Research Article

The Impact of inflation rate on Economic Growth in America's Economy Using a New Approach TVP-FAVAR

Asemeh GholamrezapourAmiri[1] and Zong Gong[2]

[2]Department of Economics and Management,
Beijing University of Technology, Beijing100124,China.

[1]**Correspondence should be addressed to:** Asemeh Gholamrezapour Amiri, Department of Economics and Management, Beijing University of Technology, Beijing100124,China.Email:gh_amiri@ymail.com

ABSTRACT
This article explores the impact of monetary policy on Economic Growth of the state. There is an immense effect of monetary policy on Economic Growth of the country. In this regard variables have been studied to prove the hypothesis. The data of past 47 years from 1970 to 2016 has been used for driving the result. To determine the relationship between two Monetary Policy on Economic Growth TVP-FAVR technique has been used.Based on the results ofInflation in the short term, medium term and long term positive impact on economic growth by decreasing weak, weak positive of reducing dwindling.

Keywords: Economic Growth, Inflation, TVP- FAVAR

1-INTRODUCTION

However, economic growth and the factors that cause it, has long attracted the attention of economists were However, despite numerous studies, still to factors that agreement has been reached and a researcher on the evidence and the mentality of its model as appropriate choose the estimate and the interpretation. In the empirical research of economic growth, there are different explanatory variables that depend more on the purpose and viewpoint of the researcher, because each researcher in his model assigns variables that are effective. The variables which belong to the correct model, the question before researchers in all experimental work.The lack of a theoretical framework agreement, will lead to considerable differences in the incidence and small sample size, the main reason is the absence of all the factors mentioned, to reduce the degree of freedom model accuracy and reliability of estimates is prevented. In large samples, estimates of the coefficient of

non-variable variables (variables that do not belong to the correct model) go to zero, but the increase in the number of observations is not always possible and the researcher either eliminates or ignores several important variables from their point of view in the model and the rest. In almost all cases, keep one variable, based on the statistical results is the same dependence, sometimes causing regression is false.

Articles new economic growth (for example, Sallai Martin, et al Zavyr Carmen Fernandez et al., 2004), they have discovered the problem and the solution. The primary treatment methods, were not of appropriate quality and defects such as lack of appropriate theoretical foundations of statistical suffered. To address these problems in the study of TVP-FAVAR method will be used. This method is a powerful tool for considering structural failures in data, factors affecting the variation of dependent variables in different time

periods and the probability of occurrence of each of these factors in different time intervals from the unique capabilities of this model.

2-THEORETICAL FRAMEWORK
2-1Monetary Policy

Monetary policy is concerned with discretionary control of money supply by the monetary authorities (Central Bank with Central Government) in other to achieve stated or desired economic goals. Governments try to control the money supply because most governments believe that its rate of growth has an effect on the rate of inflation. Hence monetary policycomprises those government actions designed to influence the behaviour of the monetary sector. Monetary Policy is the deliberate use of monetary instruments (direct and indirect) at the disposal of monetary authorities such as central bank in order to achieve macroeconomic stability. Monetary Policy is essentially the tool for executing the mandate of monetary and price stability. Monetary policy is essentially a programme of action undertaken by the monetary authorities generally the central bank, to control and regulate the supply of money with the public and the flow of credit with a view to achieving predetermined macroeconomic goals (Dwivedi, 2005). Monetary policy as one of the tools of controlling money supply in an economy of a nation by the monetary authorities in order to achieve a desirable economic growth. Monetary policies are effective only when economies are characterized by well developed money and financial markets like developed economies of the world. This is where a deliberate change in monetary variable influences the movement of many other variables in the monetary sector. Monetary policy consists of a Government's formal efforts to manage the money in its economy in order to realize specific economic goals. Three basic kinds of monetary policy decisions can be made about: a) The amount of money in circulation; b) The level of interest rate c) The functions of credit markets and the banking system (Ogunjimi, 1997). The combination of these measures is designed to

regulate the value, supply and cost of money in an economy, in line with the level of economic activity. Excess supply of money will result in an excess demand for goods and services, prices will rise and balance of payments will deteriorate. The challenge of monetary policy management rest wholly on monetary authorities which has over the years been committed to its effective control. The performance of monetary policy has improved greatly in recent times- inflation has remained at moderate levels accompanied by high growth of domestic output. To sustain the efforts, there is need for appropriate collaboration with the fiscal authorities as well as the development of confidence in inter-bank market and the necessary financial market infrastructure is still relevant.

