.024118	0.016597	0.017960	0.010292	0.075248	0.066659
6	0.014777	-0.027912	0.020215	0.029473	0.028435	0.074795	0.056226
7	0.007261	-0.027392	0.014552	0.035785	0.026999	0.071710	0.001681
8	0.006838	-0.030149	0.013017	0.032365	0.013693	0.079184	0.012499
9	0.013085	-0.035065	0.019167	0.032064	0.017883	0.086910	0.060717
10	0.012714	-0.035833	0.021104	0.039011	0.031580	0.083678	0.049406

Cholesky Ordering: MPR LENDR PSC M1 M2 INF AGRIC

APPENDIX DII: IMPULSE RESPONSE MANUFACTURING MODEL

Response of MPR: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	1.858022	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.990828	-0.128221	0.235709	-0.381600	-0.290310	0.081027	0.037065
3	2.031588	-0.076191	0.265777	-0.401785	-0.281042	0.033606	0.172050
4	2.040905	-0.075278	0.261155	-0.447018	-0.236593	0.040379	0.103343
5	2.045459	-0.082411	0.253430	-0.423071	-0.272173	0.029749	0.096695
6	2.048105	-0.082978	0.257978	-0.427137	-0.265273	0.034040	0.099316
7	2.047111	-0.082197	0.258624	-0.427537	-0.268319	0.033392	0.104520
8	2.047182	-0.081729	0.258474	-0.428868	-0.265264	0.033640	0.102737
9	2.047181	-0.082014	0.258093	-0.428084	-0.266615	0.033298	0.102307
10	2.047279	-0.082043	0.258216	-0.428133	-0.266354	0.033426	0.102334

Response of LENDR: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	-0.202874	2.385086	0.000000	0.000000	0.000000	0.000000	0.000000
2	-0.140211	2.388126	-0.106236	0.096117	-0.483455	-0.013728	-0.330741
3	-0.091900	2.366160	-0.080747	0.145040	-0.471852	-0.002633	-0.347644
4	-0.097051	2.367662	-0.059716	0.134070	-0.506151	0.004518	-0.276701
5	-0.099367	2.377105	-0.057183	0.115467	-0.474156	0.006678	-0.276139
6	-0.099875	2.375621	-0.062356	0.119619	-0.480536	0.003295	-0.286478
7	-0.098650	2.374373	-0.062444	0.121672	-0.481193	0.003602	-0.288615
8	-0.098740	2.374329	-0.061742	0.121724	-0.482435	0.003832	-0.286195
9	-0.098853	2.374659	-0.061562	0.121019	-0.481395	0.003971	-0.285906
10	-0.098891	2.374647	-0.061732	0.121102	-0.481517	0.003856	-0.286231

Response of PSC: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.004178	-0.098283	0.690722	0.000000	0.000000	0.000000	0.000000
2	0.002849	-0.112148	0.685762	-5.42E-05	0.094454	0.003694	-0.024309
3	-0.002865	-0.123430	0.675167	0.012886	0.082936	0.001225	-0.051110
4	-0.002230	-0.125208	0.676196	0.019252	0.079084	0.001820	-0.045868
5	-0.003074	-0.124353	0.677893	0.016807	0.080834	0.003061	-0.041371
6	-0.003481	-0.123825	0.677588	0.016171	0.081910	0.002828	-0.041668
7	-0.003425	-0.123975	0.677249	0.016466	0.081823	0.002697	-0.042663
8	-0.003368	-0.124082	0.677263	0.016685	0.081528	0.002698	-0.042613
9	-0.003375	-0.124058	0.677333	0.016619	0.081580	0.002739	-0.042443
10	-0.003389	-0.124038	0.677331	0.016585	0.081615	0.002736	-0.042433

Response of M1: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.008569	-0.002451	0.011540	0.075257	0.000000	0.000000	0.000000
2	0.001643	-0.005950	0.020856	0.066785	0.001994	0.011595	0.017387
3	-0.001707	-0.002280	0.021051	0.065031	0.007017	0.010569	0.024990
4	-0.002117	-0.002199	0.019533	0.064163	0.009932	0.010527	0.019724
5	-0.001947	-0.002850	0.018977	0.065948	0.007755	0.010076	0.018994
6	-0.001860	-0.002870	0.019325	0.065786	0.008024	0.010358	0.019559
7	-0.001950	-0.002775	0.019385	0.065652	0.008021	0.010350	0.019894
8	-0.001955	-0.002750	0.019347	0.065595	0.008175	0.010345	0.019742
9	-0.001949	-0.002774	0.019321	0.065652	0.008095	0.010327	0.019698
10	-0.001944	-0.002777	0.019332	0.065652	0.008101	0.010335	0.019712

Response of M2: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.007151	-0.003949	0.010602	0.052599	0.035734	0.000000	0.000000
2	8.26E-06	-0.008594	0.015052	0.048161	0.030500	0.007529	0.009939
3	-0.002028	-0.005935	0.015247	0.047514	0.035945	0.006977	0.014931
4	-0.002499	-0.005970	0.014258	0.046970	0.037167	0.006981	0.011842
5	-0.002388	-0.006323	0.013913	0.048051	0.036095	0.006713	0.011338
6	-0.002347	-0.006353	0.014109	0.047981	0.036170	0.006875	0.011673
7	-0.002398	-0.006293	0.014150	0.047896	0.036193	0.006876	0.011880
8	-0.002403	-0.006278	0.014127	0.047862	0.036279	0.006872	0.011794
9	-0.002399	-0.006291	0.014112	0.047895	0.036236	0.006861	0.011765
10	-0.002396	-0.006293	0.014118	0.047896	0.036237	0.006866	0.011773

Response of INF: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	1.118676	1.398791	0.088450	0.713571	-0.069036	8.517745	0.000000
2	-0.563846	1.300477	0.183936	1.418111	1.011198	8.584025	0.510508
3	-0.866553	1.357099	-0.023717	1.623323	1.335842	8.622816	0.462149
4	-0.931300	1.329533	-0.085497	1.708125	1.348068	8.633272	0.355260
5	-0.942534	1.321701	-0.086585	1.744481	1.324104	8.637276	0.382716
6	-0.948076	1.326285	-0.080234	1.734667	1.339143	8.643763	0.400127
7	-0.950635	1.328158	-0.082159	1.733286	1.341547	8.642523	0.399100
8	-0.950410	1.327601	-0.083493	1.734409	1.342104	8.642190	0.394820
9	-0.950262	1.327136	-0.083470	1.735426	1.340540	8.642148	0.395208
10	-0.950283	1.327260	-0.083166	1.735092	1.340940	8.642348	0.395864

