International Journal of Research in Social Sciences
Vol. 10 Issue 01, January 2020
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

INTEREST RATE CHANNEL OF MONETARY POLICY TRANSMISSION MECHANISM IN UZBEKISTAN – VECM APPROACH

AKRAM ABSALAMOV
PhD student in Post Graduated Program, Tashkent Financial Institute
Lecturer on the subject Monetary Policy at the
Banking and Finance Academy of the Republic of Uzbekistan

Abstract. Applying transmission mechanism of the monetary policy, the Central Bank impetuously responds to such macroeconomic indicators as gross production and inflation rate through the change of the bank interest rate and money supply. These impetuous responses occur through mechanism channels and occupy a significant place as interest rate channels inside these channels. In this regard this article is devoted to the study of the performance of interest rate channels in the transmission mechanisms in the Republic of Uzbekistan and their impact on the macroeconomic indicators through VECM model.

Key words: transmission mechanism, monetary policy, interest rate channel, nominal and real interest rate.

1. Introduction

In developing countries the Central Banks implement the impact of the transmission mechanism of the monetrary policy on the entire economy in reliance upon advanced foreign experience. In particular, the impact of the interbank lending market, impact of export and import volume, assets of commercial banks and impact of loan and securities therein are researched in efficient performance of the interest rate channels on the basis of the empiric analysis.

The monetary policy implemented by the Central Bank of the Republic of Uzbekistan constitutes an integral part of the macroeconopmic policy and is considered to be a signigicant tool for ensuring stability and development of the economy. However, there are certain challenges regarding enhancing the efficiency of the transmission mechanisms of the monetary policy on the entire economy. In particular, the impact of the interest rate channel of the transmission mechanism on the interest rates of the real market hasn't been researched at the adequate level yet. Herewith the correlation between the interest rate of the interbank money market and the interest rate of the Central Bank over the period of 2013-2019 accounted for –0,36 in terms of the nominal indicator and 0,03 in terms of the real indicator. This caused the fact that the share of the loans received by commercial banks from the Central Bank didn't constitute even 1 per cent in the liabilities part of commercial banks. Thus in terms of the domestic economy the share of the government securities doesn't amount to just 1 per cent in the GDP justifies insufficient development of the open market operations of the Central Bank.

It should be noted, that there are some problems related to the impact of the interest rate channel of the transmission mechanism on the macroeconomic indicators as well. In particular, the fact that share of total assets of commercial banks constitutes 50 per cent in the GDP, and the share of consumer loans extended to individuals accounts for 5-6 per cent reduces the impact of the interest rate channel on the GDP and inflation rate.

2. Literature review

First time it was John Maynard Keynes who introduced the concept of "transmission mechanism" in the monetary policy. Through the concept of "money supply" J.Keynes named the system of variable indicators which made an impact on the economic process as the "transmission mechanism". In his opinion, the change in the money supply volume leads to the change of the interest rate. As a result, lending market and securities market affect the investment expenses of the entrepreneur. As a consequence this results in the change of the gross production output. Only then the change in the commodities market will impact the situation in the money market (Keynes, 2019).

Many scholars have commented on the interest rate channel of the transmission mechanism. These are such scientists as B.Bernanke, A. Blinder, J. Rotenberg, M. Woodford, J. Taylor and others. The research of these scientists is mainly focused on the relationship between the nominal interest rate and the real interest rate, as well as the impact of interest rates on inflation (Bernanke, 1992). In addition, in this regard there should be noted a significant contribution made by J. Taylor. Prior to his research, interest rates were divided into nominal and real interest rates and their interrelationship was studied. Thus, the impact of the interest rates on the economy was studied through the model of the macroeconomic balance IS-LM offered by Keynes and in this regard the interest rate was perceived as borrowing costs. The success achieved by J. Taylor is that real interest rate does not always represent the behavior of all interest rates in the economy. Thus he considered the interest rate to be divided into "market interest rate" and "real interest rate". J.B.Taylor justified the impact of the market interest rate in reliance upon specifying the difference between the "market interest rate" and "real interest rate" (Taylor, 1995). In out opinion, in terms of our republic it is rather complicated to diniguish market interest rates and real interest rates in the national financial market and real economy. It is due to the fact that if we take into consideration the fact that market interest rates have originated from the interest rates of short-term securities, in order to determine these interest rates, we must have a developed securities market.

