International Journal of Economics and Financial Issues
Vol. 3, No. 2, 2013, pp.476-485
ISSN: 2146-4138
www.econjournals.com

Is There a Link Between Monetary Policy and Risk Perception in Eastern European Countries Implementing Inflation Targeting Regime?

Aydan Kansu
Istanbul University, Faculty of Economics, Department of Economics,
Istanbul, Turkey. Email: aykansu@istanbul.edu.tr

Nurtac Yıldırım
Istanbul University, Faculty of Economics, Department of Economics,
Istanbul, Turkey. Email: nurtacy@istanbul.edu.tr

Oguzhan Ozcelebi
Istanbul University, Faculty of Economics, Department of Economics,
Istanbul, Turkey. Email: ogozc@istanbul.edu.tr

ABSTRACT: Following the recent financial crisis of August 2007 in US, economists and policy makers hold the view that monetary policy may have an effect on real economic activity through 'risk taking channel' which indicates the risk behavior of economic agents and the linkages between monetary policy and perception of risk. In this study, we examine whether changes in monetary policy stance influence the risk perceptions and generates any impact on the real side of the economy in Czech Republic, Poland, Russian Federation and Turkey implementing inflation targeting. In the context of a SVAR model, we find that monetary policy does not affect risk perception reflected by stock price variability and any attempt by central banks to stimulate real economic activity through monetary policy also appears to be ineffective in these countries.

Keywords: Monetary policy; Interest Rates; Stock Markets; Real Economic Activity; Risk perception; SVAR model
JEL Classifications: E30; E32; E37; E43; E44; G10

1. Introduction

The role of asset prices in monetary policy design has long been of interest both to scholars and policy makers. The reason this issue has drawn so much attention is that asset price bubbles have historically had devastating effects on real economy. It has been observed since the dawn of modern capitalist era that swings in asset prices point the way of financial and economic crises both in developed and developing countries. The recent global crisis initially arisen in US in August 2007 and then in other countries is also acknowledged as a prototype for crises triggered by the burst of asset bubbles and spread to the real sector. The lessons from the crisis have reemphasized the importance of understanding the interaction between monetary policy and asset prices which accounts for bidirectional causation working both from monetary policy to asset prices and from asset prices to systematic monetary policy.

The financial crisis has also lead monetary authorities to take financial stability into account more seriously since this crisis appears to erupt in a low inflation environment just as the other financial crisis in US[1]. As a sequence of the 2007 crisis, many central banks implemented

[1] Bordo and Wheelock (2004, 2007) present well documented analysis on the issue that most of the stock market booms in US and other countries occur during the periods marked by price stability and rapid growth of output and productivity.

expansionary monetary policy associated with low interest rates in order to avoid recession[2]. This policy seemed to be sustainable at that period since inflation could be kept at targeted levels. However, financial imbalances build up easily in such an economic environment. Low interest rates stimulate not only economic activity but also risk appetite of investors reducing risk aversion and changing risk perception of economic agents which in turn is expected to produce real outcomes in an economy. This case leads to the reinforcement of the view that monetary policy may have an effect on real economic activity through 'risk taking channel' which is related to the risk behavior of economic agents. This fact, on the other hand, raises another concern for policymakers in that policy makers seeking to avoid such devastating financial crisis should take into account the overall components of this channel such as risk perception of investors in stock markets or risk aversion and uncertainty. Since investors' risk perception acts as a signal for possible changes in stock markets, a monetary authority seeking to maintain financial stability should pay attention to this signal by responding through interest rates. Responding to this signal by increasing interest rates when risk aversion falls and decreasing interest rates when risk aversion increases, central bank may also have a chance to avoid price bubble in stock markets. In the light of these implications, it is increasingly argued that reaction functions which do not include asset prices and risk perception or other financial risk factors may not capture the overall effects of monetary policy choices of monetary authority.

