Applied Economics Studies, Iran (AESI) **7**

Volume 8, Number 33, Spring 2020

Assessment of the Role of Credit Channel in Output during Recession and Boom Period in the Iranian Economy

Arabian Mahdi, A.[1], Khosravinejad, A.K.[2*], Pedram, M.[3]
Nazarian, R.[4], Mohammadi. T.[5]

Abstract

Empirical studies mainly model monetary transmission mechanism and the role of credit channel as symmetric across business cycles. Since the degree of asymmetric information and information stickiness in different business periods varies depending on the state of the economy of each country, therefore, it would be necessary to evaluate credit channel by using nonlinear methods. This study, using time series information of the Iranian economy, assesses the impact of credit channel on Iran's economy by Markov Switching Vector Auto Regression approach (MS-VAR) and using seasonal data for the years 1990 to 2017. In general, it can be concluded that in boom period the effect of monetary policy shock leads to increased output growth by about 0.3 percent and then will decrease untill the end of the first year and again will increase in season 5 by about 0.1 percent and, subsequently, it will disappear. The effect of this shock during recession will increase output growth by about 0.1 percent and, then, decrease to the end of the first year. Again in season 5, output growth will increase by about 0.05 percent and, subsequently, it will disappear by the end of the period. Also, credit shock leads to increased output growth by about 0.25 percent during boom period and then will be decreased. But, it is ineffective during recession. The results indicate that credit channel is effective during boom period but ineffective during recession. Furthermore, the effect of monetary policy on output through the credit channel during the boom period is more than the recession.

Keywords: Monetary Transmission Mechanism, Monetary Policy, Markov Switching Vector Auto Regression.

JEL Classification: E60, E52, E44.

1. Ph.D. student of Economics, Central Tehran Branch, Islamic Azad University, Tehran, Iran — **Email:** arabianahmad@gmail.com
2. Assistant professor, The Faculty of Economics and Accounting, Central Tehran Branch, Islamic Azad University, Islamic Azad University, Tehran, Iran — **Email:** khosravinejad@gmail.com
3. Professor, Department of Economics, Alzahra University — **Email:** mehdipedram@alzahra.ac.ir
4. Assistant professor, The Faculty of Economics and Accounting, Central Tehran Branch, Islamic Azad University, Islamic Azad University, Tehran, Iran — **Email:** r_nazarian@yahoo.com
5. Associate Professor, Faculty of economics, Allameh Tabataba'i University — **Email:** atmahmadi@gmail.com

Volume 9, Number 33, Spring 2020

1. Introduction

The effects of monetary policy on the general level of prices and on real sectors of the economy have long been one of the most important issues in macroeconomics. Empirical studies in this field have confirmed the early finding of Friedman and Schwartz (1963) that monetary policy actions are followed by movements in real output that may last for two years or more (Romer and Romer[1], 1989; Bernanke and Blinder[2], 1992).

This study evaluates the nonlinear effect of the credit channel on output during recession and boom periods in the Iranian economy by using the Markov Switching Regression Model (MSVAR).

2. Theoretical Background and Literature Review

Theoretical and empirical studies have shown that monetary variables are effective in macro nominal variables, both in the short and long terms. Also, these effects are transmitted to macroeconomic target variables such as employment and GDP growth in the short run.

Different views and attitudes have been raised by economic schools about the importance of monetary policy and its impact on real macroeconomic variables. Each of these schools, based on their assumptions and attitudes to economic issues, have proposed various channels for monetary policy to influence the economy. In the following sectin, different views on the credit channel will be discussed.

2-1. Credit channel

The credit channel of monetary policy transmission is a subset of non-neoclassical attitudes to the mechanism of transmission. In other words, the strength and weakness of this channel can be affected by the government's discretionary policies in the markets or through the failure of private markets. The credit channel consists of two channels of bank lending and balance sheet (Bernanke & Gertler[3], 1995).

The bank lending channel is briefly defined as follows:

Contractionary monetary policy → bank deposits ↓ → bank loans ↓ → total expenditures ↓ → total output ↓

The balance sheet channel states that monetary tightening affects the borrower's balance sheet and output through their net worth and cash flows. Expansionary monetary policy, which causes a rise in equity prices, leads to higher investment spending and aggregate demand because of the decrease in adverse selection and moral hazard problems.