3. How then does the interest rate channel work?

The Central Bank influences the economy through the interest rate channel in the following ways:

a) Impact on the investment expenses of the enterprises;

$$i_{CB} \downarrow \Rightarrow i_{real} \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow$$

b) Impact on the government purchases;

$$M_2 \uparrow \Rightarrow i_{CB} \downarrow \Rightarrow Demand\ to\ Securities \uparrow \Rightarrow P_{Sec} \uparrow \Rightarrow i_{Sec} \downarrow \Rightarrow G \uparrow \Rightarrow Y \uparrow$$

c) Impact on the population consumption;

$$M_2 \uparrow \Rightarrow i_{CB} \downarrow \Rightarrow i_{credit} \downarrow \Rightarrow Concumer\ Loans \uparrow \Rightarrow C \uparrow \Rightarrow Y \uparrow$$

d) Impact on the export volume;

$$M_2 \uparrow \Rightarrow i_{CB} \downarrow \Rightarrow Exchange\ Rate \downarrow \Rightarrow Export \uparrow$$

e) Impact on the import volume;

$$M_2 \uparrow \Rightarrow i_{CB} \downarrow \Rightarrow G \uparrow;\ C \uparrow; I \uparrow \Rightarrow Y \uparrow \Rightarrow Import \uparrow$$

Impact of the interest rate channel on the export or import, and, as a result, either positive change or negative change of the trade balance is connected with the fulfilment of Marshall – Lerner condition.

Here:

i_{CB}–Nominal interest rate of the Central Bank; i_{real} – real market interest rates; I – investment expenses of enterprises; G – government purchases; C – consumer; Y – Gross domestic product; P_{Sec} – Market price of securities; i_{Sec} – interest rate of securities; E – exchange rate.

3. Analysis of Interest Rate channel in Uzbekistan

Currently it should be noted that in the majority of the developed countries the interest rate channel is considered to be the main one in the transmission mechanisms of the central banks. First of all, the central banks impact the interest rates on the money markets through determination of the basic indicative interest rate. Then they adjust deposit and lending interest rates directly in the proportion to the change of interest rates in the money markets. The economic environment and economic entities will coordinate their activities in line with this adjustment.

3.1. The influence of Interest rate channel on real market interest rates.

When analyzing interrelation between the interest rate of the Central Bank with the interest rate in the money market during 2013Q1:2016Q4 the correlation between the nominal ratio constituted 0,43 and this correlation between real indicators equaled to 0,73. This fact proved inadequate relation between the refinancing rate and the interest rate in the money market.

