THE EFFECTIVENESS OF INFLATION TARGETING IN GEORGIA

INTRODUCTION

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Monetary policy as the very important macroeconomic regulator has been identified as the subject of intense research over years. Particularly, it was extensively studied for industrialized countries. However, as transition countries still are not able to implement strong and stable monetary policy, the issue at hand has become the focus of academic research only in recent years. Thus, we find very interesting to analyze the monetary policy in developing countries on an example of Georgia.

Firstly, in case of Georgia the data availability gives us the possibility to make complete analyses. Secondly, country itself presents interesting case as it has recently experienced important economic transformation since Rose Revolution in 2003, followed by financial crisis and Russian-Georgian War in 2008. So, the above-mentioned sequence of quite influential events outlines the challenging role of National Bank of Georgia to keep macroeconomic stability in the country. Probably this might be the reason of switching from monetary base to inflation targeting (IT) regime in 2009. Thus we find interesting to elaborate consequences of this crucial change in the strategy of the monetary policy since 2009. Howeverthe effectiveness of Georgian monetary policy, after switching to inflation targeting regime, has not been systematically studied until now.Recent research papers instead provide findings for 2002-2007, trying to identify the main channel of monetary transmission mechanism in Georgia. Based on the literature we can just state that the strongest channel of the monetary transmission mechanism in Georgia is the exchange rate pass through(Gigineishvili, 2002; Samkharadze, 2008; Bakradze, 2008; Barbakadze, 2008). Thus, in order to compare implications of monetary policy implementation in the time period before and after changing the targeting regime we study the effects of exchange rate shocks on inflation in the pre and post inflation targeting regime by raising the following research hypothesis:

- Inflation targeting regime has reduced exchange pass through.

THEORETICAL BACKGROUND

MAIN DEFINITIONS

Generally monetary policy comprises the rules and actions that are adopted by the central bank to achieve its objectives. In most countries, the main objective of the central bank is to achieve price stability, yet the mandate of many central banks also encompasses other objectives, such as attainment of full employment, domestic financial stability and effective operation of foreign payments (Loayza and Schmidt-Hebbel, 2002). Yet, how the monetary policy affects the real economy? This can be explained by the monetary transmission mechanism. As Petursson (2001) explains, "the process that describes how changes in monetary policy propagate to other parts of the economy is called the transmission mechanism of monetary policy". In other words, this is the mechanism which shows how changes in the monetary policy variable affect inflation and output (Rummel, 2012).Additionally, monetary policy changes are triggered by shocks that can affect the attainments of specified objectives, affecting the economy through various mechanisms of transmission to the ultimate policy goals (Loayza and Schmidt-Hebbel, 2002).
Exchange rate pass through is one of the other channels of the monetary transmission mechanism. Based on the theory of the neoclassical exchange rate channel, when we face appreciation of the national currency, net export

of the country decreases so does the total output and thus the inflation rate decreases as well(Boivin, Kiley, and Mishkin, 2010)[1].

- The exchange-rate channel: $NEER\uparrow \Rightarrow NX\downarrow \Rightarrow y\downarrow \Rightarrow \pi\downarrow$

Here, NEER stands for nominal effective market exchange rates. In addition to net export, import also plays the particular role here. Due to an increase in NEER, which means appreciation of the national currency, imported goods become cheaper compared to the national production. Here we can consider two goods, intermediaries and final production. On the one hand, if intermediaries become cheaper the cost of domestic firms decreases and finally which reflects in the decreased prices and thus in the decreased inflation rate. On the other hand, when imported final production becomes cheaper, then if local firms refuse reducing prices, it is possible that they will lose market. So, both directions give us the same result – reduced inflation rate.

INFLATION TARGETING FRAMEWORK

While monetary policy has received wide attention compared to fiscal policy, particularly in the stabilization of the aggregate economy, there still exists debate on how monetary policy should be conducted. Among the strategies of conducting monetary policy, inflation targeting has gained wide acceptance by many central bankers and economists.

As Mishkin (2000) puts it, inflation targeting is a monetary policy strategy that encompasses five main elements: the public announcement of medium-term numerical targets for inflation; an institutional commitment to price stability as the primary goal of monetary policy, to which other goals are subordinated; an information inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments; increased transparency of the monetary policy strategy through communication with the public and the markets about the plans, objectives, and decisions of the monetary authorities; and increased accountability of the central bank for attaining its inflation objectives.

Theoretically inflation targeting can be "strict" or "flexible", but in practice inflation targeting is never strict but always flexible, in the sense that all inflation-targeting central bankers not only aim at stabilizing inflation around the inflation target but also put some weight on stabilizing the real economy, for instance, implicitly or explicitly stabilizing a measure of resource utilization such as the output gap (Svensson, 2010).

Some empirical studies support inflation targeting, for example, Batini and Laxton (2006) studied whether inflation targeting is associated with positive economic performance in emerging market. They conclude that targeting is associated with lower inflation, lower inflation expectations, and lower inflation volatility, with absence of visible adverse effects of targeting on output.

Even though inflation targeting is argued to be a ''constrained discretion'' which makes it possible to take care of inflation while maintaining output stability. There are still authors who find fault in this framework. For example Dittmar, Gavin, and Kydland (1999) adapt a Phillips Curve model to examine the price level implications of inflation-targeting rules and they show that when the central bank cares about the real economy, an inflation targeting regime will lead to much more uncertainty about inflation and the price level than is suggested.

According to Mishkin (2000), because an explicit numerical target for inflation increases the accountability of the central bank, inflation targeting might also reduce the likelihood that the central bank will fall into the time-inconsistency trap. Additionally, this regime is associated with transparency, which has tended to make the central bank highly accountable to the public.

Finally, we found really interesting to review the relationship between exchange rate pass through and inflation targeting. According to Taylor (cited in Coulibaly and Kempf, 2011)since inflation targeting is aimed at reducing inflation and sustaining the low inflation rate in the long run, it is possible to predict a low exchange rate pass through in countries that have adopted inflation targeting policy.

1 See for example the neoclassical models of investment of Jorgenson (1963) and Tobin (1969), the lifecycle/ permanent income models of consumption of Brumbergand Modigliani (1954), Ando and Modigliani (1963), and Friedman (1957), and the international IS/LM-type models of Mundell (1963) and Fleming (1962).

