Applied Studies in Agribusiness and Commerce – APSTRACT
University of Debrecen, Faculty of Economics and Business, Debrecen
DOI: 10.19041/APSTRACT/2020/3-4/6

SCIENTIFIC PAPER

A DISAGGREGATED ANALYSIS OF MONETARY POLICY EFFECTS ON THE AGRICULTURAL SECTOR IN NIGERIA

Jonathan E. Ogbuabor[1], Onyinye I. Anthony-Orji[2], Charles O. Manasseh[3], Anthony Orji[4]

[1,2,4]Department of Economics, University of Nigeria, Nsukka, Nigeria
[3]Department of Banking and Finance, University of Nigeria, Enugu, Nigeria

jonathan.ogbuabor@unn.edu.ng | +23 48035077722
onyinye.anthony-orji@unn.edu.ng | +23 48030884157
charssille@gmail.com | +23 48036767885
anthony.orji@unn.edu.ng | +23 48038559299 (Corresponding Author)

Abstract: *This study provides a disaggregated analysis of the effects of monetary policy shocks on the agricultural sector in Nigeria from 1981Q1 to 2016Q4. The study utilized the generalized impulse responses and the normalized generalized forecast error variance decompositions from an underlying VAR model, which are order-invariant. The four monetary policy variables used in the study are interbank call rate, monetary policy rate, broad money supply and exchange rate; while the four agricultural sub-sectors investigated are crop production, forestry, fishing and livestock. The study also controlled for the general price level and other economic activities in the overall economy. The findings indicate that the aggregate agricultural sector and its various sub-sectors consistently responded negatively to unanticipated monetary tightening in most of the forecast horizon; while the immediate impact of monetary policy shocks is transmitted to the agricultural sector through the interest rate and money demand (credit) channels. The findings further indicate that apart from these two channels, the roles of monetary policy rate and exchange rate are non-negligible in the long-run. The role of money supply channel in spreading monetary policy shocks to the agricultural sector remained muted all through. The study concludes that the monetary authority should evolve interest rate, credit, and exchange rate policies that will promote the development of the agricultural sector in Nigeria.*

Keywords: *Disaggregated, Monetary Policy; Agricultural Sector; VAR Model; Nigeria*
(JEL code: *E52; N50; C22; N57*)

INTRODUCTION

Monetary policy is one of the macroeconomic management tools used to influence outcomes in the real sectors of an economy to their desired direction. It is expected to influence the real sectors of an economy through movements in interest rates which would alter the cost of capital and investment in these sectors. In fact, the extant literature indicates that monetary policy influences the economy through an array of channels, such as interest rates, credit and/or bank lending, asset prices through exchange rates, equity and housing prices channels (Mishkin, 2007; CBN, 2014). However, the main aims of monetary policy are the promotion of price stability, sustainable output and employment.

Recent investigations into the effect of monetary policy on the economy have generally focused on the sectoral effects of monetary policy since different sectors of the economy respond differently to monetary policy shocks (Moussir and Chatri, 2017). Such investigations have important policy implications for macroeconomic management since monetary authorities can then consider the effects of their actions on the various sectors of the economy. For example, the

tightening of monetary policy might be considered benign from the general perspective, whereas it can also be viewed as malignant for certain sectors of the economy. Thus, monetary policy is said to have strong distributional effects on the economy, and empirical evidence on how the various sectors react to monetary policy shocks is essential about how to stimulate growth.

Current empirical studies on the sectoral effects of monetary policy shocks in developing countries generally indicate that tight monetary policy negatively affects the agricultural sector, which is one of the key components of the real economy in Nigeria (CBN, 2014; Moussir and Chatri, 2017). Indeed, over the years, the agricultural sector has made great contributions to domestic production, employment and foreign exchange earnings in Nigeria (Oluwaseyi (2017). However, a trend analysis of its contributions to Nigeria's gross domestic product (GDP) has revealed a substantial variation and long-term decline since the early 1960s. Specifically, its contribution to GDP declined from 60% in the early 1960's to 23.11% in 2015. Its contribution to GDP further declined to 20.48% in 2016Q1. In addition, the real growth rate of the sector declined from 6.70% in 2012 to 3.72% in 2015. Its growth rate declined to 3.09% as at 2016Q1. This unsatisfactory situation has been largely attributed to unstable and often inappropriate economic policies, the relative neglect of the sector and the negative impact of oil boom (Orji, A., Ogbuabor, Anthony-Orji, and Alisigwe, 2020, Ogbuabor and Nwosu, 2017; National Bureau of Statistics, 2016). Thus, economic policies in Nigeria, such as the monetary policies of the Central Bank of Nigeria (CBN), cannot be said to be successful if they do not impact positively on the real sectors of the economy, especially the agricultural sector that employs and feeds the larger chunk of the country's population. The goal of this study is to provide a disaggregated analysis of the effects of monetary policy shocks on the agricultural sector in Nigeria . Agriculture is as old as man himself as it was the first occupation of mankind. Even with the evolvement of modern civilization, it still remains an essential part of the growth and development of any extant economy (Anthony-Orji, Orji, Ogbuabor & Ezealigo, 2020; Orji, Ogbuabor, Okeke & Anthony-Orji, 2019; Orji, Ogbuabor, and Umesiobi, 2014).