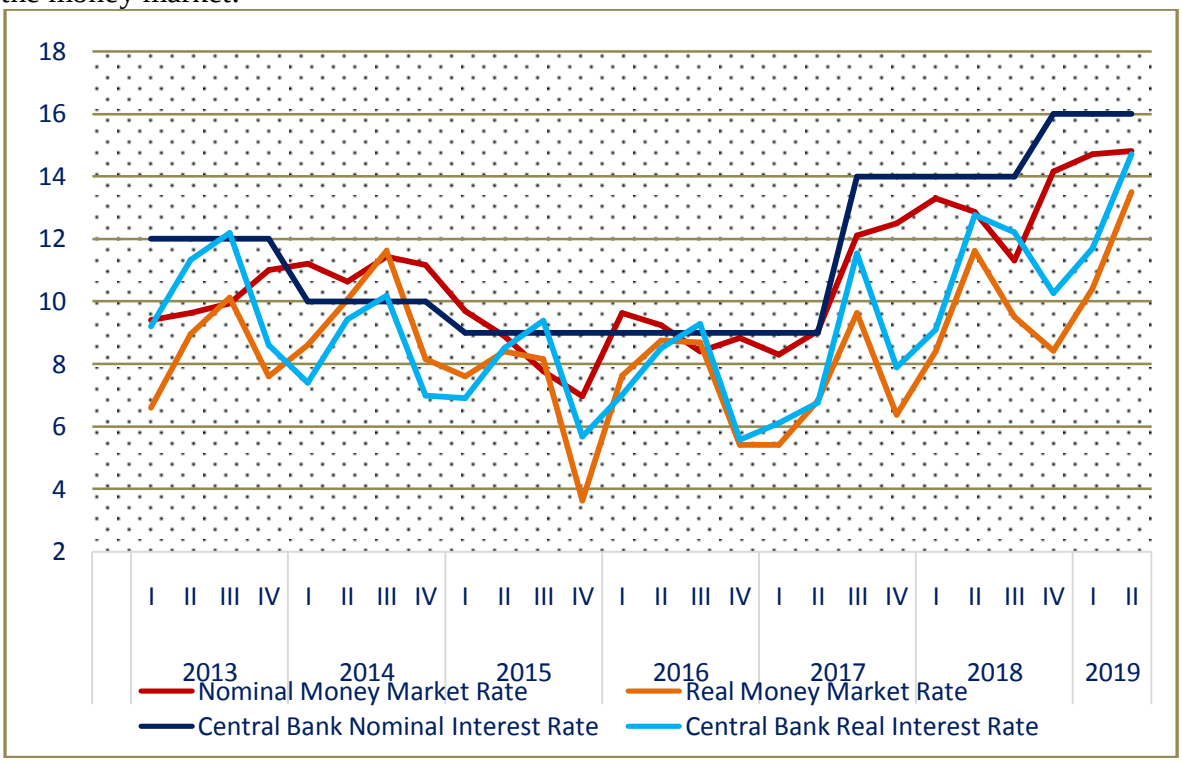

Figure 1. Correlation between the refinancing rate of the Central Bank and the interest rate of the money market.*

It should be noted that during 2017Q1:2019Q2 there was a significant correlation between the refinancing rate fixed by the Central Bank and the inerest rate of the money market and due to this fact the correlation between the nominal and real coefficients was

* Calculated by the author on the basis of the statistic data obtained from the official site of the Central Bank of the Republic of Uzbekistan www.cbu.uz

nearly ρ=0,96. This fact justifices high interelation between two interest rates. In this regard, high correlation between these two coefficients which was oberved during the period of 2013Q1:2019Q2 proves that the refinancing rate of the Central Bank made a significant impact on the interbank money market. This can be seen from the data provided in the table below.

Table 1

Correlation between Central Bank Interest Rate and Real Market Rates[†]

№	Variables	Correlation Coefficients (ρ)					
		2013Q1-2016Q4		2017Q1-2019Q2		2013Q1-2019Q2	
		Nominal	Real	Nominal	Real	Nominal	Real
1.	Money Market Rate	0,43	0,73	0,96	0,96	0,88	0,86
2.	Interest rate on short-term household domestic currency deposits	0,83	0,86	-0,68	-0,01	-0,36	0,03
3.	Interest rate on long-term household domestic currency deposits	0,39	0,73	0,72	0,75	-0,08	0,24

When analyzing indicators of the period of 2013Q1-2019Q2, i.e. 26 quarters, we can witness absence of the correlation of nominal and real indicators of short-term deposits of the population and refinancing rate. In addition, if the correlation between nominal interest rates constitutes ρ= –0,36, the correlation between the real interest rates amounts to ρ=0,03.

3.2. The empirical analysis of the interest rate channel

When determining the impact of the interest rate of the Central Bank on the economy, empiric analysis have been performed with the help of VAR or VECM models. In this regard during the period of 2003Q1:2019Q2 we found efficient to develop the model demonstrating interrelation between the real interest rate of the Central Bank (INR_t), real money supply ($M2_t$), inflation rate (CPI_t), as well as real Gross Domestic Product of the country (GDP_t). All above mentioned indicators have been seasonable adjusted.

In order to observe the dispersion of the data selected, we have performed descriptive statistics analysis.

Table 2

Descriptive statistics of Variables[‡]

	Observations	Median	Maximum	Minimum	Std. Dev.
R_GDP	65	9.798518	10.95800	7.939382	0.821595
CPI	65	4.625953	4.673481	4.562065	0.020400
R_M2	65	6.821254	7.699569	4.620459	0.748562
INR	65	4.602487	4.667509	4.554349	0.020790

As the table illustrates, the standard dispersion of the inflation occurred in the economy accounted for 0,02% on average, and during the analyzed period dispersion

[†] Independently calculated by the author on the basis of the statistic data on the interest rate.
[‡] Calculated by the author on the basis of the official statistic data.

increased by maximum 4,67 per cent and reduced by minimum 4,56. Having considered the fluctuation level of the indicators it is required to study their mutual correlation.