MONETARY POLICY AND ECONOMIC ENVIRONMENT IN GEORGIA

The National Bank of Georgia (NBG) is the central bank of Georgia, which is responsible for the formulation and implementation of monetary policy. It is an independent unit conducting monetary and exchange rate policies in the country. According to the Monetary Policy Strategy[1], which describes the main principles of monetary policy in Georgia and the directions of its development, the main objective of the National Bank of Georgia is to ensure price stability in the country. Since 2009, monetary policy in Georgia is focused on inflation targeting. However, before 2009, monetary policy was implemented under a monetary targeting regime which targeted a desired growth rate of the monetary base with the aim of controlling inflation[2].

The inflation target is set annually for the following 3-year period by the NBG and is approved by the Parliament of Georgia. Taking into consideration that at present Georgia is an emerging market economy and that such economies are characterized with higher inflation and growth, the NBG has set an inflation target of 6 percent for the year 2014 and 5 percent in period of 2015-2016. However, for the long-run, as the Georgian economy should converge to that of developed countries, the NBG set the long-run inflation target at 3 percent. It is also remarkable that monetary policy of the National Bank of Georgia does not react on temporary deviations from the inflation target caused by exogenous factors, except the case when the deviation is so large that it has impact on fundamental factors influencing inflation such as: inflation expectations and deviation of GDP from its potential level[3].

As for recent research analyses of Georgian economy, as we have already mentioned, they focus on identifying the main monetary transmission mechanism in Georgia.

Study conducted by Gigineishvili (2002) distinguishes between four main monetary transmission channels: direct interest rate channel, indirect interest channel, credit channel and the exchange rate channel. Finally paper, aiming to investigate the impacts of Russian crisis, finds the exchange rate channel the most important transmission mechanism of monetary policy in 1998-2001.

Another paper of Samkharadze (2008) analysing pass-through of different channels using VAR approach and Impulse Response Functions, exhibits the same results, finding out positive and significant exchange rate pass-through to inflation, commonly observed in transition economies. The author also outlines that as Georgian economy is based on cash transactions, high level of dollarization and law financial intermediation does not enable NBG to use its monetary policy tools efficiently.

In an attempt to explain the characteristics of inflation, Barbakadze (2008) finds out that exchange rates and nominal wages together with seasonal price fluctuations are the main determinants of inflation in Georgia. Namely, in the short-run depreciation of Georgian Lari against US dollars by 1 percent leads to a contemporaneous increase in CPI by 0,28 percent. In the long-run the impact becomes stronger and an increase in CPI encounters 0,43 percent. As for nominal wages, in the short-run 1 percent increase in nominal wages leads to an increase in CPI by 0,03 percent in the same month, while the impact in the long-run becomes less significant.

As for studying inflation targeting regime in Georgia, we can only find evaluation of readiness to switch to the IT regime. The paper of Bakradze and Billmeier (2008), conducted several months before the changes in monetary targeting strategy, underlines three particular elements of IT in Georgia. As the first element, authors consider the legal status of the central bank, and consistency of its interactions with the public, meaning clear cut target for annual inflation followed by unambiguous communication to the public underlining that price stability is the priority aim for the central bank. As for the second basic element, they present setting of the target for inflation, over a certain horizon. And the third element is defined as a model to forecast inflation with some precision. Finally, while paper raises the question whether Georgia is ready for switching to IT, the conclusion is simply – "not yet". Authors, explain such conclusion based on the following reasons: an absence of full implementation of the central bank's independence, not enough clearly pronounced monetary policy and the lack of a reliable interest rate that reflects the monetary stance.

1 Organic Law of Georgia on the National Bank of Georgia, N 1676 – IIS, Tbilisi, 24 September 2009.
2 Source of information: National Bank of Georgia - https://www.nbg.gov.ge/index.php?m=628.
3 "Main Directions of Monetary and Exchange Rate Policies of Georgia for years 2014-2016", N1727-IS, Kutaisi, December 11, 2013.

Empirical Analyses

Model Specification

To verify our research hypothesis, based on the literature presented above, we use VAR approach:

$$Y_t = A(L)Y_t + \mu_t \quad (1)$$

Where $Y_t$isthe vector of endogenous variables, including: real domestic GDP, domestic consumer price index, domestic lending rate, money supply and nominal effective exchange rate (NEER).According to the definition provided by the NGB, NEER is calculated as a weighted geometric average of nominal exchange rates against main trade partner countries' currencies.

$$NEER = \prod_{i=1}^{14}\left[1/e_i\right]^{w_i},$$

Where e_i is nominal exchange rate to the "i" partner countries' currencies, w_i - weight of the country "i" in the foreign trade turnover of Georgia. The growth of the index means appreciation of lari. The reduction indicates depreciation.

We use the data provided by National Bank of Georgia[1] and National Statistics Office of Georgia[2]. The data is monthly for all variables except the real GDP which was originally released in quarters. However, we filled the gaps between quarters by using interpolation.

Although, as the country has specific characteristics, we employ structural VAR approachas follows:

$G(L)Y_t = \varepsilon_t$,where $G(L) = F + H(L)$ (2)

Therefore, the structural equation and reduced-form equation (1) have the following relationship:

$A(L) = -F^{-1}H(L)$; $\mu_t = F^{-1}\varepsilon_t$ or $\varepsilon_t = F\mu_t$; $\Sigma = F^{-1}\Lambda F^{-1\prime}$ (3)

Σ and $\Lambda$are variance covariance matrix of μ_t andε_t , respectively.Consistent estimates of F and $\Lambda$are inferred by estimates of Σ. Since $F^{-1}\Lambda F^{-1\prime}$ contains $n\times(n+1)$ parameters to be estimated, while Σcontains only $n\times(n+1)/2$ parameters, we need $n\times(n+1)/2$ restrictions to achieve identification. Normalization of the diagonal elements of F reduces the required number of restrictions to $n\times(n-1)/2$, which should be motivated by economic theory.

Following Samkharadze (2008) who studied the monetary transmission mechanism in Georgia, we employ the non-recursive identification scheme:

$$A \qquad \mu_t \varepsilon_t$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & a_{34} & 0 \\ 0 & 0 & a_{43} & 1 & a_{45} \\ a_{51} & a_{53} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{y} \\ \mu_t^{p} \\ \mu_t^{m} \\ \mu_t^{i} \\ \mu_t^{x} \end{bmatrix} = \begin{bmatrix} \varepsilon_t^{y} \\ \varepsilon_t^{p} \\ \varepsilon_t^{m} \\ \varepsilon_t^{i} \\ \varepsilon_t^{x} \end{bmatrix}$$

The first row of "matrix A" represents the assumption that the real sector does not contemporaneously react to all policy variables. In the same way, the second row underlines that pricelevel is not contemporaneously affected. The third row shows that the money demand depends contemporaneously on the output, inflation and interest rate. The fourth row presents the monetary policy reaction function, in other words how the interest rate is set by the changes in money shock and exchange rate. And finally the last row shows that exchange rate might be affected by all kind of shocks to other endogenous variables.