Response of MAN: Period	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.051516	-0.007741	0.074243	0.081161	-0.414894	0.012674	0.583207
2	0.051010	-0.043070	0.012382	-0.085226	0.200167	0.077106	-0.033198
3	0.044830	-0.112577	-0.042774	0.132731	-0.165873	0.008411	0.010406

4	0.056648	-0.101510	-0.000897	0.077299	-0.049163	0.050851	0.042110
5	0.044576	-0.096399	-0.003512	0.079366	-0.083292	0.041172	0.072871
6	0.046544	-0.094065	-0.005548	0.071438	-0.057140	0.043574	0.053414
7	0.046361	-0.096762	-0.007939	0.078619	-0.070928	0.040971	0.052966
8	0.047028	-0.096526	-0.006550	0.077197	-0.067175	0.042320	0.053830
9	0.046629	-0.096372	-0.006517	0.077200	-0.068451	0.042063	0.055154
10	0.046679	-0.096246	-0.006563	0.076855	-0.067467	0.042149	0.054567

Cholesky Ordering: MPR LENDR PSC M1 M2 INF MAN

APPENDIX DIII: IMPULSE RESPONSE SERVICES MODEL

Response of SERV: Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.099275	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	(0.00679)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.072780	-0.002043	-0.006787	0.003828	0.022641	-0.006081	-0.003899
	(0.00817)	(0.00616)	(0.00660)	(0.00402)	(0.00530)	(0.00250)	(0.00486)
3	0.057700	-0.001735	-0.009350	0.006162	0.035799	-0.009797	-0.005106
	(0.00967)	(0.00930)	(0.00968)	(0.00650)	(0.00738)	(0.00399)	(0.00757)
4	0.048954	-0.000273	-0.009654	0.007746	0.043592	-0.012070	-0.004922
	(0.01037)	(0.01114)	(0.01134)	(0.00824)	(0.00839)	(0.00508)	(0.00938)
5	0.043727	0.001706	-0.008786	0.008980	0.048305	-0.013420	-0.004061
	(0.01083)	(0.01242)	(0.01245)	(0.00964)	(0.00909)	(0.00602)	(0.01082)
6	0.040466	0.003869	-0.007340	0.010076	0.051210	-0.014148	-0.002911
	(0.01127)	(0.01343)	(0.01333)	(0.01086)	(0.00970)	(0.00691)	(0.01207)
7	0.038309	0.006049	-0.005643	0.011144	0.053020	-0.014431	-0.001680
	(0.01169)	(0.01430)	(0.01407)	(0.01200)	(0.01025)	(0.00777)	(0.01319)
8	0.036780	0.008164	-0.003866	0.012237	0.054136	-0.014378	-0.000480
	(0.01209)	(0.01506)	(0.01472)	(0.01307)	(0.01075)	(0.00860)	(0.01421)
9	0.035615	0.010181	-0.002102	0.013380	0.054789	-0.014059	0.000635
	(0.01248)	(0.01572)	(0.01528)	(0.01409)	(0.01121)	(0.00941)	(0.01512)
10	0.034666	0.012091	-0.000395	0.014580	0.055113	-0.013519	0.001638
	(0.01285)	(0.01631)	(0.01577)	(0.01506)	(0.01162)	(0.01020)	(0.01594)

Response of MPR: Period	SERV	MPR	LENDR	PSC	M1	M2	INF

1	-0.209988	1.809953	0.000000	0.000000	0.000000	0.000000	0.000000
	(0.17556)	(0.12373)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	-0.130650	1.494385	0.235673	0.071700	-0.038378	0.015807	-0.012969
	(0.18364)	(0.14768)	(0.11440)	(0.06080)	(0.09227)	(0.04474)	(0.08902)
3	-0.092063	1.252941	0.374042	0.135532	-0.058157	0.035844	-0.020116
	(0.20023)	(0.18888)	(0.17476)	(0.10395)	(0.13305)	(0.07498)	(0.14545)
4	-0.074231	1.067352	0.450027	0.191015	-0.070955	0.059207	-0.022998
	(0.20363)	(0.21604)	(0.20552)	(0.13580)	(0.15050)	(0.09689)	(0.18214)
5	-0.066637	0.923693	0.486331	0.238580	-0.082056	0.084722	-0.023262
	(0.20032)	(0.23131)	(0.22025)	(0.16008)	(0.15790)	(0.11372)	(0.20634)
6	-0.063845	0.811510	0.497766	0.279018	-0.093578	0.111293	-0.022263
	(0.19528)	(0.23889)	(0.22643)	(0.17912)	(0.16115)	(0.12727)	(0.22235)
7	-0.063116	0.723020	0.494006	0.313219	-0.106132	0.138028	-0.020986
	(0.19072)	(0.24189)	(0.22815)	(0.19443)	(0.16272)	(0.13859)	(0.23282)
8	-0.063119	0.652458	0.481348	0.342040	-0.119656	0.164257	-0.020072
	(0.18732)	(0.24229)	(0.22767)	(0.20706)	(0.16358)	(0.14831)	(0.23944)
9	-0.063249	0.595553	0.463871	0.366259	-0.133844	0.189509	-0.019886
	(0.18510)	(0.24137)	(0.22618)	(0.21775)	(0.16414)	(0.15686)	(0.24339)
10	-0.063261	0.549144	0.444184	0.386554	-0.148336	0.213472	-0.020596
	(0.18386)	(0.23990)	(0.22438)	(0.22702)	(0.16459)	(0.16453)	(0.24550)

Response of LENDR:

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.126763	-0.014653	2.249429	0.000000	0.000000	0.000000	0.000000
	(0.21764)	(0.21746)	(0.15377)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	-0.077373	0.135036	1.704695	0.074839	0.066929	0.086046	0.030327
	(0.21486)	(0.20956)	(0.18239)	(0.07572)	(0.11445)	(0.05568)	(0.11009)
3	-0.175765	0.237788	1.325742	0.130494	0.068839	0.165367	0.052418
	(0.22456)	(0.23355)	(0.22342)	(0.12406)	(0.15722)	(0.08956)	(0.17204)
4	-0.218234	0.304842	1.057621	0.174262	0.040912	0.235290	0.064615
	(0.21841)	(0.24802)	(0.24046)	(0.15603)	(0.16991)	(0.11155)	(0.20665)
5	-0.231675	0.345856	0.864720	0.210187	0.001257	0.295498	0.067866
	(0.20649)	(0.25221)	(0.24311)	(0.17795)	(0.17151)	(0.12680)	(0.22547)
6	-0.230497	0.368505	0.723626	0.240559	-0.041099	0.346680	0.063996
	(0.19553)	(0.25053)	(0.23945)	(0.19361)	(0.16999)	(0.13811)	(0.23516)
7	-0.222338	0.378606	0.618735	0.266728	-0.081888	0.389875	0.054920
	(0.18785)	(0.24646)	(0.23399)	(0.20542)	(0.16830)	(0.14711)	(0.23963)
8	-0.211184	0.380421	0.539504	0.289530	-0.119299	0.426166	0.042325
	(0.18350)	(0.24211)	(0.22893)	(0.21488)	(0.16728)	(0.15474)	(0.24130)
9	-0.199066	0.376997	0.478722	0.309528	-0.152741	0.456549	0.027575
	(0.18171)	(0.23854)	(0.22511)	(0.22300)	(0.16706)	(0.16157)	(0.24163)
10	-0.186984	0.370460	0.431396	0.327127	-0.182213	0.481894	0.011712
	(0.18166)	(0.23621)	(0.22273)	(0.23039)	(0.16754)	(0.16794)	(0.24150)

Response of PSC:

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.131214	0.010743	-0.094684	0.657067	0.000000	0.000000	0.000000
	(0.06481)	(0.06418)	(0.06385)	(0.04492)	(0.00000)	(0.00000)	(0.00000)
2	0.156384	0.055972	-0.047623	0.620065	-0.026800	0.005240	0.005832

	(0.07380)	(0.07159)	(0.07329)	(0.04804)	(0.03431)	(0.01662)	(0.03307)
3	0.164561	0.090720	-0.010794	0.589611	-0.040164	0.008977	0.008102
	(0.08571)	(0.08711)	(0.08959)	(0.05768)	(0.05354)	(0.02983)	(0.05799)
4	0.163672	0.118085	0.018974	0.563962	-0.046531	0.012457	0.008652
	(0.09303)	(0.10099)	(0.10266)	(0.06892)	(0.06510)	(0.04093)	(0.07740)
5	0.158088	0.140036	0.043585	0.541996	-0.049437	0.016293	0.008424
	(0.09721)	(0.11187)	(0.11209)	(0.07998)	(0.07271)	(0.05060)	(0.09282)
6	0.150215	0.157871	0.064234	0.522958	-0.050808	0.020756	0.007874
	(0.09980)	(0.12011)	(0.11878)	(0.09033)	(0.07821)	(0.05922)	(0.10522)
7	0.141369	0.172480	0.081712	0.506311	-0.051679	0.025928	0.007203
	(0.10172)	(0.12634)	(0.12358)	(0.09989)	(0.08250)	(0.06704)	(0.11526)
8	0.132261	0.184499	0.096576	0.491659	-0.052588	0.031796	0.006484
	(0.10340)	(0.13109)	(0.12709)	(0.10868)	(0.08603)	(0.07421)	(0.12341)
9	0.123271	0.194400	0.109243	0.478697	-0.053798	0.038296	0.005726
	(0.10503)	(0.13476)	(0.12971)	(0.11680)	(0.08903)	(0.08086)	(0.13005)
10	0.114594	0.202549	0.120038	0.467179	-0.055422	0.045343	0.004911
	(0.10668)	(0.13768)	(0.13174)	(0.12433)	(0.09164)	(0.08705)	(0.13546)

Response of M1:

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.005836	0.013096	-0.004808	0.007209	0.076768	0.000000	0.000000
	(0.00759)	(0.00752)	(0.00746)	(0.00744)	(0.00525)	(0.00000)	(0.00000)
2	0.015090	0.016204	0.000235	0.008369	0.068605	0.002613	0.002041
	(0.00842)	(0.00813)	(0.00828)	(0.00716)	(0.00616)	(0.00195)	(0.00384)
3	0.020248	0.018426	0.003550	0.010108	0.063681	0.004575	0.003057
	(0.00972)	(0.00982)	(0.01005)	(0.00779)	(0.00750)	(0.00343)	(0.00662)
4	0.023136	0.020183	0.005884	0.012150	0.060533	0.006196	0.003507
	(0.01059)	(0.01142)	(0.01155)	(0.00879)	(0.00849)	(0.00468)	(0.00880)
5	0.024763	0.021701	0.007659	0.014346	0.058354	0.007645	0.003644
	(0.01120)	(0.01275)	(0.01273)	(0.00992)	(0.00924)	(0.00580)	(0.01059)
6	0.025688	0.023098	0.009115	0.016613	0.056699	0.009014	0.003604
	(0.01168)	(0.01387)	(0.01369)	(0.01108)	(0.00988)	(0.00684)	(0.01212)
7	0.026218	0.024435	0.010385	0.018908	0.055324	0.010354	0.003464
	(0.01212)	(0.01481)	(0.01448)	(0.01223)	(0.01044)	(0.00783)	(0.01344)
8	0.026524	0.025744	0.011548	0.021207	0.054095	0.011691	0.003264
	(0.01256)	(0.01563)	(0.01517)	(0.01335)	(0.01097)	(0.00876)	(0.01460)
9	0.026700	0.027039	0.012648	0.023498	0.052937	0.013039	0.003026
	(0.01300)	(0.01636)	(0.01578)	(0.01444)	(0.01146)	(0.00967)	(0.01563)
10	0.026800	0.028327	0.013709	0.025774	0.051812	0.014404	0.002762
	(0.01345)	(0.01703)	(0.01633)	(0.01550)	(0.01192)	(0.01054)	(0.01655)