Table 3

Correlation Matrix of Variables

	R_GDP	CPI	R_M2	INR
R_GDP	1			
CPI	0.1856	1		
R_M2	0.9871	0.1930	1	
INR	-0.2146	-0.9988	-0.2232	1

If we analyze the data presented in the table, herein correlation between the real GDP and the inflation rate accounted to 0,19. Thus, the correlation of the GDP with the money supply constitutes 0,98, in this regard the increase of the money supply can make a positive impact on the GDP growth. Moreover, the correlation of the real interest rate of the Central Bank with the GDP is based on the market reguliarities and amounts to -0,22. However, this correlation is not strong enough due to certain reasons.

Below we are conducting Augmented Dickey-Fuller Test in reliance on 4 indicators. Augmented Dickey-Fuller Test model is arranged as it follows:

$$\Delta GDP_t = \alpha_1 + \beta_1 t + \gamma_1 GDP_{t-1} + \delta_1 \Delta GDP_{t-1} + \cdots + \delta_{p-1} \Delta GDP_{t-(p-1)} + \varepsilon_t$$

$$\Delta CPI_t = \alpha_2 + \beta_2 t + \gamma_2 CPI_{t-1} + \varphi_1 \Delta CPI_{t-1} + \cdots + \varphi_{p-1} \Delta CPI_{t-(p-1)} + \tau_t$$

$$\Delta R\_M2_t = \alpha_3 + \beta_3 t + \gamma_3 R\_M2_{t-1} + \omega_1 \Delta R\_M2_{t-1} + \cdots + \omega_{p-1} \Delta R\_M2_{t-(p-1)} + \theta_t$$

$$\Delta INR_t = \alpha_4 + \beta_4 t + \gamma_4 INR_{t-1} + \mu_1 \Delta INR_{t-1} + \cdots + \mu_{p-1} \Delta INR_{t-(p-1)} + \sigma_t$$

Herein, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ - are constant value, $\beta_1, \beta_2, \beta_3, \beta_4 -$ variable coefficient which changes over the period of time.

With the help of this Augmented Dickey-Fuller Test model we have developed the following table demonstrating the indicators.

Table 4

The Results Augmented Dickey-Fuller Test

№	Variables	t-Statistic	Probability	Conclusion
1.	R_GDP	-1.683006	0.4347	I(1)
2.	CPI	-1.553773	0.5000	I(1)
3.	R_M2	-1.278855	0.6337	I(1)
4.	INR	-1.551677	0.5010	I(1)

As it is obvious from the table, none of the selected indicators is in the stationary.