[1] National Bank of Georgia - https://www.nbg.gov.ge/index.php?m=2&lng=eng.

[2] National Statistics Office of Georgia - http://geostat.ge/index.php?action=page&p_id=137&lang=eng.

As we need to compare the implications of the monetary policy in Georgia before and after the inflation targeting regime, we split time period between 2003-2008 and 2009-2013 and we estimate two models for these time periods with different restrictions.

To make restrictions properly, for the first period we follow restrictions set in the paper (Samkharadze 2008). Namely, based on the approach offered by Citu (2003),Samkharadzeassumes that money enters the equation of the interest rate, which implies that a_{43} equals to zero. The author also states that $a_{42}$is not different from zero becausepolicy variables do not cause contemporaneous effects on the interest rate. The last restriction imposed by Samkharadze refers to the fact that interest rate inGeorgiadoes not have a lot of power to attract the foreign capital in the country. So it implies that $a_{54}$is zero as well. However, for the second time period after inflation target regime, we change restrictions. Precisely, we make a_{42} non-zero, in other words, in conditions of inflation targeting, we would expect interest rate to respond to price level since we think that to achieve inflation targetNBG might adjust interest rates.

Preliminary Test Results[3]

First of all, we applied Augmented Dickey-Fuller Unit Root Test to check stationarity of variables. All variables found out to be non-stationary but getting stationary at the first difference level. After we tested for the appropriate number of lags to include in our model using VAR Lag Order Selection Criteriaby assuming a maximum lag length of 6. We observed that the various criteria used in selecting the optimal number of lags suggested different lag length. Specifically, LR suggested 4 lags, FPE suggested 1 lag, AIC suggested 6 lags, SC suggested 1 lag and HQ suggested 1.It seemed rational to choose lag one since majority of methods suggests 1 lag. However, to avoid the possibility of autocorrelation of residuals when few lags are used, we test for VAR residual serial correlation. The test was conducted with LM autocorrelation test. None of the lags chosen by the various methods certified the test. However, at lag 2, the test rejected the presence of autocorrelation among residuals. Since lag 2 is in between the two lags, we found it rational to choose it as our optimal lag. Afterwards, since our variables were stationary at the first difference level, we checked for cointegration applying Johansen Cointergation Test, figuring out no cointegration which enabled us not to switch on VEC model but to keep working on VAR model. Finally, since our focus was set on the VAR model, we checked the stability of VAR system. The test was done with 2lags, as we have already defined 2 lags as the optimal lag length. For a VAR process to be stationary, the roots of det ($I_n z^p – A_1 z^{p-1}$ - …-A_p) = 0 must all lie inside the unit circle. Test result confirmed that all roots of the equation lie inside the unit circle, thus the VAR system satisfies the stability condition.

While constructing the above-mentioned matrix with different restrictions for the first and second models to run structural VAR, we faced some problems because of collineairity. Thus to improve our estimation, we logged our variables. Because of putting everything in logs, we checked above-mentioned tests again, however results were pretty the same.

Interpretation of Results

First Model, Time period 2003-2008

Figure 1, presents the response of inflation (proxied by CPI) to a nominal effective exchange rate shock (po5sitive), in period 2003-2008. First of all we should recall that a positive shock in NEER is translated into the appreciation of the national currency[4]. In line with the economic intuitions, that currency appreciation might cause the decrease in inflation rate, the figure shows that inflation

[3] Since for both models we used the same data and variables and applied the same tests, to avoid duplicate writing, we provide test results once for both models.

[4] See the section of Model Specification, p.4.

responds negatively to the shock. Moreover, this effect is persistent over the period of 12 months. It reaches its peak in the sixth month and then declines for the eleventh and the twelfth months. However, the response is highly insignificant, evidenced by the wide margin of the error band from the zero horizontal line.