The risk taking channel indicating the linkages between monetary policy and perception of risk operates mainly with the balance sheet channel to transmit a change in monetary policy into economic activity. Balance sheet channel refers to the influence of monetary policy on firms' balance sheets and income statements. An expansionary policy puts upward pressure on asset prices driving up the net worth of firms and leading to higher investment spending and hence aggregate demand and output, defining balance sheet channel. A fall in interest rates also exerts an influence on risk perceptions of economic agents stimulating financial agents to take on more risks and to increase their liabilities.

The remainder of the paper is structured as follows: Section 2 develops the theoretical framework by tracing briefly the role of asset prices in monetary policy setting and the debate on whether monetary authorities should react to changes in the factors of these channels such as swings in asset prices. This section also outlines the role of risk factors in transmission mechanism. Some previous empirical researches on these issues are also presented in Section 2. Section 3 presents the data and model proposed here for exposing the effects of changes in monetary policy stance on risk perception proxied by stock price variability and on real economic activity in Czech Republic, Poland, Russian Federation and Turkey. Empirical findings are presented in section 4. Section 5 discusses policy implications and concludes the paper.

2. Theoretical Considerations and A Review of Previous Empirical Studies

The link between monetary policy and economic activity is traditionally examined by transmission of monetary policy which indicates how the interest rate policy conducted by central bank has an impact on the overall economic activity particularly on inflation and economic growth through various channels. Asset prices among others are paid a special attention in monetary transmission mechanism. The effects of asset prices are transmitted to the overall economic activity mainly by two channels: wealth effect and balance sheet effect. Swings in asset prices triggered by monetary policy exert an influence on consumption through wealth effect and on investment expenditures through balance of sheet effect, affecting the overall economic activity. When asset prices stay on an increasing (decreasing) course due to the expansionary (contractionary) monetary policy, the wealth of economic agents increases (decreases), putting an upward (downward) pressure

[2] See Taylor (2009) for a detailed evaluation on the crisis which he assumes to be triggered by too "loose fitting" monetary policy with a big deviation from Taylor rule, keeping interest rates well below the level that policy suggests.

on consumption expenditures and leading to economic boom (recession).[3] A rise in asset prices has a significant influence on consumption by even households who do not hold any asset through its positive effects on consumer confidence and expectations on future economic conditions (Poterba, 2000). The other channel through which monetary policy exerts its influence on economic activity via changes in asset prices is balance sheet channel introduced by Bernanke and Gertler (1995). Balance sheet channel indicates the possible influence of monetary policy on borrowers' balance sheets and income statements comprised of a variety of financial assets. Increased asset prices preceded by expansionary monetary policy drive up the net worth of firms reducing adverse selection and moral hazard problems. This in turn leads to higher lending encouraging higher investment spending and aggregate demand (Mishkin, 2001). A tight monetary policy, however, reduces the value of the borrower's collateral since a rise in interest rates leads to a decrease in asset prices. Besides, rising interest rates reduce borrowers' cash flows due to increased interest expenses. This will in turn lead to the worsening of their financial situation, the increase in moral hazard, a decline in lending and the extension of the effects of initial policy to the overall economic activity (Bernanke and Gertler 1989, 1995).

Along with these relationships between monetary policy setting and stock prices, the risk taking channel turns out to be extensively articulated in the face of the lessons drawn from the recent crisis. It reveals that the choice of expansionary monetary policy in order to avoid recession is not free from distortionary effects on financial markets. One of the ways through which this channel can be effective is the impact of interest rates on asset prices and hence on collateral values and some other incomes and profits, that is, 'balance sheet channel'. An economic environment with low interest rates may easily switch the investors' risk perception and risk tolerance by increasing the value of assets and collaterals and hence improving their balance sheets (Borio et al., 2001; Borio and Zhu, 2008). In addition, increased stock prices along with low interest rates contribute to a fall in volatility in stock prices and hence risk perception regarding the volatility of stock prices (Gambacorta, 2009). In this respect, risk taking channel can be seen as one of the reinforcing factors for balance sheet channel of transmission mechanism. Another way by which this channel operates is identified as 'search for yield' indicating that low interest rates along with an expansionary monetary policy encourage financial institutions to take on higher risks searching for riskier assets with higher expected returns, which in turn is likely to introduce financial distortions (Rajan, 2005). Communication policies and the degree of transparency of central banks also affect the operation of this channel. An increased degree of transparency and a strong commitment by central banks to maintain a sound economic environment with reduced risk and uncertainty about the future may affect the perception of risk (Borio et. al., 2001).