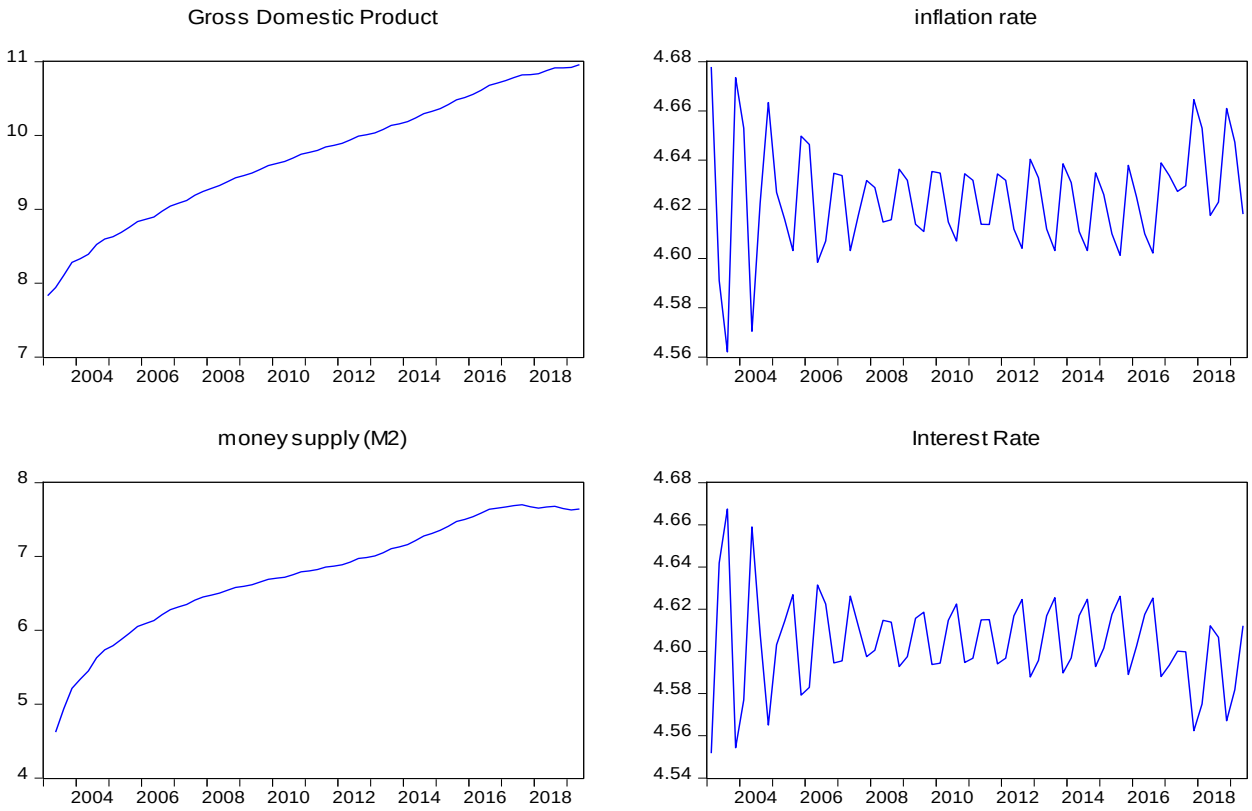

Figure 2. Dynamics of change of the indicators analyzed over the period of 2003-2019.

Due to the fact that the majority of the indicators specified above are of non-stationary nature, VAP model cannot be supported in reliance on these indicators. Furthermore, in our analysis we should use VECM model. However, in order to apply VECM model these indicators should be inter-correlated. For this reason it is required to implement Johansen Cointegration Test which demonstrates correlation of these indicators.

Table 5

Unrestricted Cointegration Rank Test (Trace)

Null Hypothesis	Eigenvalue	Trace Statistic	5%Critical Value	Prob.**
None *	0.764883	146.9764	47.85613	0.0000
At most 1 *	0.451736	57.22065	29.79707	0.0000
At most 2 *	0.202689	19.95876	15.49471	0.0099
At most 3 *	0.090996	5.915125	3.841466	0.0150

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Null Hypothesis	Eigenvalue	Max-Eigen Statistic	5% Critical Value	Prob.
None *	0.764883	89.75577	27.58434	0.0000
At most 1 *	0.451736	37.26189	21.13162	0.0001
At most 2	0.202689	14.04363	14.26460	0.0541
At most 3 *	0.090996	5.915125	3.841466	0.0150

The data presented in this table illustrates the interrelated correlation of these four indicators, which is of a long-term nature. In the next stage of our analysis, VECM model is recommended for application to find optimal "lag".

Table 6

Optimal Lag Length Criteria for VECM

Lag	LogL	LR	FPE	AIC	SC	HQ
1	898.6307	NA	1.96e-18	-29.42102	-28.86253	-29.20257
2	1067.711	293.0722	1.20e-20	-34.52369	-33.40671	-34.08678
3	1206.751	222.4649	2.02e-22	-38.62504	-36.94957	-37.96967
4	1278.715	105.5461	3.22e-23	-40.49049	-38.25652	-39.61666
5	1338.988	80.36445*	7.77e-24*	-41.96626*	-39.17380*	-40.87398*

In our model the number of optimal "lags" determined in reliance upon Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), as well as Hannan-Quinn information criterion (HQ), constitutes 5. However, when using VECM model, one "lag" was omitting. This it is possible to make a conclusion that in VECM model the number of optimal "lags" constitutes 4.