Response of M2:

Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.008599	0.012173	-0.003616	0.006989	0.052857	0.035133	0.000000
	(0.00632)	(0.00624)	(0.00618)	(0.00615)	(0.00496)	(0.00240)	(0.00000)
2	0.013088	0.014517	-0.000123	0.009044	0.049101	0.035911	-0.000574
	(0.00735)	(0.00710)	(0.00721)	(0.00630)	(0.00586)	(0.00294)	(0.00321)
3	0.015895	0.016543	0.002520	0.011333	0.046694	0.036442	-0.001317
	(0.00871)	(0.00878)	(0.00897)	(0.00706)	(0.00711)	(0.00386)	(0.00573)

4	0.017748	0.018398	0.004653	0.013746	0.045043	0.036855	-0.002086
	(0.00970)	(0.01040)	(0.01052)	(0.00809)	(0.00810)	(0.00483)	(0.00781)
5	0.019050	0.020159	0.006470	0.016219	0.043821	0.037220	-0.002813
	(0.01044)	(0.01179)	(0.01180)	(0.00922)	(0.00890)	(0.00580)	(0.00958)
6	0.020026	0.021865	0.008088	0.018719	0.042840	0.037579	-0.003470
	(0.01105)	(0.01300)	(0.01286)	(0.01039)	(0.00959)	(0.00674)	(0.01114)
7	0.020799	0.023535	0.009577	0.021226	0.041997	0.037954	-0.004051
	(0.01162)	(0.01406)	(0.01378)	(0.01156)	(0.01022)	(0.00767)	(0.01252)
8	0.021440	0.025179	0.010978	0.023728	0.041231	0.038359	-0.004558
	(0.01218)	(0.01502)	(0.01461)	(0.01272)	(0.01082)	(0.00859)	(0.01377)
9	0.021990	0.026800	0.012317	0.026219	0.040507	0.038802	-0.004999
	(0.01275)	(0.01589)	(0.01537)	(0.01388)	(0.01139)	(0.00949)	(0.01492)
10	0.022470	0.028401	0.013611	0.028697	0.039803	0.039288	-0.005383
	(0.01332)	(0.01672)	(0.01608)	(0.01502)	(0.01195)	(0.01038)	(0.01598)

Response of INF: Period	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.684528	0.700907	0.522762	0.138113	1.187252	-0.483652	8.116890
	(0.80038)	(0.79757)	(0.79533)	(0.79447)	(0.79026)	(0.78539)	(0.55486)
2	-0.471336	0.381104	0.208420	0.269270	1.622289	-0.272548	6.793487
	(0.84416)	(0.82578)	(0.84965)	(0.72984)	(0.78769)	(0.68781)	(0.61629)
3	-1.056906	0.214746	0.071904	0.325021	1.661379	-0.016476	5.741216
	(0.91804)	(0.94794)	(0.97910)	(0.74722)	(0.83234)	(0.65258)	(0.77351)
4	-1.330371	0.132196	0.025476	0.342955	1.506087	0.244714	4.877292
	(0.92547)	(1.03444)	(1.05316)	(0.79268)	(0.84342)	(0.64824)	(0.90087)
5	-1.434390	0.094845	0.022440	0.343205	1.265299	0.491138	4.151350
	(0.89353)	(1.07456)	(1.07508)	(0.84096)	(0.82990)	(0.65742)	(0.98570)
6	-1.447710	0.081358	0.038368	0.336345	0.996879	0.713756	3.531545
	(0.84577)	(1.07802)	(1.06134)	(0.88194)	(0.80365)	(0.67076)	(1.03326)
7	-1.413721	0.080020	0.060834	0.327746	0.730694	0.909343	2.996774
	(0.79548)	(1.05599)	(1.02566)	(0.91249)	(0.77178)	(0.68366)	(1.05095)
8	-1.356253	0.084466	0.083808	0.319971	0.481333	1.077720	2.532305
	(0.74915)	(1.01786)	(0.97800)	(0.93258)	(0.73817)	(0.69414)	(1.04572)
9	-1.288324	0.091301	0.104616	0.314095	0.255132	1.220230	2.127299
	(0.70929)	(0.97098)	(0.92528)	(0.94349)	(0.70493)	(0.70160)	(1.02365)
10	-1.216975	0.098774	0.122299	0.310424	0.054034	1.338912	1.773388
	(0.67618)	(0.92083)	(0.87220)	(0.94694)	(0.67328)	(0.70611)	(0.98993)

Cholesky Ordering: SERV MPR LENDR PSC M1 M2 INF
Standard Errors: Analytic

APPENDIX EI: VARIANCE DECOMPOSITION OF AGRIC MODEL

Variance Decomposition of MPR:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	1.880298	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.733481	94.82667	0.273457	0.755875	2.131050	1.701758	0.243164	0.068025
3	3.510815	89.17253	0.185599	2.490947	4.674873	2.859408	0.525052	0.091590
4	4.162986	86.40511	0.141998	3.233904	5.790642	3.845190	0.479246	0.103915
5	4.768412	84.21403	0.168601	3.603881	6.686141	4.822204	0.400844	0.104301
6	5.318938	82.50107	0.220274	3.864867	7.491562	5.469759	0.329267	0.123201
7	5.831338	81.09824	0.286118	4.058949	8.176477	5.962626	0.274234	0.143358
8	6.307574	79.98931	0.356903	4.166597	8.747675	6.359133	0.235281	0.145096
9	6.756613	79.03926	0.427408	4.231851	9.240958	6.709559	0.208005	0.142961
10	7.182907	78.23248	0.491022	4.278164	9.664154	6.995698	0.188131	0.150348