On the empirical side of the issue, regarding the role of risk taking channel, there have been a few studies most of which are conducted in banking sector examining the link between monetary policy and bank risk. These studies commonly found a significant positive relationship between expansionary monetary policy accompanied by low interest rates over a long period of time and risk taking behavior of banks in various countries under estimation (Jimenez et al., 2009; Ioannidou et al., 2009, Altunbaş, 2010; Gambacorta, 2009; Delis and Kouretas, 2011; Paligorova and Santos, 2012) There are fewer empirical studies on the linkage between monetary policy and risk perception in stock markets partly because the risk taking channel is primarily identified by its effects on banking sector.

One of the studies seeking to explore the linkages between risk aversion in financial markets, stock market option-based implied volatility and monetary policy is conducted by Bekaert et al. (2010). In order to capture the effect of monetary policy on stock market risk they employ a structural VAR model using monthly data for US over the period 1990-2007. Stock market option-based implied volatility is decomposed into two components in the study: risk aversion and uncertainty. They found that there is a strong positive relationship between real interest rates used as monetary policy stance and risk aversion. Expansionary monetary policy drives up risk appetite and reduces risk aversion

[3] As a striking finding, Poterba (2000) found that more than 60 percent of wealth creation is attributed to the increasing value of household stock holdings in US throughout 1990s. For further empirical analysis on the effects of household financial wealth on consumption, see, among others, Benjamin et al. (2004), Bostic et al. (2009) for US and Sousa (2010) for Euro area.

exposing investors to more risky positions. The other component of implied volatility, uncertainty, was not found to respond to monetary policy. However, high level of uncertainty leads to expansionary monetary policy in the future.

Employing VAR models, Luo et al. (2011) investigate the effect of monetary policy in UK and Germany on investors' risk aversion for which several option based implied volatility indices are used as proxy. The authors found strong evidence that monetary policy shocks exert an influence on risk perception and risk aversion in both countries. The effect is found to be relevant for a longer period of time in UK while it lasts for a shorter time of period in Germany. The study also produces the result that Bank of England responds to a rise in risk aversion by expansionary monetary policy whereas this is not the case for European Central Bank which reacts to a rise in risk aversion in German security markets through tight monetary policy.

3. Empirical Methodology

In this study, we particularly investigate the effects of monetary policy decisions on risk perception reflected by stock price variability and real economic activity in Eastern European countries implementing inflation targeting regime (Czech Republic, Poland, Russian Federation and Turkey) by employing Blanchard-Quah type Structural Vector Autoregression (SVAR) model following the methodology of Luo et al. (2011) with the data from January 2002[4] to August 2012. Within the context, long-run theoretical considerations are allowed and interactions between monetary policy and stock prices are incorporated into the estimation process as mentioned in section 4. In our study, monetary policy stance is proxied by the inter-bank call money interest rate in real terms[5] (irt_t), whereas industrial production index[6] (ind_t) is used for indicating the real economic activity. For the asset price volatility, volatility of stock price index[7] -the standard deviation of stock price index's yearly logarithmic returns- (vol_t) is computed.

3.1. Unit Root Tests for the Time Series

Stationary among the variables is to be tested for specify the appropriate econometric model. In this study, we employ the most widely used test in the econometric literature -the Augmented Dickey-Fuller (ADF) test- as expressed below;

$$\Delta y_t = \upsilon y_{t-1} + \sum_{j=1}^{p-1} \alpha_j^* \Delta y_{t-j} + \gamma tr + \mu + u_t \quad (1)$$