When using the analysis considered above, we develop VECM model on the impact of the interest rate of the Central Bank on the economy with the application of these 4 indicators.

$$\Delta GDP_t = \alpha_1 + p_1 e_1 + \sum_{i=1}^{4} \beta_i \Delta GDP_{t-i} + \sum_{i=1}^{4} \delta_i CPI_{t-i} + \sum_{i=1}^{4} \gamma_i \Delta RM2_{t-i} + \sum_{i=1}^{4} \omega_i INR_{t-i}$$

$$CPI_t = \alpha_2 + p_2 e_2 + \sum_{i=1}^{4} \beta_i \Delta GDP_{t-i} + \sum_{i=1}^{4} \delta_i CPI_{t-i} + \sum_{i=1}^{4} \gamma_i \Delta RM2_{t-i} + \sum_{i=1}^{4} \omega_i INR_{t-i}$$

$$\Delta RM2_t = \alpha_3 + p_3 e_3 + \sum_{i=1}^{4} \beta_i \Delta GDP_{t-i} + \sum_{i=1}^{4} \delta_i CPI_{t-i} + \sum_{i=1}^{4} \gamma_i \Delta RM2_{t-i} + \sum_{i=1}^{4} \omega_i INR_{t-i}$$

$$INR_t = \alpha_4 + p_4 e_4 + \sum_{i=1}^{4} \beta_i \Delta GDP_{t-i} + \sum_{i=1}^{4} \delta_i CPI_{t-i} + \sum_{i=1}^{4} \gamma_i \Delta RM2_{t-i} + \sum_{i=1}^{4} \omega_i INR_{t-i}$$

In addition, using VECM model it is possible to receive mutual impulse responses to macroeconomic indicators.

If we take into consideration the impulse reaction of the interest rate channel on the GDP, we can see that the impact of the increase of the refinancing rate of the Central Bank was not so significant within first 6 months. After that period this resulted in the decrease of the real GDP and made an outsatnding impact.

The main objective of the change of the refinancing rate of the Central Bank of the Republic of Uzbekistan over last years is combatting inflation. However, as we can see from the analysis, the interest rate does not affect the inflation.

When analyzing the impact of the money supply cahnge of the Central Bank we can see a positive impact of the increase of quarterly real money supply, i.e. money supply in circulation on the GDP. More precisely, the increase of the money supply in circulation results in the growth of the real GDP starting from the 3d quarter.