Variance Decomposition of LENDR:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	2.456038	0.641777	99.35822	0.000000	0.000000	0.000000	0.000000	0.000000
2	3.489475	0.379358	97.61085	0.104881	0.050990	1.759948	0.022345	0.071626
3	4.222670	0.308831	97.76087	0.139572	0.034833	1.479455	0.077947	0.198487
4	4.788128	0.326434	97.24151	0.111927	0.035933	1.703505	0.377188	0.203505
5	5.262630	0.395142	96.37574	0.097549	0.090079	1.792764	1.047807	0.200919
6	5.683678	0.447705	95.22161	0.105626	0.244772	1.867595	1.863496	0.249197
7	6.064574	0.493205	93.89880	0.124021	0.480638	1.882560	2.825926	0.294852
8	6.414362	0.532921	92.50521	0.156479	0.768285	1.879067	3.860126	0.297910
9	6.741043	0.565705	91.12166	0.192245	1.104916	1.833710	4.882343	0.299417
10	7.051197	0.585480	89.77882	0.225439	1.463329	1.781062	5.838619	0.327255

Variance Decomposition of PSC:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.697602	0.137798	1.895225	97.96698	0.000000	0.000000	0.000000	0.000000
2	1.004460	0.293486	3.138003	95.80743	0.083236	0.031882	0.134533	0.511428
3	1.241419	0.235006	3.304144	94.36786	0.180921	1.380030	0.123638	0.408401
4	1.431905	0.214474	3.259024	94.25550	0.262697	1.580552	0.108102	0.319650

5	1.618137	0.200811	3.136051	94.03912	0.254954	1.885167	0.093676	0.390221
6	1.782736	0.184074	3.082598	93.92812	0.256386	1.956881	0.083024	0.508922
7	1.931492	0.178297	3.009834	93.95614	0.260239	2.058532	0.070965	0.465991
8	2.068067	0.177091	2.946334	93.95550	0.255602	2.183467	0.062112	0.419892
9	2.198805	0.170547	2.895924	93.87750	0.243947	2.304882	0.056059	0.451146
10	2.322609	0.162965	2.855846	93.84597	0.237433	2.349612	0.050814	0.497361

Variance Decomposition of M1:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.079114	1.808388	0.073485	3.081505	95.03662	0.000000	0.000000	0.000000
2	0.108936	0.981316	0.196489	5.428121	92.16592	0.359105	0.807651	0.061401
3	0.135705	0.736003	0.580107	8.157347	88.31255	0.973007	0.647488	0.593496
4	0.158201	0.616779	0.626902	8.585695	87.48554	1.555212	0.479828	0.650046
5	0.176569	0.631978	0.578114	8.573424	87.60466	1.675599	0.412009	0.524220
6	0.192142	0.657039	0.514130	8.594964	87.58378	1.746940	0.404963	0.498185
7	0.206280	0.661727	0.455195	8.679548	87.25220	1.822031	0.442873	0.686425
8	0.219259	0.672841	0.403479	8.692773	87.03865	1.938468	0.545967	0.707825
9	0.231008	0.703258	0.364832	8.657479	86.96414	1.975167	0.690716	0.644409
10	0.241713	0.722485	0.336707	8.651046	86.88198	1.955783	0.816195	0.635802

Variance Decomposition of M2:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.067120	1.587914	0.389047	3.630066	69.74496	24.64801	0.000000	0.000000
2	0.091601	0.853750	0.925641	5.792303	67.77283	24.00563	0.464550	0.185294
3	0.112969	0.703064	1.542797	6.325903	65.69395	25.21022	0.401777	0.122287
4	0.130985	0.627603	1.574319	6.316627	64.85941	26.16839	0.298928	0.154719
5	0.146414	0.649515	1.466115	6.079353	64.21467	27.17458	0.291172	0.124596
6	0.159534	0.716243	1.316931	5.872235	63.63004	27.94354	0.395915	0.125101
7	0.170842	0.767544	1.183685	5.723754	63.14162	28.52220	0.550664	0.110530
8	0.181205	0.794685	1.065450	5.612686	62.56667	29.08920	0.746305	0.125002
9	0.190911	0.825259	0.962210	5.496388	61.99183	29.61428	0.996959	0.113071
10	0.199774	0.861770	0.878733	5.386874	61.52972	29.97105	1.262931	0.108917

Variance Decomposition of INF:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	8.895848	1.989329	3.158891	0.248800	0.290391	2.72E-05	94.31256	0.000000
2	12.64378	1.084454	3.702656	0.293578	1.101682	1.439838	92.37013	0.007659
3	15.59665	0.743402	4.187759	0.323288	2.299108	3.846396	88.59490	0.005148
4	17.87910	0.565956	4.503675	0.266006	2.674102	5.100325	86.88597	0.003962
5	19.77437	0.465166	5.022212	0.223285	2.688408	6.004081	85.59031	0.006536
6	21.39504	0.403872	5.709581	0.190908	2.603706	6.673510	84.41253	0.005890

7	22.82608	0.360020	6.490692	0.168320	2.462554	7.149847	83.36285	0.005719
8	24.11745	0.327912	7.312991	0.153491	2.308695	7.533123	82.35865	0.005136
9	25.30332	0.303003	8.145724	0.144206	2.156285	7.809039	81.43657	0.005178
10	26.41149	0.282155	8.950392	0.138514	2.012418	8.004645	80.60712	0.004755

Variance Decomposition of AGRIC:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	AGRIC
1	0.087952	1.530435	0.156027	2.283781	2.399048	0.004374	21.16983	72.45651
2	0.122383	1.739997	0.289742	2.575979	1.358817	2.409552	24.70570	66.92021
3	0.134427	1.770851	0.511690	2.485143	2.714166	4.530098	32.46276	55.52529
4	0.149595	1.621026	1.365041	2.274467	3.324825	3.769131	42.66483	44.98068
5	0.184357	1.707273	2.610304	2.308120	3.138255	2.793425	44.75197	42.69066
6	0.214071	1.742715	3.636041	2.603604	4.223094	3.836120	45.39806	38.56036
7	0.232370	1.576693	4.475547	2.601860	5.955707	4.605768	48.05291	32.73152
8	0.250564	1.430506	5.297016	2.507629	6.790605	4.259848	51.31484	28.39956
9	0.277738	1.386251	5.905160	2.517205	6.859632	3.881646	51.55672	27.89338
10	0.301648	1.352854	6.417259	2.623443	7.487788	4.386679	51.40265	26.32933