In the regression model above, first-differenced series $y_t - y_{t-1}$ are denoted by Δy, p is the number of lagged differences, μ and tr denote the intercept and trend terms, respectively and γ is the coefficient of tr. ADF test statistic is based on the t-statistic of the coefficient υ from OLS estimation. Accordingly, $H_0 : \upsilon = 0$ versus $H_0 : \upsilon < 0$ is tested. Since critical values of the test depend on the deterministic terms (μ and tr), different critical values are used when a constant or linear trend term is included in the test. In our study, the Pantula principle proposed by (Pantula, 1989) is followed to determine the inclusion of deterministic terms. Pantula principle implies that if a linear

[4]After Turkey has been recognized as a candidate state at the Helsinki European Council, Central Bank of the Republic of Turkey (CBRT) announced a new economic stabilization and structural change program towards the goal of full membership in the EU. Within this context, the year 2002 has been marked by the adoption of inflation targeting regime.

[5] We compute the real interest rate on the inter-bank call money interest rate as; Real Interest Rate=((1+Nominal Interest Rate)/(1+Actual Inflation Rate))-1. Consumer price inflation series are percentage changes over the same month of previous year of the consumer price index with the OECD base year (2005) = 100.

[6] Industrial production series are percentage changes over the same month of previous year of the industrial production index with the OECD base year (2005) = 100.

[7] Stock price index's yearly logarithmic returns is computed as; $\log(spi_t / spi_{t-1})$, where spi_t denotes the value of the stock price index at t period and spi_{t-1} is value of the stock price index at $t-1$ period. Stock price index series are with the base year (2005) = 100 and obtained from OECD.

trend term is needed in the test for y_t, then only a constant term should be used in the test for Δy. Similarly, if just a constant is necessary in the test for y_t, the test for Δy is to be carried with no deterministic term (Lütkepohl, 2007a: 55). All series used in the empirical analysis have a nonzero mean and a linear trend except irt_t^{pol}, irt_t^{tur} and ind_t^{tur}. Accordingly, ADF test is applied to irt_t^{pol}, irt_t^{tur} and ind_t^{tur} series with only constant terms, whereas ADF tests of other series are implemented with constant and trend terms. The number of lagged differences in the regressions allowing a maximum lag length (p) of 10 are determined by the Akaike Information Criteria (AIC). Table 1 indicates that all series are stationary at least at the 10% significance level.

Table 1. Augmented Dickey-Fuller Test Results

Variables	Augmented Dickey-Fuller Test Statistic	Deterministic Terms	Number of Lagged Differences
irt_t^{cze}	-2,67	Constant	3
irt_t^{pol}	-3,55	Constant, trend	7
irt_t^{rus}	-3,01	Constant	4
irt_t^{tur}	-3,16	Constant, trend	6
vol_t^{cze}	-2,69	Constant	2
vol_t^{pol}	-3,01	Constant	2
vol_t^{rus}	-2,87	Constant	2
vol_t^{tur}	-2,59	Constant	6
ind_t^{cze}	-4,09	Constant	8
ind_t^{pol}	-2,94	Constant	1
ind_t^{rus}	-2,82	Constant	4
ind_t^{tur}	-4,01	Constant, trend	4
Notes: 10% critical values for ADF test with constant and trend constant are -3,13 and -2,57 from Davidson and McKinnon (1993), *Table 20.1, p. 708.*			

3.2. SVAR Model

The point of departure of the empirical analysis is a K-dimensional stationary VAR (p) model [8] as specified below;

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + D_t + u_t \tag{2}$$

where $y_t = (y_{1t}, \ldots, y_{Kt})'$ is a vector of observable endogenous variables with K elements. The A_i are fixed $(K \times K)$ coefficient matrices, whereas D_t contains all deterministic variables such

[8] In mathematics, simultaneous equations are a set of equations containing multiple variables that form a system of equations. On the other hand, it is quite common in economics to have models where some variables are not only explanatory variables for a given dependent variable, but they are also explained by the variables that area used to determine. In those cases, we have models of simultaneous equations in which it is necessary to identify which are endogenous and which are exogenous. According to Sims (1980), it there is simultaneity among a number of variables, then all variables treated as endogenous. This means that in tis general reduced form each equation has the same set of regressors which leads to the development of the VAR model (Asteriou and Hall, 2007:.279.)

as a constant term, a linear trend term and dummy variables Finally, $u_t = (u_{1t},...,u_{Kt})$ is a K-dimensional unobservable zero-mean innovation process, that is, $E(u_t) = 0$ with positive definite covariance matrix $E(\mu_t\mu_t^{'}) = \Sigma_u$ (Lütkepohl, 2005:13).