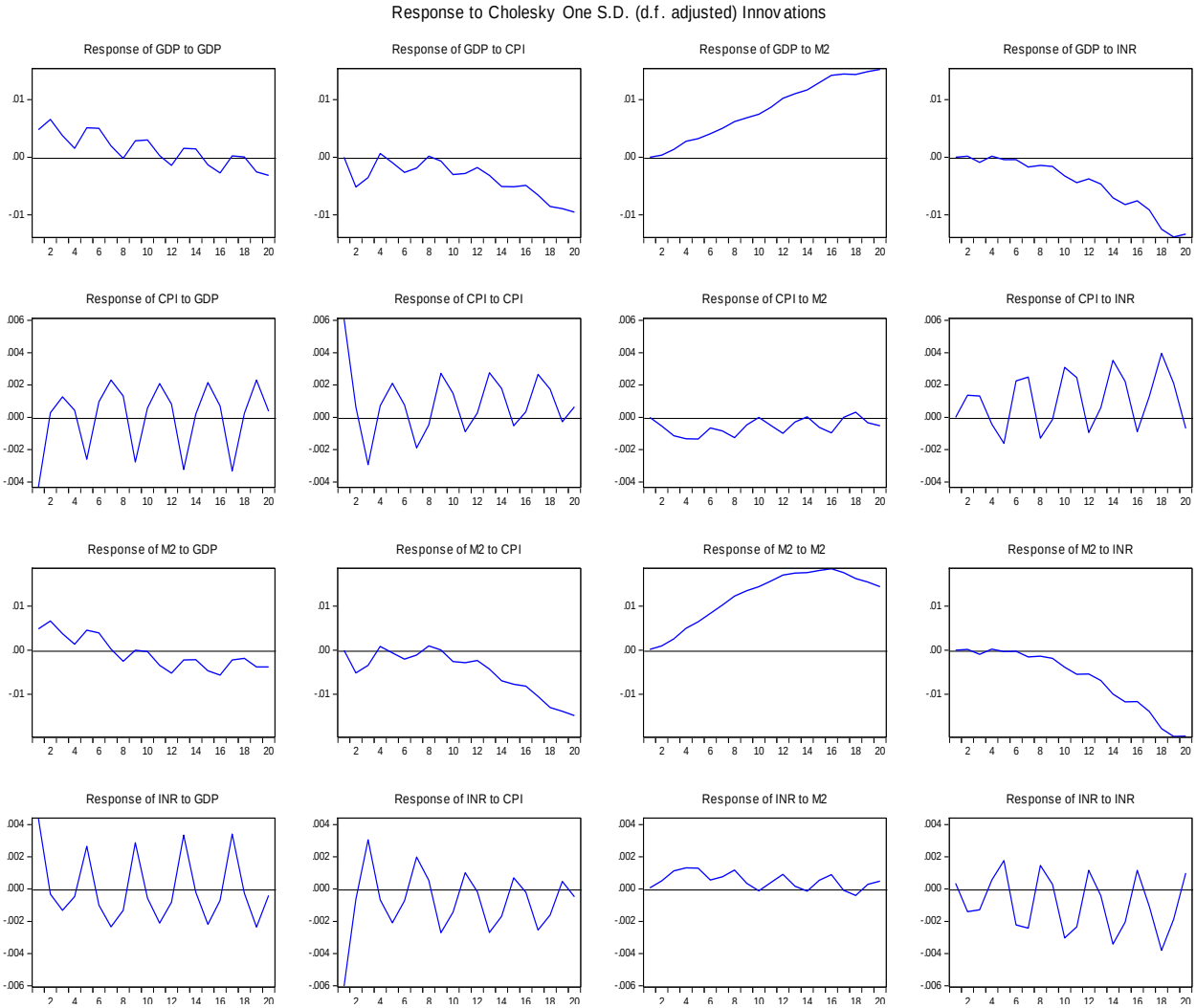

Figure 3. Mutual impulse of the macroeconomic indicators

The money supply increase makes an inverse impact on the inflation rate during initial one year. However, beginning from the 4th quarter the increase of the money supply in circulation partially raised inflation pressure and this effect disappeared after 6 quarters. In general, the impact of the change of the real money supply on the inflationary processes is very insignificant.

The increase of the inflation, which is one of the macroeconomic indicators of the Republic of Uzbekistan, leads to the growth of the real interest rate as well and this impact impulse lasts during 4 quarters. Afterwards the impact of the inflation on the real interest rates is gradually disappearing.

When considering the impact of the inflation of the Republic of Uzbekistan on real GDP growth over the period of 2003Q1:2019Q2, we can notice that the increase of inflation negatively affects the real GDP and this impact has a very significant character. In particular, the increase of the inflation which happened in the country within first two months causes reduction of the real GDP. In conclusion it is possible to say that since 2003 up to present time the inflation rate of the national economy was not less 6 per cent (making no reckoning of the inflation rate in 2003 and 2004). Thus, high inflation rates negatively affect the real economy of our country.

5. Conclusion

Summarizing the analysis provided above, it is posible make a conclusion that with the aim of raising the impact of the nominal and real interest rates of the Central Bank it is required to undertake the following measures:

1. In order to provide a comprehensive support to the various branches of the economy it is advasable to increase logical impact of the interest rate channel on the macroeconomic indicators through reducing loans extended on the preferential terms.

However, it should be noted that loans extended on the preferential terms cannot reach their primary objectives. As an exception we can mention only loans extended on preferential terms to the agricultural sector because entrepreneurs doing business in the agricultural sector cannot compete with entrepreneurs from other sectors for receiving preferential loans.

2. Proceeding from the peculiarities of other developing countries and locations of the countries, we can witness a high degree of the seasonal character in the composition of the Gross Domestic Product. By eliminating this seasonal character it is possible to strengthen and enhance the impact of the interest rate channel on the GDP. To achieve this aim the following measures shall be implemented:

- the monopoly in the economy and develop the competitive economy;
- avoiding the policy of protectionism;
- it is recommended to create the robust economy which manufactures the goods with high added value.

3. With the aim of reducing the inflation rate in the country, in our opinion, it is necessary for the Central Bank to implement not only macroeconomic policy, but macroprudential policy as well.

Reference:

1. Keynes J.M. (2019). General theory of the employment, interest rate and money. Moscow.

2. Bernanke, B., Blinder, A., (1992) The Federal Funds Rate and the Channels of Monetary Transmission. American Economic Review 82, pp. 901-921.

3. Rotenberg, J.J., Woodford, M. (1998). An Optimization-Based Econometric Framework for the Evaluation of Monetary Policy: Expanded Version. NBER. Technical Working Papers No.0223, Cambridge MA.

3. Taylor, J.B., (1995). The Monetary Transmission Mechanism: An Empirical Framework. Journal of Economic Perspectives, 9 (4), pp. 11-26.