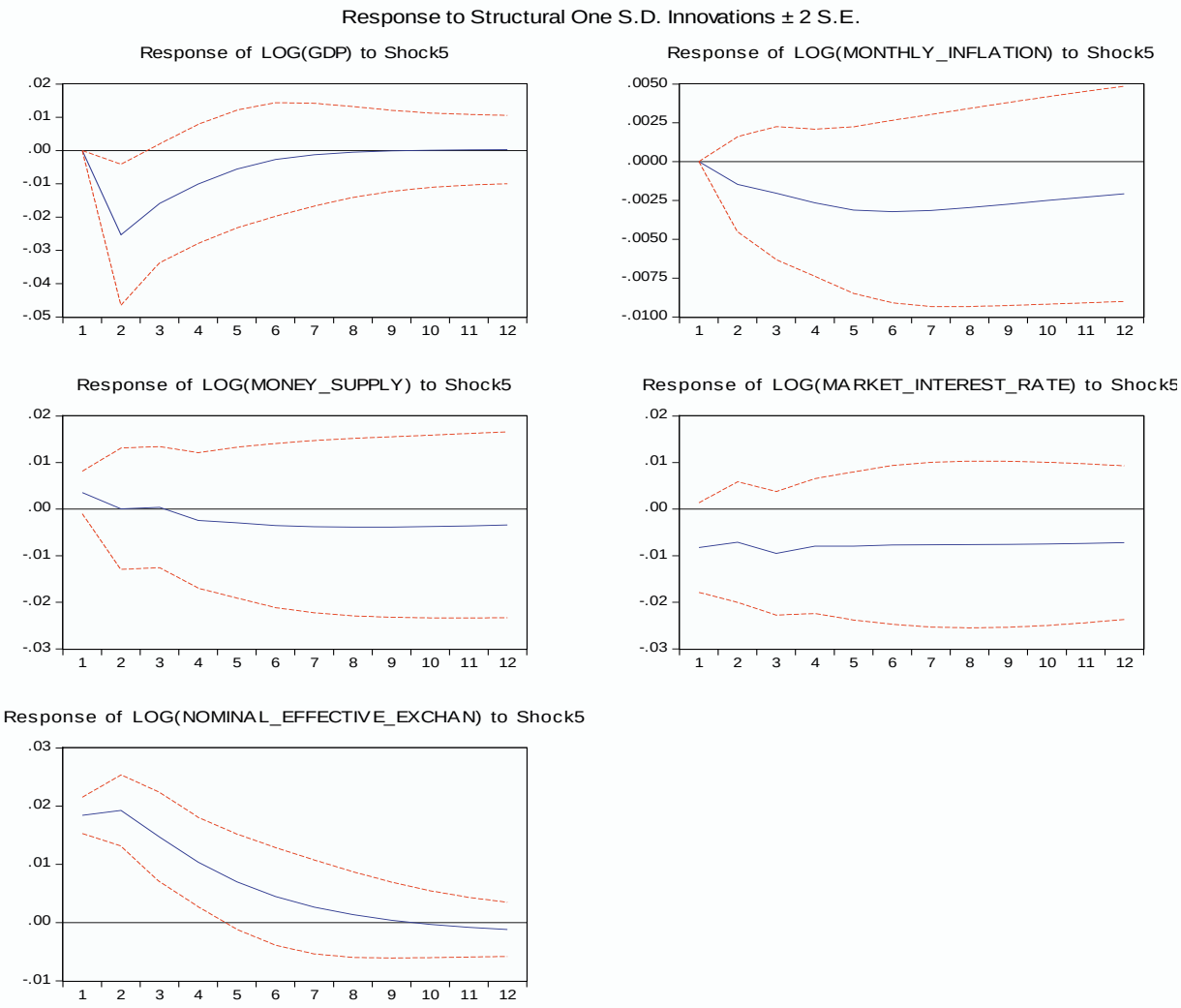

Figure 1. Illustration of the Impulse Response Functions for the first model.

Table 1, includes the variance decomposition matrix of inflation, which tells us what percentage of the variance in inflation is due to shocks to nominal effective exchange rate in Georgia, in period 2003-2008. The contribution of nominal effective exchange rate shock to the variance of inflation is 0 percent in period 1 and starts increasing from 0.772931percent from the second period accounting to 5.941185 percent by the tenth period. From the eleventh period, this peak value starts decreasing and reaches 5.722598 percent by the twelfth period.

Variance Decomposition of (MONTHLY_INFLATION):

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.011152	0.322152	99.67785	0.000000	0.000000	0.000000
2	0.016579	0.263530	91.18057	7.047229	0.735740	0.772931
3	0.019846	0.878451	84.96520	11.65672	0.908962	1.590667
4	0.022337	2.790421	77.59348	15.40952	1.543336	2.663242
5	0.024497	4.916959	70.33987	18.60074	2.303690	3.838742
6	0.026477	6.991193	63.88965	21.12133	3.230192	4.767630
7	0.028320	8.806855	58.43099	23.04641	4.313634	5.402112

8	0.030057	10.37859	53.85433	24.48079	5.520421	5.765870
9	0.031710	11.74125	49.99737	25.50928	6.826997	5.925103
10	0.033293	12.93684	46.70994	26.21054	8.201493	5.941185
11	0.034818	13.99815	43.87422	26.64781	9.617613	5.862208
12	0.036293	14.94921	41.40183	26.87430	11.05206	5.722598

Table 1. Variance Decomposition Matrix of Inflation for the first model.

Second Model, Time period 2009-2013

Figure 2, presents the response of inflation (proxied by CPI) to a nominal effective exchange rate shock (positive), in period 2009-2013.The figure shows that inflation responds positively to the shock of the exchange rate and this effect is persistent over the period of 9 months. It starts increasing in the second period and reaches its peak value by the sixth period. Afterwards, it starts declining and almost returns to the initial level by the tenth period. However, the response is highly insignificant, evidenced by the wide margin of the error band from the zero horizontal line.