M ↑⇒ P ↑⇒ adverse selection and moral hazard↓ ⇒ lending ↑ ⇒ I ↑ ⇒Y ↑

1. Romer, C. D. & Romer, D. H., 1989
2. Bernanke and Blinder, 1992
3. Bernanke and Gertler, 1995

2-2 literature review

Table 1 reviews some of the studies on the role of monetary transmission channels:

Table 1: Some of the studies on the role of monetary transmission channels

Authors	Place	Model	Results
Tunc and Kılınç	Turkey (2016)	Markov Switching	Monetary policy shocks have strong effects on both aggregate GDP, services and industrial production and sub-sectors during recessionary periods. The results are weaker for the expansionary periods
Mahathanaseth and Tauer	Thailand (2019)	Panel Data	Bank lending channel is an important conduit for the transmission of monetary policy in Thailand
Mohsenie Zenouzi	Iran	SVAR	By adding asset prices (housing prices, gold coins prices and stock prices) to the model, the effect of monetary policy shocks through liquidity shocks on output fluctuations is significantly exacerbated. So this confirms the importance of the balance sheet channel.
Shahbazi et al.	Iran (2018)	Markov Switching	Money is neutral in the long run, and shocks behave asymmetrically during business cycles periods. Also, credit channel is an important channel for transferring monetary shocks on output in the short run.

3. Model Specification

We used seasonal data from 1971 to 2016 (based on the base year of 2011). The macroeconomic variables for the estimations include growth domestic production without oil (GDP), Credit and M2. All variables were obtained from the Central Bank database. Natural logarithm of all the time series have been used to eliminate potential heteroscedasticity. Variables are all non-stationary.

The general Markov-Switching Vector Auto Regression model may be written as:

$$X_t = \begin{bmatrix} X_{1t} \\ \dots \\ X_{mt} \end{bmatrix} = \begin{bmatrix} \vartheta_1 + B_{11}X_{t-1} + \cdots + B_{P1}X_{t-p} + A_i\mu_t \\ \dots \\ \vartheta_m + B_{1m}X_{t-1} + \cdots + B_{Pm}X_{t-p} + A_m\mu_t \end{bmatrix} \quad (1)$$

$$\text{If} \begin{bmatrix} s_t = 1 \\ \dots \\ s_t = m \end{bmatrix} \ \mu_t \sim N(0; I_K)$$

Where K, the endogenous variable X_i js explained by an intercept term ν_i, a K-dimensional autoregressive matrix B of order p, and$A_{im}\mu_t$.

4. Empirical Results

Figure 1 depicts that the regimes are classified into two groups. Regime 1 indicates expansionary period corresponding to high mean and low volatility of

GDP growth rate and regime 2 indicates recession period corresponding to low mean and high volatility of GDP growth rate.

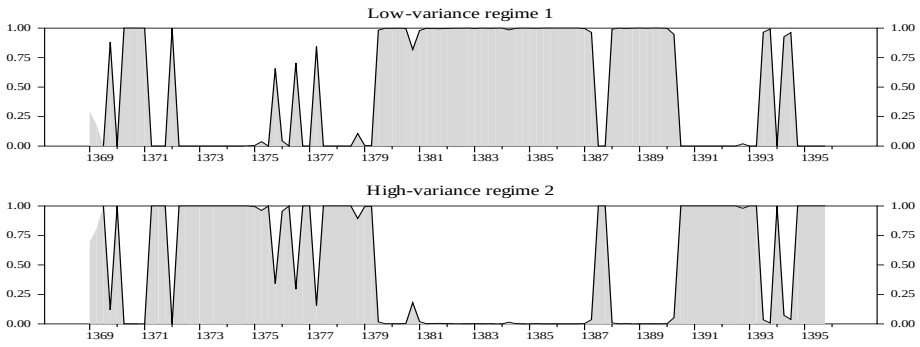

Figure 1: Recession and Boom Periods. Source: Authors' calculations

4-1. Impulse Response functions

As shown in Figure 2, in regime 1 the monetary policy shock increased output by about 0.5%, which then decreased by the end of the first year (season 4) and again increased by about 0.1% in the fifth season. In regime 2 (recession period), it also increased production by about 0.1% and then decreased by the end of the first year (season 4) and then increased by about 0.05% in the fifth season.