This study is relevant for several reasons. One, existing studies have generally neglected the disaggregated nature of the agricultural sector in Nigeria. To address this gap, this study specifically evaluated the effects of monetary policy on the four agricultural sub-sectors in Nigeria, namely: crop production, livestock, forestry and fishing. Two, an important methodological flaw in studies that have examined the sectoral effects of monetary policy in Nigeria, such as CBN (2014) and Nwosa and Saibu (2012), is the use of vector autoregressive (VAR) framework that is not order-invariant. To address this gap, this study used the generalized impulse response and the generalized forecast error variance decomposition framework advanced by Koop, Pesaran and Potter (1996) and Pesaran and Shin (1998), which was later extended by Diebold and Yilmaz (2014). Overall, this study will assist in strengthening the formulation and implementation of monetary policy in Nigeria, particularly as it affects the agricultural sector.

AN OVERVIEW OF THE EMPIRICAL LITERATURE

In the last two decades, several studies have been conducted to ascertain the sectoral effects of monetary policy, especially in the highly industrialized economies. One of the pioneer seminal papers in this regard is Bernanke and Gertler (1995), which used a vector autoregressive (VAR) model to document the responses of GDP and its components in the U.S. to monetary policy shocks. They find that during the period January 1965 to December 1993, the different components of final expenditures responded differently to monetary policy shocks. Following this study, a plethora of other studies also focused on the U.S. economy. Raddatz and Rigobon (2003) used quarterly data for the U.S. over the period 1955:1 – 2002:3 to examine the sectoral effects of monetary policy. They extended the Bernanke and Gertler (1995) methodology by advancing an identification strategy that allows the study of both the sectoral effects of monetary policy and the role that monetary policy plays in the transmission of sectoral shocks. The results also indicate significant differences in the sectoral responses to monetary policy. Jansen, Kishan and Vacaflores (2013) studied the impact of monetary policy on net sales of publicly traded firms in various sectors of the U.S. economy and find that monetary policy has a heterogeneous effect on firms in different industries. The study observed the strongest effect on firms in retail and wholesaling, while balance sheet characteristics, particularly size, influence the impact of policy.

At this point, it is easily seen that monetary policy influences different sectors of the economy in different ways. In what follows, we explore empirical studies from other economies across the globe in order to cross check the robustness of this fact. Otero (2017) investigated the impact of monetary policy on the industrial sectors in five Latin American countries using inflation targeting, namely: Brazil, Chile, Colombia, Mexico and Peru. Among others, the results indicate that the sub-sectors producing capital goods and durable consumer goods are more sensitive to monetary policy shocks. In the UK, Ganley and Salmon (1997) examined the disaggregated impacts of monetary policy on 24 industrial sub-sectors in order to establish the speed and magnitude of the reactions of firms in those sub-sectors to an unexpected monetary policy tightening. The results indicate that the sensitivity of output to changes in monetary conditions differs noticeably across industries. This is consistent with Darby and Phillips (2007), which established from impulse responses of VARs for disaggregated UK and Scottish data that some industrial sub-sectors are more interest sensitive compared to others.

Studies in Australia also obtained similar results with the ones above, which on the whole, supports the hypothesis of differential sectoral impacts of monetary policy. Lawson and Rees (2008) examined the effects of unexpected monetary

policy shocks on the Australian expenditure and production components of GDP from 1983 to 2007 using a structural vector autoregression (SVAR). The results indicate that dwelling investment, and machinery and equipment investment are the most interest-sensitive expenditure components of activity, while construction and retail trade are the most interest-sensitive production components of activity. In an earlier study of the sectoral output impacts of monetary policy in Australia using a structural vector autoregression (SVAR) model, Crawford (2007) also found that monetary policy shocks have uneven impacts across different sectors, with the construction and manufacturing sectors showing the most sizeable and rapid responses to monetary tightening, while the mining sector is not interest rate-sensitive.