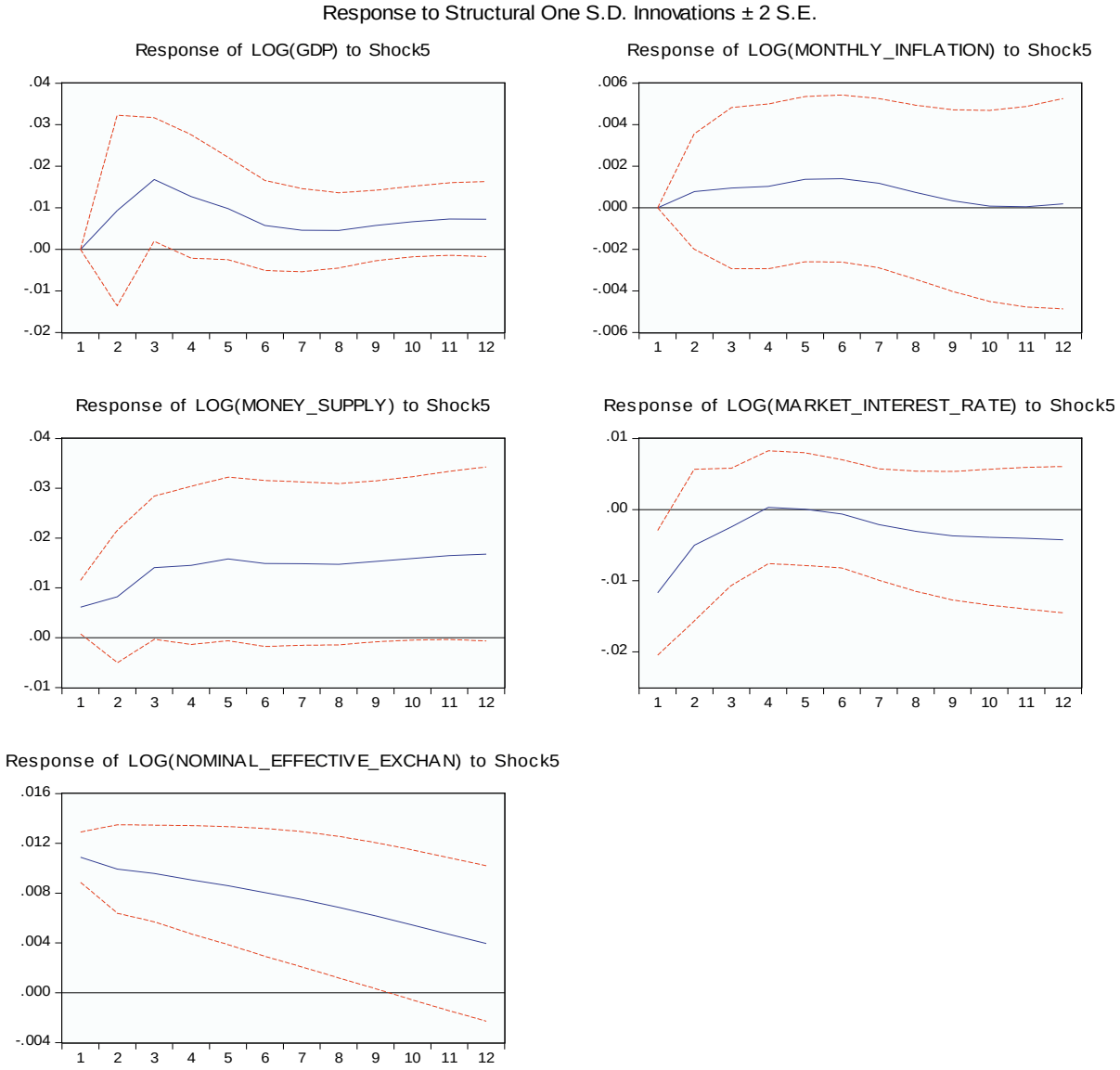

Figure 2. Illustration of the Impulse Response Functions for the second model.

Table 2, illustrates the variance decomposition matrix of inflation (which tells us what percentage of the variance in inflation is due to shocks to nominal effective exchange rate) in Georgia, in period 2009-2013. The contribution of nominal effective exchange rate shock to the variance of inflation is 0 percent in the first period. It starts increasing from 0.235072 percent at the second period and reaches its peak, 1.072116 percent by the tenth period. However, it starts decreasing and accounts 0.864321 percent by the twelfth period.

Variance Decomposition of (MONTHLY_INFLATION):

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.010034	0.928111	99.07189	0.000000	0.000000	0.000000
2	0.016031	5.572615	93.22480	0.836301	0.131214	0.235072
3	0.019144	4.119613	93.51499	0.873676	1.082686	0.409035
4	0.021090	5.108319	90.26027	0.756249	3.301301	0.573860
5	0.022590	6.485024	83.19206	0.694867	8.758487	0.869563
6	0.023877	6.409677	75.54167	0.705423	16.22252	1.120712
7	0.025185	5.791014	67.98826	0.995562	23.99924	1.225924
8	0.026569	5.331038	61.13211	1.745340	30.61240	1.179111
9	0.028055	5.087595	55.16487	2.952240	35.72318	1.072116
10	0.029621	4.899312	50.28350	4.386300	39.46830	0.962588
11	0.031263	4.649686	46.48121	5.799529	42.20526	0.864321
12	0.032971	4.371232	43.66954	7.023061	44.15581	0.780353

Table 2. Variance Decomposition Matrix of Inflation for the second model.

CONCLUSIONS

We aimed to study consequences of establishing inflations targeting regime in Georgia since 2009, as the issue at hand was not systematically studied until now. Recent research papers only give findings that the most important monetary transmission channel in Georgia was exchange rate pass through before changing targeting regime. Thus, in order to compare implications of monetary policy implementation in the time period before and after monetary policy changes,we studied the effects of exchange rate shocks on inflation in the pre and post inflation targeting regime. Based on the literature around the topic, our economic intuition behind efficiency of monetary policy was an expected decrease in exchange rate pass through. In other words, efficient monetary policy should decrease the volatility of inflation due to changes in exchange rate. Thus we raised the following research hypothesis: Inflation targeting regime has reduced exchange rate pass through.

To verify the above-mentioned hypothesis we applied structural VAR approach. However, we set different restrictions for the periods before and after IT regime. Since the monetary policy regime has been changed in 2009, we split the time period between 2003-2008 and 2009-2013 and estimated two models for these time periods.

Our econometrical analyses showed that even though in the both periods the pass through seems insignificant, in the period before inflation targeting regime the exchange rate pass-through was strong and persistent. While on the other hand, our results confirmed that for the period after establishing IT regime the exchange rate pass through was found out to be reduced.

Namely, in the first period, Variance Decompositions matrix exhibited that maximum 5.941185 percent of the variance in inflation was due to shocks to nominal effective exchange rate, while in the second period, the peak value of the variance in inflation due to shocks to nominal effective exchange rate accounted only 1.072116 percent. Moreover, Impulse Response Functions illustrated, that in the first period the impact of exchange rate shock on the inflation is strong and moreover persistent, as the inflation rate does not even returns to its initial level even after the twelfth months. In other words, the results of estimates for the first period can be translated into the high volatility of inflation due to the exchange rate shocks. While for the second period, Impulse Response Functions enlightened that the inflation rate almost returns to its initial level even by the tenth period. So our estimations

showed that persistence of the shock was clearly reduced after establishing inflation targeting regime in Georgia.

Thus, even though in the both periods the pass through seems insignificant, our results highlighted that after switching to the inflation targeting regime the exchange rate pass through has decreased finally reflected in the less response and less variance in the inflation due to the exchange rate shocks. Thus we have the reason to verify our hypothesis that inflation targeting regime has helped to reduce exchange rate pass through in Georgia.

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Appendix

First Model, Time Period 2003-2008

ESTIMATES OF RESTRICTIONS

Structural VAR Estimates					
Date: 05/31/14 Time: 03:00					
Sample (adjusted): 2003M03 2008M12					
Included observations: 70 after adjustments					
Estimation method: method of scoring (analytic derivatives)					
Convergence achieved after 16 iterations					
Structural VAR is over-identified (4 degrees of freedom)					
Model: Ae = Bu where E[uu']=I					
Restriction Type: short-run pattern matrix					
A =					
1	0	0	0	0	
C(1)	1	0	0	0	
C(2)	C(4)	1	C(5)	0	
0	0	0	1	C(6)	
C(3)	0	0	0	1	
B =					
C(7)	0	0	0	0	
0	C(8)	0	0	0	
0	0	C(9)	0	0	
0	0	0	C(10)	0	
0	0	0	0	C(11)	
	Coefficient	Std. Error	z-Statistic	Prob.	
C(1)	0.008379	0.017616	0.475642	0.6343	
C(2)	-0.174511	0.064762	-2.694663	0.0070	
C(3)	-0.062842	0.029144	-2.156279	0.0311	
C(4)	0.055693	0.438147	0.127111	0.8989	
C(5)	0.431573	0.116089	3.717610	0.0002	
C(6)	0.448470	0.258886	1.732308	0.0832	
C(7)	0.075547	0.006385	11.83216	0.0000	
C(8)	0.011134	0.000941	11.83216	0.0000	
C(9)	0.040816	0.003450	11.83216	0.0000	
C(10)	0.041203	0.003482	11.83216	0.0000	
C(11)	0.018421	0.001557	11.83216	0.0000	
Log likelihood	725.7751				
LR test for over-identification:					
Chi-square(4)	12.99439		Probability	0.0113	
Estimated A matrix:					
1.000000	0.000000	0.000000	0.000000	0.000000	
0.008379	1.000000	0.000000	0.000000	0.000000	
-0.174511	0.055693	1.000000	0.431573	0.000000	
0.000000	0.000000	0.000000	1.000000	0.448470	
-0.062842	0.000000	0.000000	0.000000	1.000000	
Estimated B matrix:					
0.075547	0.000000	0.000000	0.000000	0.000000	
0.000000	0.011134	0.000000	0.000000	0.000000	
0.000000	0.000000	0.040816	0.000000	0.000000	
0.000000	0.000000	0.000000	0.041203	0.000000	
0.000000	0.000000	0.000000	0.000000	0.018421	