Cholesky Ordering: MPR LENDR PSC M1 M2 INF AGRIC

APPENDIX EII: VARIANCE DECOMPOSITION FOR MANUFACTURING MODEL

Variance Decomposition of MPR:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	1.858022	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.779475	95.98941	0.212811	0.719163	1.884917	1.090935	0.084983	0.017783
3	3.492910	94.61145	0.182336	1.034359	2.516715	1.338188	0.063069	0.253884
4	4.087505	94.01829	0.167064	1.163523	3.033779	1.312214	0.055814	0.249315
5	4.607159	93.71652	0.163498	1.218439	3.231255	1.381890	0.048102	0.240295
6	5.075227	93.51267	0.161463	1.262437	3.371038	1.411949	0.044137	0.236309
7	5.503550	93.35909	0.159615	1.294407	3.470221	1.438421	0.041216	0.237025
8	5.900803	93.24822	0.158030	1.317861	3.546937	1.453350	0.039103	0.236499

9	6.272933	93.16338	0.156931	1.335422	3.604301	1.466677	0.037419	0.235870
10	6.624219	93.09615	0.156067	1.349489	3.649883	1.476922	0.036102	0.235383

Variance Decomposition of LENDR:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	2.393699	0.718315	99.28169	0.000000	0.000000	0.000000	0.000000	0.000000
2	3.437504	0.514683	96.40629	0.095511	0.078184	1.977998	0.001595	0.925744
3	4.218371	0.389233	95.48090	0.100064	0.170137	2.564662	0.001098	1.293906
4	4.874855	0.331093	95.08551	0.089934	0.203037	2.998464	0.000908	1.291058
5	5.453663	0.297741	94.97187	0.082851	0.207053	3.151676	0.000875	1.287933
6	5.977222	0.275786	94.85922	0.079856	0.212420	3.270061	0.000759	1.301900
7	6.458182	0.259571	94.77332	0.077754	0.217453	3.356294	0.000681	1.314925
8	6.905693	0.247463	94.70944	0.075996	0.221253	3.423440	0.000627	1.321780
9	7.325934	0.238095	94.66231	0.074589	0.223886	3.473739	0.000586	1.326793
10	7.723362	0.230616	94.62407	0.073499	0.226023	3.514131	0.000552	1.331106

Variance Decomposition of PSC:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.697692	0.003587	1.984384	98.01203	0.000000	0.000000	0.000000	0.000000
2	0.989523	0.002612	2.270999	96.75350	3.00E-07	0.911142	0.001393	0.060352
3	1.208266	0.002314	2.566703	96.11691	0.011374	1.082252	0.001037	0.219411
4	1.393399	0.001996	2.737416	95.82276	0.027642	1.135900	0.000951	0.273339
5	1.557277	0.001988	2.829241	95.66559	0.033778	1.178844	0.001147	0.289415
6	1.705373	0.002074	2.886396	95.55843	0.037158	1.213684	0.001232	0.301031
7	1.841504	0.002125	2.928658	95.47794	0.039863	1.238302	0.001271	0.311843
8	1.968243	0.002153	2.961072	95.41800	0.042080	1.255541	0.001300	0.319849
9	2.087319	0.002176	2.986108	95.37176	0.043755	1.269130	0.001329	0.325744
10	2.199959	0.002196	3.006046	95.33477	0.045072	1.280125	0.001351	0.330445

Variance Decomposition of M1:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.076657	1.249600	0.102245	2.266315	96.38184	0.000000	0.000000	0.000000
2	0.106067	0.676693	0.368051	5.050121	89.98763	0.035338	1.194986	2.687183
3	0.129290	0.472865	0.278807	6.049883	85.86291	0.318375	1.472559	5.544602
4	0.147723	0.382750	0.235734	6.382653	84.63714	0.695931	1.635792	6.030000
5	0.164517	0.322605	0.220079	6.476683	84.30860	0.783301	1.694012	6.194724
6	0.179814	0.280751	0.209711	6.576660	83.95946	0.854826	1.749851	6.368742
7	0.193901	0.251553	0.200834	6.655181	83.66683	0.906229	1.789755	6.529619
8	0.207002	0.229638	0.193871	6.712969	83.45336	0.951127	1.820139	6.638893

9	0.219328	0.212448	0.188689	6.755664	83.29655	0.983459	1.842975	6.720216
10	0.231001	0.198600	0.184552	6.790547	83.16873	1.009575	1.861591	6.786407

Variance Decomposition of M2:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.064982	1.210905	0.369365	2.661776	65.51781	30.24015	0.000000	0.000000
2	0.089041	0.644936	1.128365	4.275458	64.15111	27.83911	0.714958	1.246066
3	0.109642	0.459570	1.037217	4.753562	61.08871	29.10817	0.876443	2.676333
4	0.126662	0.383281	0.999367	4.829144	59.52661	30.42160	0.960547	2.879446
5	0.141661	0.334820	0.998147	4.825243	59.09405	30.81273	0.992452	2.942560
6	0.155263	0.301564	0.998349	4.842517	58.74313	31.07735	1.022269	3.014822
7	0.167764	0.278721	0.995820	4.859165	58.46605	31.27293	1.043597	3.083713
8	0.179395	0.261688	0.993329	4.869617	58.24831	31.43867	1.059400	3.128988
9	0.190314	0.248411	0.991895	4.876688	58.08956	31.55978	1.071304	3.162364
10	0.200642	0.237755	0.990800	4.882672	57.96199	31.65635	1.080960	3.189476

Variance Decomposition of INF:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	8.733945	1.640542	2.564986	0.010256	0.667503	0.006248	95.11046	0.000000
2	12.46212	1.010504	2.348844	0.026822	1.622762	0.661466	94.16179	0.167812
3	15.39103	0.979498	2.317412	0.017822	2.176341	1.186978	93.12177	0.200183
4	17.85835	0.999493	2.275561	0.015530	2.531379	1.451473	92.53830	0.188263
5	20.02770	1.016173	2.244809	0.014217	2.771393	1.591163	92.17604	0.186204
6	21.98751	1.029022	2.226322	0.013127	2.921784	1.691094	91.93105	0.187606
7	23.78616	1.039009	2.214135	0.012410	3.027610	1.763110	91.75527	0.188459
8	25.45794	1.046401	2.204835	0.011909	3.107177	1.817076	91.62403	0.188572
9	27.02646	1.052092	2.197470	0.011521	3.169303	1.858309	91.52260	0.188702
10	28.50889	1.056630	2.191627	0.011205	3.218684	1.891311	91.44167	0.188869