Singh and Rao (2014) and Sengupta (2014) studied the sectoral effects of monetary policy in India. Singh and Rao (2014) examined the responses of both aggregate and sectoral output to monetary policy shock using reduced form vector auto regression (VAR) model and find that the impact of a monetary policy shock at the sectoral level is heterogeneous, with some sectors like mining and quarrying, manufacturing, construction and trade, hotel, transport and communications being more responsive to monetary tightening, suggesting the need for sector-specific monetary policy in India. Sengupta (2014) also used VAR model to find that the impact of a monetary policy shock at the sectoral level is heterogeneous and that sectors like manufacturing, mining and quarrying, construction and trade are the fastest to respond, with manufacturing being the most responsive. Just as before, Sengupta (2014) concluded that the heterogeneous sectoral responses suggest the need for a more sector-specific monetary policy in India.

In Europe, Pellényi (2012) used a structural factor model to find considerable heterogeneity in the sectoral responses to monetary policy shocks in Hungary, with sectors more dependent on external finance showing greater output responses, while healthier corporate balance sheets showed weaker price responses. In South Asia, Alam and Waheed (2006) studied the responses of both aggregate and sectoral production to monetary policy shocks using a standard VAR framework and find that some sectors are more sensitive to monetary tightening. Specifically, the results indicate that manufacturing, wholesale and retail trade, and finance and insurance sectors declined more in response to interest rate shocks, while agriculture, mining and quarrying, construction, and ownership of dwellings are less sensitive to interest rate changes. Llaudes (2007) examined the differential effects of monetary tightening on the tradable and non-tradable sectors in the OECD, and find that the behavior of these two sectors varies within the countries, with the tradable sector showing greater degree of responsiveness to monetary policy shocks than the non-tradable sector. This suggests that industrial structure may be an important component for the analysis of monetary policy.

At this point, it is obvious that empirical studies have established a fact, that monetary tightening generates differential sectoral effects. Some empirical studies focusing on African economies are also consistent with this fact. Nampewo, Munyambonera and Lwanga (2013) examined the sectoral effects of monetary policy in Uganda for the period 1999 to 2011 using a recursive VAR and find that agriculture, manufacturing and service sectors respond differently to monetary tightening, with a positive shock in exchange rates resulting in the growth of agriculture and service sectors as well as decline in the manufacturing sector. This suggests the need for a stable exchange rate regime, which favors all the productive sectors of the economy. Moussir and Chatri (2017) also finds significant differences in the reactions of Moroccan sectors to monetary policy shocks, with the extraction industry, manufacturing, construction, hotels & restaurants, the financial and insurance activities being more sensitive to monetary policy shocks, while agriculture and fishing sectors appear to be insensitive to monetary policy innovations. The results further indicate that monetary policy tightening leads to a decrease of the overall GDP and price level.

In Nigeria, Nwosa and Saibu (2012) examined the transmission channels of monetary policy shocks on sectoral output growth over the period 1986Q1 – 2009Q4 using Granger Causality and unrestricted VAR model. The results indicate that interest rate channel is most effective in transmitting monetary policy to agriculture and manufacturing sectors, while exchange rate channel is most effective for transmitting monetary policy to building/construction, mining, service and wholesale/retail sectors. These results generally indicate that interest rate and exchange rate policies are important monetary policy measures for stimulating sectoral output growth in Nigeria. CBN (2014) criticized this study on two main grounds. The first is that the period covered by the study does not reflect the market orientation period of monetary policy in Nigeria. The second is that the unrestricted VAR model used in the study is sensitive to the ordering of the variables. To address these gaps, CBN (2014) used structural VAR framework and quarterly data from 1993Q1 to 2012Q4 to examine monetary policy effects on the disaggregated components of the real sector in Nigeria. The results indicate that sectoral output responded heterogeneously following contractionary monetary policy shocks, with some immediately responding negatively (services and wholesale/retail sectors), while others displayed lagged negative responses (manufacturing, building and construction, and agriculture). This is consistent with the theoretical expectation that output in each sector is expected to decline following monetary tightening. It is also consistent with the established fact that monetary policy shocks generate differential sectoral impacts. The findings of CBN (2014) further indicate that contrary to Nwosa and Saibu (2012), money supply is one of the main variables that explain the variation in sectoral output, while exchange rate does not significantly explain sectoral output changes.

Three important observations are in order at this point. The first is that the effects of monetary policy on the agricultural sector in Nigeria are yet to be investigated at a disaggregated level. It is the goal of this study to fill this gap in the literature by investigating the effects of monetary