Variance Decomposition Analyses

Variance Decomposition of (GDP):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.075547	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.085014	87.01095	1.799073	0.000204	2.308653	8.881123
3	0.089597	84.40451	1.687392	0.599105	2.164843	11.14415
4	0.091645	82.87881	1.612837	0.640060	3.018059	11.85023
5	0.092874	81.91523	1.724269	0.766276	3.697908	11.89631
6	0.093931	80.90856	1.949168	0.844920	4.585414	11.71194
7	0.094927	79.89047	2.218307	0.932974	5.473828	11.48442
8	0.095895	78.89494	2.461766	1.020147	6.367043	11.25611
9	0.096830	77.95207	2.662403	1.109261	7.236470	11.03980
10	0.097732	77.06874	2.821315	1.197629	8.075218	10.83710
11	0.098599	76.24281	2.946582	1.283245	8.879597	10.64776
12	0.099431	75.46962	3.046429	1.364386	9.648528	10.47103
Variance Decomposition of (MONTHLY_ INFLATION):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.011152	0.322152	99.67785	0.000000	0.000000	0.000000
2	0.016579	0.263530	91.18057	7.047229	0.735740	0.772931
3	0.019846	0.878451	84.96520	11.65672	0.908962	1.590667
4	0.022337	2.790421	77.59348	15.40952	1.543336	2.663242
5	0.024497	4.916959	70.33987	18.60074	2.303690	3.838742
6	0.026477	6.991193	63.88965	21.12133	3.230192	4.767630
7	0.028320	8.806855	58.43099	23.04641	4.313634	5.402112
8	0.030057	10.37859	53.85433	24.48079	5.520421	5.765870
9	0.031710	11.74125	49.99737	25.50928	6.826997	5.925103
10	0.033293	12.93684	46.70994	26.21054	8.201493	5.941185
11	0.034818	13.99815	43.87422	26.64781	9.617613	5.862208
12	0.036293	14.94921	41.40183	26.87430	11.05206	5.722598
Variance Decomposition of LOG (MONEY_SUPPLY):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.046852	9.105676	0.017517	75.89273	14.40500	0.579077
2	0.055146	9.746920	0.978421	74.54997	14.30652	0.418171
3	0.063802	13.63557	0.788412	70.55424	14.70558	0.316209
4	0.070213	14.95013	0.651419	68.22171	15.79527	0.381477
5	0.076039	16.32537	0.637778	66.04417	16.51982	0.472863
6	0.081241	17.33502	0.752488	63.81748	17.49134	0.603673
7	0.086085	18.20055	0.993153	61.64855	18.42755	0.730202
8	0.090643	18.94304	1.309389	59.49079	19.41531	0.841468
9	0.094984	19.59717	1.670483	57.38884	20.41210	0.931403

10	0.099144	20.18166	2.047270	55.35335	21.41928	0.998442
11	0.103148	20.70892	2.420812	53.39984	22.42663	1.043800
12	0.107012	21.18773	2.778329	51.53581	23.42826	1.069872
Variance Decomposition of LOG (MARKET_ INTEREST_RATE):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.042077	0.256038	0.000000	0.000000	95.88924	3.854721
2	0.049915	0.182348	0.256710	0.001757	94.80490	4.754285
3	0.058504	1.637482	0.358125	0.310484	91.59617	6.097739
4	0.064988	2.434137	0.357584	0.687052	90.07972	6.441508
5	0.070416	3.421747	0.348900	1.073866	88.40092	6.754565
6	0.075064	4.191634	0.328041	1.524960	86.96432	6.991041
7	0.079027	4.819953	0.309568	1.975385	85.65292	7.242169
8	0.082451	5.301511	0.292116	2.434151	84.46634	7.505878
9	0.085404	5.665776	0.276375	2.885545	83.39059	7.781715
10	0.087957	5.934961	0.262174	3.327272	82.41326	8.062335
11	0.090160	6.128653	0.249791	3.756005	81.52417	8.341386
12	0.092058	6.262459	0.239637	4.170845	80.71321	8.613853
Variance Decomposition of LOG (NOMINAL_ EFFECTIVE_EXCHAN):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.019023	6.228489	0.000000	0.000000	0.000000	93.77151
2	0.028104	8.867605	0.054941	1.091626	0.078364	89.90746
3	0.032378	10.59776	0.217381	0.824558	0.062887	88.29742
4	0.034610	11.96604	0.657765	0.921559	0.208755	86.24588
5	0.035928	12.95513	1.243439	1.443736	0.523891	83.83380
6	0.036792	13.50486	1.801835	2.305064	0.963687	81.42455
7	0.037432	13.74216	2.219600	3.400017	1.463447	79.17477
8	0.037950	13.78021	2.477995	4.624970	1.959760	77.15706
9	0.038399	13.70744	2.603596	5.905816	2.411484	75.37167
10	0.038807	13.57954	2.638606	7.187736	2.792456	73.80166
11	0.039187	13.42899	2.621401	8.435434	3.091799	72.42237
12	0.039545	13.27427	2.581081	9.626775	3.308947	71.20892