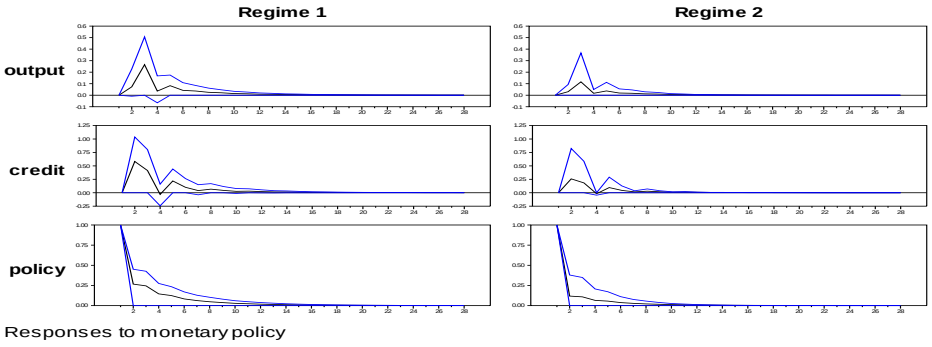

Figure 2: Impulse responses of the variables to monetary shock. Source: Authors' calculations.

In the next step, impulse response function of credit shock on output is presented in Figure 4. In regime 1 (boom period), credit shock leads to increased output growth by about 0.25 percent during boom period, which then decreases. But, it is ineffective during recession.

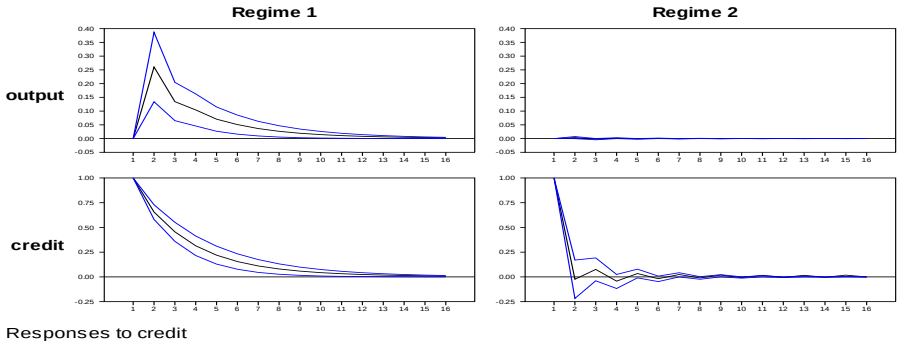

Figure 3: Impulse Response of output to credit shock Source: Authors' calculations

4-2. Choleski Variance Decomposition

The result of Choleski Variance Decomposition is presented in tables 2 and 3. In the first period, 100% of the change in output growth is explained by the variable itself, indicating that output growth responds to monetary policy changes with a lag. From the second period onwards, the explanatory effect of credit and monetary policy on the variable of output growth is evident.

Table 2: Choleski Variance Decomposition Result during the Boom Period

Period	GDP Growth	M2 Growth	Credit Growth
1	100	0	0
2	89.514	5.865	4.621
3	87.064	8.259	4.677
4	86.671	8.560	4.769
5	85.522	9.308	5.170
6	85.012	9.418	5.570
7	84.294	9.830	5.876
8	83.809	10.101	6.090

Source: Authors' calculations

Table 3: Choleski Variance Decomposition Result during Recession

Period	GDP Growth	M2 Growth	Credit Growth
1	100	0	0
2	98.386	1.259	0.355
3	98.223	1.377	0.40
4	98.149	1.430	0.421
5	98.131	1.443	0.426
6	98.126	1.447	0.427
7	98.124	1.448	0.428
8	98.122	1.449	0.429

Source: Authors' calculations

5. Summary and Conclusion

The purpose of this study was to evaluate the role of credit channel in production during periods of recession and boom in the Iranian economy due to the important role of banks in financing of manufacturing companies and underdevelopment of capital market in Iran. For this purpose, the seasonal data from 1990 to 2016 and the Markov Switching Regression Model (MS-VAR) and regime-dependent impulse response function were used.