2-2Monetary Policy Transition Mechanism

There are different transmission channels through which monetary policy affects economic activities and these channels of transmissions have been broadly examined under the monetarist and Keynesian schools of thought. The monetarist postulates that change in the money supply leads directly to a change in the real magnitude of money. Describing this transmission mechanism, (Friedman and Schwartz. 1963) say an expansive open market operations by the Central Bank, increases stock of money, which also leads to an increase in Commercial Bank reserves and ability to create credit and hence increase money supply through the multiplier effect. In order to reduce the quantity of money in their portfolios, the bank and non-bank organisations purchase securities with characteristics of the type sold by the Central Bank, thus stimulating activities in the real sector. This view is supported by (Tobin, 1978) who examines transmission effect in terms of assets portfolio choice in that monetary policy triggers asset switching between equity, bonds, commercial paper and bank deposits. He says that tight monetary policy affects liquidity and banks ability to lend which therefore restricts loan to prime borrowers and business firms to the exclusion of mortgages and consumption spending

thereby contracting effective demand and investment .

Conversely, the Keynesians posit that change in money stock facilitates activities in the financial market affecting interest rate, investment, output and employment. (Modigliani, 1963) supports this view but introduced the concept of capital rationing and said willingness of banks to lend affects monetary policy transmission. In their analysis of use of bank and non bank funds in response to tight monetary policy (Oliner and Rudebush, 1995) observe that there is no significant change in the use of either but rather larger firms crowd out small firms in such times and in like manner (Gertler and Gilchrist, 1991) supports the view that small businesses experience decline in loan facilities during tight monetary policy and they are affected more adversely by changes in bank related aggregates like broad money supply.. Further investigation by (Borio, 1995) who investigated the structure of credit to non government borrowers in fourteen industrialised countries observe that it has been influenced by factors such as terms of loan as interest rates, collateral requirement and willingness to lend.

2-2-1The Classical View of Monetary Policy

The classical economists' view of monetary policy is based on the quantity theory of money. The quantity theory of money is usually discussed in term of fisherian equation of exchange, which is given by the expression $MV = PY$. In the expression, M denotes the supply of money over which the Federal Government has some control; V denotes the velocity of circulation which is the average number of times a currency is spent on final goods and services over the course of a year; P denotes the price level GDP. Hence PY represents current nominal GDP. The equation of exchange is an identity which states that the current market value of all final goods and services (nominal GDP) must equal the supply of money multiplied by the average number of times a currency is used in transaction in a given year. The classical economist believes that the economy is always at or near the natural level of real GDP.

Thus, they assume that in the short run, the Y in the equation of exchange is fixed. They further argue that the velocity of circulation of money tends to remain constant. So that V can also be regarded as Fixed. Given that both Y and V are fixed, it follows that if the Central Bank of Nigeria (CBN) were to engage in expansionary (or contractionary) monetary policy, it will lead to an increase (or decrease) in money supply (M), the only effect would be to increase (or decrease) the price level P, in direct proportion for the change in money supply (M). In other words, expansionary monetary policy can only lead to inflation, and contractionary monetary policy can only lead to deflation of the price level.

2-2-2 Keynesian View of Monetary Policy

Keynesian theory did not buy the notion that the relationship between money and price is direct and proportional. They share the view that it is indirect through the rate of interest. Also they reject the notion that the economy is always at or near the natural level of real GDP so that Y in the equation of exchange can be regarded as fixed. They also reject the proposition that the velocity of circulation of money is constant. Keynesians believe that expansionary monetary policy increases the supply of loanable funds available through banking system, causing interest rates to fall. With lower interest rate, aggregate expenditures on investment and interest-sensitive consumption goods usually increase, causing real GDP to rise. Hence, monetary policy can affect real GDP indirectly.

2-2-3 The Monetarist View of Monetary Policy

Monetarist is a school of thought led by Milton Friedman. This school of thought is a modern variant of classical macroeconomics. They developed a subtler and relevant version of the quantity theory of money. Like any school of thought, Friedman (1963) emphasized on the supply of money as the key factor affecting the well-being of the economy and as well, accepted the need for an effective monetary policy to stabilize an economy. He also has the notion that, in order to promote steady growth rate, money supply should grow at a fixed rate, instead of

being regulated and altered by the monetary authority(ies). Friedman equally argued that since money supply might be demanded for reasons other than anticipated transaction, it can be held in different forms such as money, bonds, equities, physical goods and human capital. Each form of this wealth has a unique characteristic of its own and a different yield. These effects will ultimately increase aggregate money demand and expand output. The Monetarists acknowledge that the economy may not always be operating at the full employment level of real GDP. Thus, in the short-run, monetarists argue that expansionary monetary policies may increase the level of real GDP by increasing aggregate demand. However, in the long-run, when the economy is operating at the full employment level, they argue that the quantity theory remains a good approximation of the link between the supply of money, price level, and the real GDP. Also, in the long-run expansionary monetary policy only lead to inflation and do not affect the level of real GDP.