Variance Decomposition of MAN:

Period	S.E.	MPR	LENDR	PSC	M1	M2	INF	MAN
1	0.726113	0.503348	0.011366	1.045438	1.249354	32.64870	0.030465	64.51133
2	0.765656	0.896550	0.326660	0.966395	2.362661	36.19817	1.041555	58.20800
3	0.805017	1.121136	2.251131	1.156524	4.855813	36.99053	0.953109	52.67176
4	0.821168	1.553359	3.691541	1.111596	5.552779	35.90815	1.299465	50.88311
5	0.840150	1.765470	4.843146	1.063683	6.197093	35.28681	1.481569	49.36223
6	0.854410	2.003775	5.894893	1.032689	6.691039	34.56597	1.692620	48.11902
7	0.870223	2.215441	6.918990	1.003822	7.266284	33.98551	1.853329	46.75663
8	0.885449	2.421997	7.871476	0.975068	7.778632	33.40227	2.018574	45.53198
9	0.900545	2.609579	8.755015	0.947889	8.254921	32.86959	2.169634	44.39337
10	0.915248	2.786524	9.581820	0.922820	8.696949	32.36538	2.312559	43.33395

Cholesky Ordering: MPR LENDR PSC M1 M2 INF MAN

APPENDIX EIII: VARIANCE DECOMPOSITION OF SERVICES MODEL

Variance Decomposition of SERV: Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.099275	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.125627	96.01013	0.026444	0.291857	0.092862	3.248051	0.234319	0.096334
3	0.143678	89.52838	0.034795	0.646590	0.254940	8.691249	0.644133	0.199917
4	0.158945	82.64235	0.028726	0.897286	0.445807	14.62360	1.102994	0.259237
5	0.172818	76.30831	0.034047	1.017458	0.647081	20.18259	1.536019	0.274493
6	0.185755	70.79482	0.072861	1.036824	0.854301	25.06943	1.909625	0.262140
7	0.197958	66.08078	0.157517	0.994187	1.069109	29.24747	2.212913	0.238024
8	0.209545	62.05554	0.292366	0.921323	1.295171	32.77687	2.445780	0.212952
9	0.220601	58.59802	0.476806	0.840375	1.536463	35.74244	2.612921	0.192971
10	0.231189	55.60196	0.707660	0.765453	1.796658	38.22652	2.721026	0.180719

Variance Decomposition of MPR: Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	1.822093	1.328156	98.67184	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.373363	1.085851	97.80328	0.986033	0.091267	0.026148	0.004436	0.002986
3	2.715610	0.944331	95.99213	2.650329	0.318797	0.065836	0.020810	0.007768
4	2.960975	0.857159	93.73641	4.539261	0.684318	0.112802	0.057487	0.012567
5	3.151652	0.801284	91.32699	6.387768	1.177068	0.167351	0.123004	0.016540
6	3.307990	0.764586	88.91673	8.062496	1.779876	0.231931	0.224842	0.019542
7	3.441285	0.740140	86.57619	9.510741	2.473090	0.309427	0.368638	0.021777
8	3.558443	0.723670	84.33108	10.72457	3.236843	0.402457	0.557837	0.023548
9	3.663979	0.712380	82.18495	11.71848	4.052302	0.513047	0.793683	0.025157
10	3.760988	0.704397	80.13190	12.51659	4.902323	0.642480	1.075434	0.026875

Variance

Decomposition of LENDR:

Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	2.253045	0.316551	0.004230	99.67922	0.000000	0.000000	0.000000	0.000000
2	2.832812	0.274840	0.229906	99.26592	0.069794	0.055820	0.092264	0.011461
3	3.149875	0.533666	0.755845	98.00229	0.228081	0.092910	0.350243	0.036963
4	3.357440	0.892222	1.489669	96.18236	0.470147	0.096626	0.799400	0.069573
5	3.511345	1.251046	2.332107	94.00031	0.788152	0.088354	1.439070	0.100964
6	3.636749	1.567959	3.200787	91.58850	1.172275	0.095137	2.250256	0.125086
7	3.746254	1.829870	4.037763	89.04020	1.611666	0.137437	3.203695	0.139371
8	3.846592	2.037068	4.807947	86.42271	2.095230	0.226548	4.266192	0.144302
9	3.941514	2.195208	5.494008	83.78542	2.612228	0.365939	5.404862	0.142330
10	4.033164	2.311513	6.090860	81.16489	3.152726	0.553609	6.589625	0.136778

Variance Decomposition of PSC:

Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.676783	3.758902	0.025195	1.957295	94.25861	0.000000	0.000000	0.000000
2	0.934426	4.772721	0.372021	1.286490	93.47947	0.082256	0.003145	0.003895
3	1.121597	5.465397	0.912444	0.902203	92.51812	0.185327	0.008590	0.007921
4	1.272604	5.899404	1.569747	0.723025	91.50315	0.277645	0.016254	0.010775
5	1.400915	6.141661	2.294576	0.693442	90.47723	0.353645	0.026940	0.012507
6	1.513518	6.246840	3.053856	0.774216	89.45411	0.415674	0.041887	0.013422
7	1.614587	6.255866	3.824671	0.936443	88.43893	0.467712	0.062596	0.013784
8	1.706839	6.198356	4.590836	1.158103	87.43476	0.513448	0.090715	0.013778
9	1.792140	6.095480	5.340876	1.422052	86.44428	0.555847	0.127948	0.013518
10	1.871828	5.962323	6.066727	1.714796	85.46991	0.597194	0.175966	0.013080

Variance Decomposition of M1:

Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.078575	0.551587	2.778042	0.374389	0.841717	95.45426	0.000000	0.000000
2	0.107014	2.285641	3.790443	0.202324	1.065399	92.56016	0.059640	0.036390
3	0.128070	4.095432	4.716446	0.218089	1.366762	89.35162	0.169259	0.082387
4	0.145746	5.682230	5.559506	0.331375	1.750313	86.24365	0.311404	0.121522
5	0.161454	6.982811	6.336895	0.495084	2.215805	83.34150	0.477948	0.149958
6	0.175866	8.018708	7.065763	0.685878	2.759905	80.63581	0.665550	0.168390
7	0.189364	8.833175	7.759431	0.892366	3.377529	78.08575	0.873046	0.178704
8	0.202192	9.468716	8.427187	1.108943	4.062685	75.64953	1.100135	0.182804
9	0.214521	9.960776	9.075050	1.332735	4.808954	73.29344	1.346758	0.182290
10	0.226477	10.33721	9.706613	1.562120	5.609757	70.99306	1.612810	0.178426

Variance

Decomposition of M2:

Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	0.065668	1.714693	3.436134	0.303292	1.132854	64.78930	28.62373	0.000000
2	0.092071	2.893045	4.234157	0.154466	1.541089	61.39971	29.77365	0.003890
3	0.112464	3.936586	5.001563	0.153752	2.048323	58.38902	30.45442	0.016330
4	0.130015	4.809045	5.744900	0.243106	2.650423	55.69191	30.82266	0.037965
5	0.145916	5.522523	6.469746	0.389613	3.339798	53.23376	30.97726	0.067304
6	0.160767	6.100963	7.179459	0.574072	4.107060	50.95406	30.98236	0.102034
7	0.174915	6.567781	7.875421	0.784722	4.942079	48.80914	30.88103	0.139828
8	0.188586	6.942582	8.557611	1.013914	5.834613	46.76928	30.70330	0.178704
9	0.201933	7.240957	9.225146	1.256339	6.774694	44.81487	30.47085	0.217146
10	0.215068	7.475163	9.876694	1.508081	7.752845	42.93335	30.19978	0.254079

Variance Decomposition of INF:

Period	S.E.	SERV	MPR	LENDR	PSC	M1	M2	INF
1	8.293346	0.681275	0.714268	0.397327	0.027734	2.049398	0.340099	95.78990
2	10.86833	0.584772	0.538866	0.268132	0.077533	3.421413	0.260921	94.84836
3	12.45458	1.165438	0.440074	0.207514	0.127144	4.384814	0.198865	93.47615
4	13.53286	1.953537	0.382281	0.176117	0.171913	4.952469	0.201136	92.16255
5	14.29682	2.756936	0.346919	0.158045	0.211659	5.220598	0.298228	91.00762
6	14.85231	3.504681	0.324454	0.147111	0.247406	5.287892	0.507283	89.98117
7	15.26593	4.174930	0.309858	0.140835	0.280273	5.234327	0.834987	89.02479
8	15.58237	4.764640	0.300339	0.138066	0.311171	5.119309	1.279767	88.08671
9	15.83248	5.277436	0.294251	0.138104	0.340774	4.984811	1.833651	87.13097
10	16.03777	5.719000	0.290559	0.140406	0.369571	4.859149	2.483982	86.13733

Cholesky Ordering: SERV MPR LENDR PSC M1 M2 INF

APPENDIX FI: OLS ESTIMATE FOR AGRIC MODEL

Dependent Variable: AGRIC
Method: Least Squares
Date: 11/24/14 Time: 17:18
Sample: 1986Q1 2012Q4
Included observations: 108

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.601996	0.504013	1.194406	0.2351
MPR	-0.000165	0.008634	-0.019112	0.9848
LENDR	-0.002772	0.007927	-0.349656	0.7273
PSC	0.031513	0.018946	1.663282	0.0994
M1	1.534910	0.399968	3.837584	0.0002
M2	-0.664645	0.399080	-1.665442	0.0989
INF	0.002183	0.001552	1.406887	0.1625

R-squared	0.977840	Mean dependent var	5.720222
Adjusted R-squared	0.976524	S.D. dependent var	1.760003
S.E. of regression	0.269666	Akaike info criterion	0.279354
Sum squared resid	7.344694	Schwarz criterion	0.453196
Log likelihood	-8.085098	Hannan-Quinn criter.	0.349840
F-statistic	742.8052	Durbin-Watson stat	0.640917
Prob(F-statistic)	0.000000		

APPENDIX FII: OLS ESTIMATE FOR MANUFACTURING MODEL

Dependent Variable: MAN
Method: Least Squares
Date: 11/24/14 Time: 17:31
Sample: 1986Q1 2012Q4
Included observations: 108

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.675172	1.431317	1.869029	0.0645
MPR	0.008511	0.024519	0.347124	0.7292
LENDR	-0.013788	0.022512	-0.612479	0.5416
PSC	-0.011705	0.053804	-0.217558	0.8282
M1	2.771391	1.135845	2.439938	0.0164
M2	-2.287977	1.133324	-2.018819	0.0462
INF	0.004649	0.004407	1.054870	0.2940

R-squared	0.616509	Mean dependent var	3.974226
Adjusted R-squared	0.593727	S.D. dependent var	1.201466
S.E. of regression	0.765808	Akaike info criterion	2.366850
Sum squared resid	59.23273	Schwarz criterion	2.540692
Log likelihood	-120.8099	Hannan-Quinn criter.	2.437336
F-statistic	27.06167	Durbin-Watson stat	2.459386
Prob(F-statistic)	0.000000		

APPENDIX FIII: OLS ESTIMATE FOR SERVICES MODEL

Dependent Variable: SERV
Method: Least Squares
Date: 11/24/14 Time: 17:40

Sample: 1986Q1 2012Q4
Included observations: 108

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.515907	0.251732	-6.021904	0.0000
MPR	-0.010254	0.004312	-2.377945	0.0193
LENDR	0.001922	0.003959	0.485440	0.6284
PSC	0.048988	0.009463	5.176893	0.0000
M1	0.262592	0.199766	1.314498	0.1917
M2	0.608852	0.199323	3.054604	0.0029
INF	-0.002381	0.000775	-3.071601	0.0027

R-squared	0.994768	Mean dependent var	4.434880
Adjusted R-squared	0.994457	S.D. dependent var	1.809050
S.E. of regression	0.134686	Akaike info criterion	-1.109120
Sum squared resid	1.832177	Schwarz criterion	-0.935278
Log likelihood	66.89247	Hannan-Quinn criter.	-1.038633
F-statistic	3200.438	Durbin-Watson stat	0.855772
Prob(F-statistic)	0.000000		