Second Model, Time Period 2009-2013

ESTIMATES OF RESTRICTIONS

Structural VAR Estimates					
Date: 05/31/14 Time: 03:50					
Sample (adjusted): 2009M03 2013M12					
Included observations: 58 after adjustments					
Estimation method: method of scoring (analytic derivatives)					
Convergence achieved after 11 iterations					
Structural VAR is over-identified (3 degrees of freedom)					
Model: Ae = Bu where E[uu']=I					
Restriction Type: short-run pattern matrix					
A =					
1	0	0	0	0	
C(1)	1	0	0	0	
C(2)	C(4)	1	C(6)	0	
0	C(5)	0	1	C(7)	
C(3)	0	0	0	1	
B =					
C(8)	0	0	0	0	
0	C(9)	0	0	0	
0	0	C(10)	0	0	
0	0	0	C(11)	0	
0	0	0	0	C(12)	
	Coefficient	Std. Error	z-Statistic	Prob.	
C(1)	0.011808	0.016018	0.737121	0.4610	
C(2)	-0.102103	0.050906	-2.005710	0.0449	
C(3)	0.017218	0.017455	0.986421	0.3239	
C(4)	0.569622	0.430140	1.324272	0.1854	
C(5)	-0.946137	0.426357	-2.219118	0.0265	
C(6)	0.524366	0.119734	4.379439	0.0000	
C(7)	1.074269	0.389848	2.755609	0.0059	
C(8)	0.081866	0.007601	10.77033	0.0000	
C(9)	0.009987	0.000927	10.77033	0.0000	
C(10)	0.031561	0.002930	10.77033	0.0000	
C(11)	0.032577	0.003025	10.77033	0.0000	
C(12)	0.010882	0.001010	10.77033	0.0000	
Log likelihood	662.0720				
LR test for over-identification:					
Chi-square(3)	1.023709		Probability	0.7955	
Estimated A matrix:					
1.000000	0.000000	0.000000	0.000000	0.000000	
0.011808	1.000000	0.000000	0.000000	0.000000	
-0.102103	0.569622	1.000000	0.524366	0.000000	
0.000000	-0.946137	0.000000	1.000000	1.074269	
0.017218	0.000000	0.000000	0.000000	1.000000	
Estimated B matrix:					
0.081866	0.000000	0.000000	0.000000	0.000000	
0.000000	0.009987	0.000000	0.000000	0.000000	
0.000000	0.000000	0.031561	0.000000	0.000000	
0.000000	0.000000	0.000000	0.032577	0.000000	
0.000000	0.000000	0.000000	0.000000	0.010882	

Variance Decomposition Analyses

Variance Decomposition of LOG(GDP):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.081866	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.084978	95.18183	1.205115	0.287508	2.114936	1.210615
3	0.093679	81.60628	3.021357	0.677474	10.48862	4.206265
4	0.096629	77.60974	3.390769	0.699219	12.61518	5.685093
5	0.099002	75.28068	3.322033	0.923535	14.07906	6.394685
6	0.100670	74.61051	3.223965	1.325171	14.33073	6.509625
7	0.101493	73.69378	3.210518	1.869793	14.61579	6.610112
8	0.102060	72.90535	3.189579	2.205705	14.96475	6.734613
9	0.102754	71.96630	3.148990	2.378527	15.55148	6.954697
10	0.103571	70.86623	3.130601	2.450430	16.29243	7.260309
11	0.104498	69.61881	3.133293	2.499352	17.13137	7.617174
12	0.105412	68.42882	3.134197	2.559028	17.91730	7.960654
Variance Decomposition of LOG(MONTHLY_INFLATION):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.010034	0.928111	99.07189	0.000000	0.000000	0.000000
2	0.016031	5.572615	93.22480	0.836301	0.131214	0.235072
3	0.019144	4.119613	93.51499	0.873676	1.082686	0.409035
4	0.021090	5.108319	90.26027	0.756249	3.301301	0.573860
5	0.022590	6.485024	83.19206	0.694867	8.758487	0.869563
6	0.023877	6.409677	75.54167	0.705423	16.22252	1.120712
7	0.025185	5.791014	67.98826	0.995562	23.99924	1.225924
8	0.026569	5.331038	61.13211	1.745340	30.61240	1.179111
9	0.028055	5.087595	55.16487	2.952240	35.72318	1.072116
10	0.029621	4.899312	50.28350	4.386300	39.46830	0.962588
11	0.031263	4.649686	46.48121	5.799529	42.20526	0.864321
12	0.032971	4.371232	43.66954	7.023061	44.15581	0.780353
Variance Decomposition of LOG(MONEY_SUPPLY):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.038893	4.883674	7.489314	65.85127	19.29140	2.484346
2	0.053866	4.068968	13.85153	39.04193	39.40750	3.630070
3	0.067648	5.800373	16.47305	27.34325	43.77158	6.611752

4	0.077359	4.923392	18.06281	22.78876	45.65403	8.571013
5	0.086329	4.233200	18.22874	20.03510	47.27161	10.23134
6	0.092852	4.629142	17.78559	18.84727	47.32374	11.41426
7	0.098169	4.677653	17.10670	18.38759	47.33034	12.49772
8	0.102421	4.686384	16.41455	18.08169	47.26482	13.55255
9	0.106119	4.491479	15.74076	17.76480	47.29456	14.70840
10	0.109450	4.292550	15.08607	17.35652	47.33023	15.93463
11	0.112577	4.094223	14.43727	16.89237	47.36890	17.20724
12	0.115489	3.931063	13.80877	16.42368	47.37253	18.46396
Variance Decomposition of LOG (MARKET_ INTEREST_RATE):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.035883	0.027926	6.934259	0.000000	82.42334	10.61447
2	0.040928	8.599510	5.705086	0.008693	76.03944	9.647271
3	0.044965	11.76650	4.793754	4.097929	71.05409	8.287729
4	0.048304	15.16551	4.192961	6.840622	66.61474	7.186170
5	0.050485	14.00999	4.120713	9.373702	65.91675	6.578841
6	0.052666	12.89213	4.700496	10.71735	65.63130	6.058734
7	0.055419	11.68713	6.059414	11.17658	65.46028	5.616605
8	0.058302	10.56714	7.762990	11.24024	65.08360	5.346031
9	0.061232	9.666636	9.383817	11.29764	64.44359	5.208313
10	0.063940	9.134038	10.67924	11.46026	63.58044	5.146023
11	0.066361	8.783986	11.65293	11.73838	62.67579	5.148904
12	0.068470	8.521115	12.38089	12.04214	61.83630	5.219564
Variance Decomposition of LOG (NOMINAL_ EFFECTIVE_EXCHAN):						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.010973	1.649952	0.000000	0.000000	0.000000	98.35005
2	0.015219	0.897085	2.973953	2.178063	0.274197	93.67670
3	0.018967	0.604373	9.236208	2.682430	1.679742	85.79725
4	0.022441	0.432322	16.26966	3.214268	2.478855	77.60490
5	0.025795	0.479572	22.93993	3.802529	2.929161	69.84881
6	0.028948	0.610860	28.73275	4.315118	3.140811	63.20046
7	0.031816	0.801390	33.50139	4.743697	3.078284	57.87524
8	0.034356	0.963595	37.43241	5.080394	2.894529	53.62907
9	0.036538	1.086713	40.68170	5.296094	2.661887	50.27361
10	0.038359	1.164391	43.36993	5.405285	2.437391	47.62300
11	0.039837	1.215996	45.55699	5.425445	2.260137	45.54143
12	0.041001	1.249239	47.27826	5.382060	2.164435	43.92601