3- EMPIRICAL STUDIES

Umaru and Zubairu, (2012) investigated the impact of inflation on economic growth and development in Nigeria between 1970-2010 through the application of Augmented Dickey-Fuller technique in testing the unit root property of the series and Granger causality test of causation between GDP and inflation. The results of unit root suggest that all the variables in the model are stationary and the results of Causality suggest that GDP causes inflation and not inflation causing GDP. The results also revealed that inflation possessed a positive impact on economic growth through encouraging productivity and output level and on evolution of total factor productivity. A good performance of an economy in terms of per capita growth may therefore be attributed to the rate of inflation in the country.

HameedGul, Dr. Khalid Mughal, DrSabit Rahim, (2012) The monetary instruments and the decisions of monetary authorities influence the macro variables which include GDP, money supply, interest rate, exchange rates and inflation.

The objective of the research is to identify the interdependence between monetary policy and economic growth and the influence of monetary instruments in the economy like Pakistan. The method of least square OLS has been used to conclude the result. The main objective of economic policies is to enhance the welfare of the public and the monetary policy supports this wide objective by focusing its efforts to promote the price stability

EvasAgalega, Samuel Antwi, (2012) The prime objective of study is to understand the effects in the interest rate and inflation and that have brought change on the Gross Domestic Product on the region of Ghana. The results have beenderived from multiple linear regression to establish the result that there is strong correlation between interest rate, GDP and inflation. The bank of Ghana and Government should work together and develop those policies that aim to reduce stabilizing both macro and micro indicator.

Wong Hong Chau, Babak Mohammad Pour (2014) The study aims the relationship between the monetary policy and Gross Domestic Product (GDP) in Malaysia. The Johansson co-integration analysis and Vector error correction model has applied in study. The data has been collected from 1991 to 2011. The research shows that there is a possibility of existence of long run equilibrium relationship between GDP and real interest rate and also there is also positive relationship between GDP and money supply in Malaysia.

Martin Feldstein, (2012) The study investigates and measures the strength and stability of the linkage between monetary aggregate and nominal GDP.

IqraEhsaan, SaleemAnjum(2011) state that higher the money supply by state bank of Pakistan (SBP) entails the high rate of inflation. The relationship between monetary policy and GDP has been observed by applying regression model. For driving the result past 12 years data has taken into consideration. The research proves that the interest rate has an immense effect with GDP and it is necessary to maintain interest rate in order to bring the inflation rate up to 5% to 6%.

BesnikFetai, IzatZeqiri, (2010) The study investigates the benefits and relative cost associated with active monetary and regime of different exchange rate in the Republic of Macedonia. Econometric model for testing has been used to show the result that different strategy of exchange rate regime and active monetary policy incur more cost than benefit.

IrfanHameed, (2010) GDP is immensely affected by the monetary policy of the state. By applying regression technique the relationship between two variables monetary policy and GDP has been observed. For motivating the results past 30 years data has been used which results that GDP is greatly affected by monetary policy. This paper proves that there are various unknown factors that affect the GDP but the monetary policy or growth in money supply has a huge effect.

Mohsin S Khan, (2010) the study investigate the major changes in conducting and designing of monetary policy and provide an overview of current debate of monetary policy and its target, instruments and analysis of monetary transaction processes. The research underlines the relationship between the growth of GDP and different monetary aggregates in 20 Sub-Saharan African economies.

Eric MurayaMathenge, (2011) The research establishes the relationship between monetary policy and Gross Domestic Product (GDP). GDP is greatly affected by monetary policy of the state. By using regression method the study conclude that growth in money supply has high influence on GDP of an economy and there are various unknown factors that affect the GDP.