The results illustrated the asymmetric effects of monetary policy on GDP growth and credit. Also, the credit channel was found to be an active channel during the boom period and had positive effects on GDP growth. But the channel was inactive during the recession and had no effect on GDP growth during this period.

The results of the Variance decomposition of forecast errors also indicated that in the boom period monetary policy and credit play a greater role in justifying GDP growth than in the recession period.

Finally, given the asymmetric effects of monetary policy on output growth, policy makers need to consider business cycles in their own policies.

References

Bernanke, B. and A.S. Blinder. (1988). "Credit, Money, and Aggregate Demand", *American Economic Review*, 78(2), 435-439.

Bernanke, B. S., and Gertler. M. (1989). "Agency costs, net worth and business fluctuations", *American Economic Review, 79(1), 705-744.*

Bernanke, B. and Gertler, M. (1995). "Inside the black box: the credit channel of monetary transmission", *Journal of Economic Perspectives*, 9(4), 27-48.

Bernanke, B. and Blinder, A. (1992). "The federal funds rate and the channels of monetary transmission", *American Economic Review*, 82(4), 901-921.

Bordon, A. R. & Weber, A. (2010). "The Transmission Mechanism in Armenia: New Evidence from a Regime Switching VAR Analysis", *IMF Working Papers*, 10(270), 1-31.

Catik, A. N., Karacuka, M. (2011). "*The Bank Lending Channel in Turkey: Has it Changed after the Low Inflation Regime?*", DICE Discussion Papers, 32, University of Düsseldorf, Düsseldorf Institute for Competition Economics (DICE).

Christiano, L., Eichenbaum, M. and Evans, C. (1999). "Monetary Policy Shocks: What Have We Learned and to What End?", *Handbook of Macroeconomics, Elsevier Science, Amsterdam*, 1(1), 65–148.

Ehrmann, M., Ellison. M. and Valla. N. (2001). "Regime dependent impulse response functions in a Markov-Switching vector auto regression model", *Economic Letters*, 8(11), 1-27.

Ehrmann, M., Ellison, M., & Vallac, V. (2003). "Regime-dependent impulse response functions in a Markov switching vector autoregression model", *Economic Letters*, 78(3), 295-299.

Egea, F.B. & Hierro, L.A. (2019). "Transmission of monetary policy in the US and EU in times of expansion and crisis", *Journal of Policy Modeling*, 41(4), 763-783.

Fisher, M.E. & J. J. Seater (1993), "Long-Run Neutrality and Super Neutrality in an ARIMA Framework", *American Economic Review*, 83(3), 402-415.

Fridman, M. & Swchwartz, A. (1963). A Monetary History of the United States, 1867-1960, Princeton: Princeton University Press.

Ford, Jim L., Agung, J., Ahmed, S. S., Santoso, B. (2003). "Bank Behavior and the Channel of Monetary Policy in Japan, 1965-1999", *The Japanese Economic Review*, 54(3), 275-299.

Golfeld, S., M., Quandt, Richard E., (1973). "The Estimation of Structural Shifts By Switching Regressions", *Econometric Reserch Program, Princeton University*, 2(4), 473-483.

Hamilton, J. (1990). "Analysis of time series subject to change in regime", *The Journal of Econometrics*, 45, 39-70.

Hendricks, W., Kempa, B. (2008). "Asymmetric transmission of monetary policy in Europe: A markov-switching approach", *Journal of Economic Integration*, 23(4), 873-895.

Kaviani, E., Imamverdie, G. A., and Nazarian, R. (2013). "Assessing effect of monetary transmission mechanism through the Credit Channel on the Growth of Banking Facility in banks". M.Sc., Tehran, Islamic Azad University, Central Tehran Branch, Faculty of Economics and Accounting.

Kiyotaki, N. and Moore, J. (1997). "Credit cycles". *Journal of Political Economy*, 105(2), 211-248.

Komijani, A. and Ali Nejad Mehrabani, F. (2012). "Evaluating the Effectiveness of Monetary transmission Channels on Output and Inflation and Analyzing Their Relative Importance in the Iranian Economy". *Journal of Planning and Budgeting*, 17(2), 39-64.

Krolzig, H. (1997). "Markov Switching Vector Autoregressions: Modelling, Statistical Inference and Applications to Business Cycle Analysis", *Berlin, Springer-Veriag*, 454(2).