ინფლაციის თარგეთირების ეფექტიანობა საქართველოში

იაშა (იაკობ) მესხია
ეკონომიკის მეცნიერებათა დოქტორი, პროფესორი, ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტის საერთაშორისო ბიზნესის კათედრის ხელმძღვანელი

თინათინ ახვლედიანი
ვარშავის უნივერსიტეტის საერთაშორისო ეკონომიკის პროგრამის მაგისტრანტი

რეზიუმე

საქართველოს ეროვნული ბანკის როლი ქვეყნის ეკონომიკურ განვითარებასა და მაკროეკონომიკური სტაბილურობის შენარჩუნების პროცესში გადამწყვეტ მნიშვნელობას იძენს. განსაკუთრებით აღსანიშნავია უკანასკნელი წლებში მონეტარული პოლიტიკის იმპლემენტაცია, ვარდების რევოლუციის შემდგომი ეკონომიკური რეფორმების, რუსეთ-საქართველოს ომისა და მსოფლიო ფინანსური კრიზისის ფონზე. ამ მხრივ, საყურადღებოა ის ფაქტი, რომ სწორედ მონეტარული პოლიტიკის ეფექტიანობის ამაღლების მიზნით მოხდა საქართველოს ეროვნული ბანკის სტრატეგიაში გარკვეული ცვლილებების შეტანა. კერძოდ, 2009 წელს, მონეტარული რეჟიმიდან ინფლაციის თარგეთირების რეჟიმზე გადასვლა. თუმცაღა იქიდან გამომდინარე, რომ ინფლაციის თარგეთირების ეფექტიანობის შესწავლა საქართველოში სისტემურ ხასიათს ჯერ კიდევ არ ატარებს, მნიშვნელოვნად მიგვაჩნია, ეროვნული ბანკის სტრატეგიაში დანერგილი თარგეთირების რეჟიმის შედეგების გამოკვლევა.

აღნიშნული საკითხის გარშემო არსებული ეკონომიკური ლიტერატურის ანალიზის საფუძველზე ცალსახად იკვეთება, რომ მონეტარული პოლიტიკის გადაცემის მექანიზმში ყველაზე ძლიერ გაცვლითი კურსის კომპონენტი მუშაობს. სხვა სიტყვებით რომ ვთქვათ, ინფლაციის მერყეობაზე ყველაზე უფრო მნიშვნელოვან გავლენას გაცვლითი კურსის ცვლილებები ახდენს. მონეტარული პოლიტიკის ეფექტიანობა კი ნიშნავს სწორედ გაცვლითი კურსის გავლენით ინფლაციის დონის მერყეობის შემცირებას. შესაბამისად, ეროვნული ბანკის ახალი სტრატეგიის ეფექტიანობის შესწავლის მიზნით სტატიაში გამოკვლეულია გაცვლითი კურსის შოკის გავლენა ინფლაციის დონეზე ინფლაციის თარგეთირების წინა და შემდგომ პერიოდებში.

კვლევა ეფუძნება ემპირიულ ანალიზს, სახელდობრ, ეკონომეტრიკული ანალიზისთვის გამოყენებულია სტრუქტურული ვექტორული ავტორეგრესიის მოდელი (structural VAR). ამასთან, მონეტარული პოლიტიკის სტრატეგიის ცვლილების შესაბამისად, დროის პერიოდი დაყოფილია ინფლაციის თარგეთირების რეჟიმის წინა და შემდგომ პერიოდებად და აგებულია ორი ეკონომეტრიკული მოდელი სხვადასხვა შეზღუდვებით, შესაბამისად 2003-2009 და 2009-2013 წლებისთვის. ეკონომეტრიკული ანალიზის შედეგები ცხადყოფს რომ გაცვლითი კურსის არხის გავლენა ინფლაციის მერყეობის დონეზე 2003-2009 წლებში უფრო მტკიცე და ძლიერია ვიდრე ინფლაციის თარგეთირების შემდგომ 2009-2013 წლებში. უფრო ზუსტად, ინფლაციის თარგეთირების წინა პერიოდში ვარიაციის დეკომპოზიციის მატრიცა გვიჩვენებს რომ ინფლაციის ცვლილების მაქსიმუმ 5.94 % გამოწვეულია ნომინალური ეფექტური გაცვლითი კურსის შოკის გავლენით, ხოლო იმპულსზე რეაქციის ფუნქცია გვიჩვენებს, რომ ინფლაციის დონე საწყის მაჩვენებელს არ უბრუნდება თორმეტი თვის შემდეგაც კი. ინფლაციის თარგეთირების შემდგომ პერიოდში კი იმავე შოკის გავლენით აიხსნება ინფლაციის ცვლილების მხოლოდ 1.07 % და იმპულსზე რეაქციის ფუნქციის შედეგებზე დაყრდნობით ინფლაციის დონე უბრუნდება საწყის მაჩვენებელს ათი თვის შემდგომ.

საბოლოოდ, ჩვენს მიერ შემოთავაზებული ეკონომეტრიკული ანალიზის საფუძველზე შეიძლება დავასკვნათ, რომ ინფლაციის თარგეთირების შემდგომ პერიოდში შემცირებულია გაცვლითი კურსის შოკის გავლენა ინფლაციის დონის მერყეობაზე. შესაბამისად ინფლაციის თარგეთირება შეიძლება მივიჩნიოთ მონეტარული პოლიტიკის ეფექტიანობის ამაღლების მნიშვნელოვან ინსტრუმენტად საქართველოში.