4-Time-varying FAVAR model

Our time-varying FAVAR model consists of the following equations

$$X_{it} = \beta F_t + e_{it}$$

$$F_{k,t} = c_t + \sum_{l=1}^{2} \phi_{l,t} F_{k,t-j} + v_t$$

$$e_{it} = \rho_i e_{it-1} + \varepsilon_{it}$$

with F = {Ft1,Ft2,Ft3}, β denotes the factor loading matrix and the coefficients $\varphi\tilde{}l,t$ = { ct,φl,t} follow a random walk:

$$\tilde{\phi}_{l,t} = \tilde{\phi}_{l,t-1} + \eta_t$$

The covariance matrix of the innovations vt is factored as

$$VAR(v_t) \equiv \Omega_t = A_t^{-1} H_t (A_t^{-1})'$$

where the time-varying matrices Ht and At are given as in the time-varying VAR model:

$$H_t \equiv \begin{bmatrix} h_{1,t} & 0 & 0 \\ 0 & h_{2,t} & 0 \\ 0 & 0 & h_{3,t} \end{bmatrix} \qquad A_t \equiv \begin{bmatrix} 1 & 0 & 0 \\ \alpha_{21,t} & 1 & 0 \\ \alpha_{31,t} & \alpha_{32,t} & 1 \end{bmatrix}$$

with the hi,t evolving as geometric random walks

$$\ln h_{i,t} = \ln h_{i,t-1} + v_t.$$

Following Primiceri (2005) we postulate that the non-zero and non-one elements of the matrix At evolve as driftless random walks

$$\alpha_t = \alpha_{t-1} + \bar{\tau}_t$$

and we assume the vector $[\varepsilon'_t, \eta'_t, \bar{\tau}'_t, \tilde{v}'_t]'$ to be distributed as

$$\begin{bmatrix} \varepsilon_t \\ \eta_t \\ \bar{\tau}_t \\ v_t \end{bmatrix} \sim N(0,V), \text{ with } V = \begin{bmatrix} R_t & 0 & 0 & 0 \\ 0 & Q_F & 0 & 0 \\ 0 & 0 & S & 0 \\ 0 & 0 & 0 & G \end{bmatrix} \text{ and } G = diag\left(\sigma_1^2, ... \sigma_K^2\right)$$

Bernanke, Boivin and Eliasz (2005) show that identification of the FAVAR model given by equations (D-1) requires putting some restrictions on the matrix of factor loadings.

Following their example we assume that the top J ×J block of βik is an identity matrix. The model is then estimated using a Gibbs sampling algorithm with the conditional prior and posterior distributions described below

4-Estimates of the TVP-FAVAR model

The study, using 2014 MATLAB and using two timeouts endogenous variables of the model, impulse response analysis is provided in the entire period. Impulse response function of the different research studies have varied over time. In the following charts the variable length, height and width of the desired inflation rate that changes on economic growth have been analyzed.

Figure 4: how respond to change in the inflation rate in a state of shock cumulative economic growth


Response of gy, Shock to p
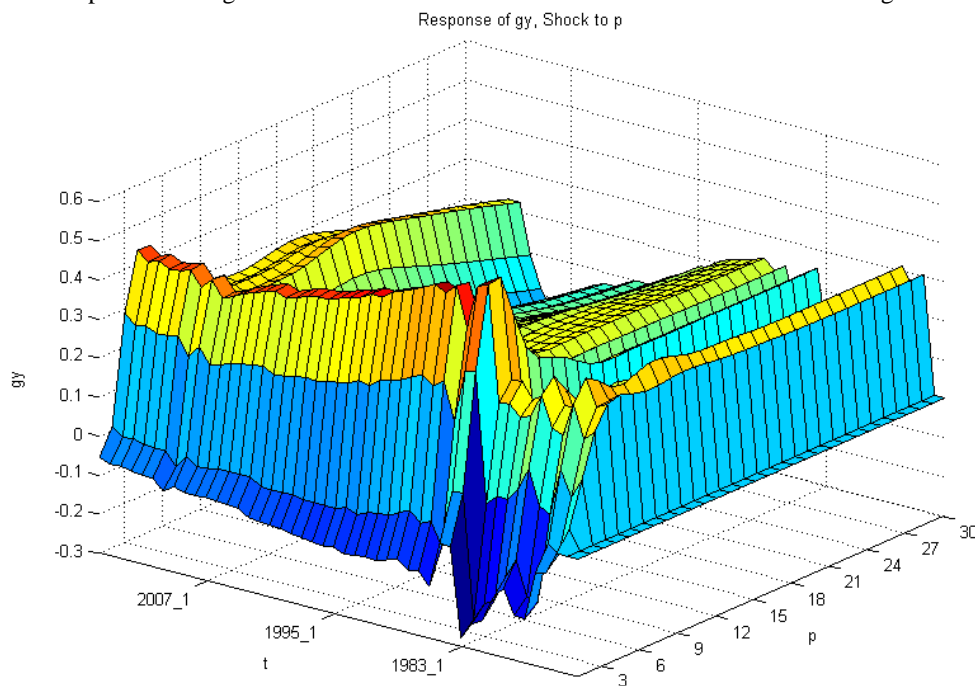
Applying a shock to one standard deviation in inflation over time makes a U-shaped graph (move on axis) on America's economic growth over time. Inflation has had a positive but decreasing effect on economic growth, but this effect is stronger in the early and late period than the mid-term.