Lucas, R. (1972). "Expections and the Neutrality of Money", *Journal of Economic Theory*, 4(2), 103-124.

Lucas, R. and Stokey, N. L. (1987). "Money and Interest in a Cash-in-Advance Economy", *Econometrica, Econometric Society*, 55(3), 491-513.

MacCallum, B. T. (2004). "Long Run Monetary Neutrality and Contemporary Policy Analysis", Paper Presented at the Eleventh International Conference of the Institute for Monetary and Economic Studies, Bank of Japan, Tokyo, July 5-6.

Mahathanaseth, I. and Tauer, L. W. (2019), "Monetary Policy Transmission Through the Bank Lending Channel in Thailand", *ELSEVIER*, 60(C), 14-32.

Mankiw, N. G. & Taylor, M. P. (2011). Macroeconomics, South-Western, 2nd Edition, Cengage Learning, 702-703.

Mishkin, F. S. (1995). "Symposium on the Monetary Transmission Mechanism", *The Journal of Economic Perspectives*, 9(4), 3-10.

Mishkin, F. S. (2001), The Economics of Money, Banking, and Financial Markets, 6th Edition, Addison Wesley Publishing Company.

Mohsenie Zenouzi, S. J. (2017). "Investigating the Importance of Balance Sheet Channel, Credit View in Iran's Monetary Transmission Mechanism", *Journal of Economic Research (Sustainable Growth and Development)*, 17(4), 69-97.

Moshiri, S. and Vashghani, M. (2011). "Investigation of Monetary Transmission Mechanism and its Scheduling in Iranian Economy", *Journal of Economic Modeling*, 4(11), 1-32.

Raei, R., Iravani, M. J. and Ahmadi, T. (2018). "Monetary Shocks and Monetary Policy Transfer Channels in the Iranian Economy: Emphasizing the Currency Exchange Rate, Housing Price and Credit", *Journal of Economic Research and Development*, 8 (31), 29-44.

Romer, C. D., Romer, D. H. (1989). "Does monetary policy matter? A new test in the spirit of Friedman and Schwartz", *National Bureau of Economic Research, NBER Working Paper Series*, 4(2966), 121-184.

Shahbazi, K., Khodavisi, H., Rezaei, A and Yekta, I. (2018). "Investigating the Asymmetric Effects of Monetary Shocks on Iran's Gross Domestic Product during business cycle Periods with Emphasis on Bank Credits". *Journal of Econometric Modeling*, 2(4), 55-84.

Shah Hosseini, S. and Bahrami, J. (2016). "Macroeconomic Volatility and Monetary Transmission Mechanism in Iran (DSGE Approach)". *Journal of Economic Research*, 16(60), 1-48.

Smith, B. J. (2007). "An R Package for MCMC Output Convergence Assessment and Posterior Inference", *Journal of Statistical Software*, 21(11), 1-37.

Taghavi, M. and Lotfi, A. A. (2006). "Investigating the effects of monetary policy on the volume of deposits, lending facilities and liquidity of the banking system of the country (1994-2004)". *Journal of Economic Research*, 6, (20), 131- 166.

Tunc, C. and Kılınç, M. (2016). "The Asymmetric Effects of Monetary Policy on Economic Activity in Turkey", *MPRA Paper*, 72688, 1-29.

Ülke, V. and Berument, M. H. (2016). "Asymmetric Effects of Monetary Policy Shocks on Economic Performance: Empirical Evidence from Turkey", *Applied Economics Letters*, 23(5), 353-360.

Varghese, R. (2018). "The bank lending channel a time- varying approach", Graduate Institute of International and Development Studies International Economics Department, Working Paper No. HEIDWP10.

Walsh, C. E. (2010), Monetary Theory and Policy. Third Edition, Cambridge, MA: MIT Press.

Wilbowo, P. P. (2005). Monetary Policy Transmission Mechanism and Bank Portfolio Behavior: The Case of Indonesia, A thesis of PhD, Department of Economics, University of Birmingham.

Zhu, B., and Sebastian, S. (2017). "Housing market stability, mortgage market structure, and monetary policy: Evidence from the euro area". *Journal of Housing Economics*, 37(C), 1-21.