An increase of one standard deviation in the growth of liquidity in each period (move on to the transverse axis) enhance the growth of the economy. In all study periods of inflation had a positive impact on economic growth, but this effect is stronger at the beginning and end of the middle period.

In the middle of the inflationary period, it has had less effect on economic growth, but given that the response function graph is still above the equilibrium level, it can't be said that this variable has led to a decline in economic growth.

Figure 5:how respond to change in the inflation rate of economic growth in the immediate shock

Response of gy, Shock to p
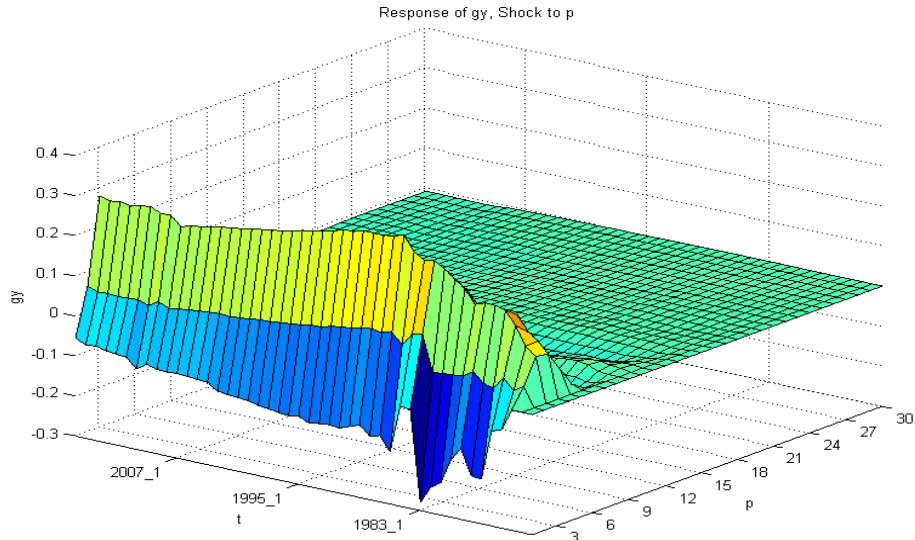
Applying a shock to one standard deviation in inflation rate to 9 periods a positive impact on economic growth.

The results TVP-FAVAR in the short, medium and long term is as follows:

Table 1: Results of the accumulated model

Model	Variable impulse	Effect in the short run	Effect in the middle	Effect in the long run
Economic growth	Inflation	Positive weakening	Positive Reduction	Positive weakening

According to the results table (1) is shown the effects of variables affecting economic growth in the short, medium and long term is different. The use of statistical methods TVPFAVAR feasible.

5-CONCLUSION

Since the change of regime change behavior, time series are to identify the factors that are causing this change in behavior could be a leading indicator to help policy-makers to predict the future status of economic growth.Given that any change in diet can cause structural breaks in the dynamics of economic growth, and to ignore this failure mislead policymakers in policy making and the deviation of the results is therefore recommended that policymakers in different circumstances to implement policies that according to the characteristics of the regime, have the highest harmony and balance. In oil economies, because of the government's access to oil revenues, the government's incentive to no longer tax and provide financing for public

services through resorting to inflationary taxes is higher. Composition of Money and Credit Council of State as being members in increasing the dominance of fiscal policies on monetary policy, to be effective.

Given that different variables in different periods have different effects on economic growth. However, the use of models that have the ability to separate the different risk levels for regime change in the economic growth forecast is recommended. As a result, policy-makers and stakeholders is recommended for the general policies at all times to improve economic growth not use in any regime, depending on the factors affecting economic growth in what are, by means of appropriate regulations to policy lodge an .

Based on interest rates and economic growth are negatively affected, while Keynesians one of the most important channels, the impact of monetary and fiscal policy on economic growth through the mechanism of transfer interest rate is known, it is recommended to determine the optimal interest rate than a specified rate and Fixed interest is not taken and depending on the circumstances and policies have flexibility in running these rates. This flexible rates under control and accelerate economic incentives to equalize the imbalance in the market if they will be.

Given that inflation is positive for economic growth in the United States, policies that partly increase inflation and motivate producers are necessary, although after the 2007 recession, policymakers and policymakers in the country expansionary policies have tried to improve the level of inflation. It should be noted from one level to the next is inflation growth inhibitors. As a result of that threshold behavior change models of economic growth in the face of change show a variable examined.

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