For exploring the dynamic interactions between the endogenous variables of a VAR(p) process, impulse-response analysis is carried out. Accordingly, impulse responses are estimated by dropping the deterministic (a constant, a linear trend and dummies) and exogenous variables from the system. If intercept term is excluded for simplicity, VAR(p) process can be expressed as;

$$y_t = A_1 y_{t-1} + ... + A_p y_{t-p} + u_t \quad (3)$$

IRFs are estimated for tracing out the responsiveness of dependent variables in the VAR to shocks to each of the variables for the following periods. For instance, if there are K variables in a system, K^2 impulse responses are computed (Brooks, 2008: p.299). If the process y_t is stationary *I*(0), the Wold moving average (MA) representation below reflects the effects of the shocks.

$$y_t = \Phi_0 u_t + \Phi_1 u_{t-1} + \Phi_2 u_{t-2} + ..., \quad (4)$$

where I_K is an $(K \times K)$ identity matrix, $\Phi_0 = I_K$ and the Φ_S can be computed as;

$$\Phi_s = \sum_{j=1}^{s} \Phi_{s-j} A_j, \qquad s = 1,2,..., \quad (5)$$

where $A_j = 0$ for $j > p$. According to the expression (5), the elements of Φ_s represent the impulse responses of the components of y_t with respect to the u_t innovations since the change in y_{it} given $\{y_{t-1}, y_{t-2},...\}$, is measured by the innovation u_{it}. On the other hand, the underlying shocks are not likely to occur in isolation if the components of u_t may be instantaneously correlated, thus a Cholesky decomposition of the covariance matrix Σ_u is preferred to orthogonalize the innovations of the VAR-type model. If B is a lower triangular matrix such that $\Sigma_u = \mathrm{BB}^{'}$, the orthogonalized shocks that based on an one standard deviation shock, are given by $\varepsilon_t = \mathrm{B}^{-1}u_t$ (Breitung et al., 2007: 165-166). For the stationary case, the form below is expressed to represent the impulse responses of the components of y_t.

$$y_t = \Psi_0 \varepsilon_t + \Psi_1 \varepsilon_{t-1} + ..., \quad (6)$$

where $\Psi_i = \Phi_i P$ $(i = 0,1,2,...)$. $\Psi_0 = P$ is lower triangular and thus an ε or one standard deviation shock in the first variable may have an instantaneous effect on all the variables, whereas a shock in the second variable cannot have an instantaneous impact on y_{1t} but only on the other variables of the VAR model (Breitung et al., 2007: 166). On the other hand, different ordering of the variables in the vector y_t may produce different impulse responses, thus SVAR model is a useful model to identify the shocks in an impulse response analysis. Within this context, restrictions are imposed on the matrices A and B in the SVAR model form.

$$\mathrm{A}y_t = A_1^* y_{t-1} + ... + A_p^* y_{t-p} + \mathrm{B}\varepsilon_t \quad (7)$$

where A_i^*'s $(i = 1,..., p)$ are $(K \times K)$ coefficient matrices, the residuals are represented as $\mathrm{B}\varepsilon_t$, ε_t is a $(K \times 1)$ vector of structural shocks with covariance matrix $\mathrm{E}(\varepsilon_t\varepsilon_t^{'}) = \Sigma_t$. and structural shocks are instantaneously uncorrelated in any case. In expression (7), restrictions can be placed on both A and B matrices, thereby SVAR AB-model is obtained. In the AB-model, the relation to the reduced form residuals is given by $\mathrm{A}u_t = \mathrm{B}\varepsilon_t$, whereupon a SVAR model's impulse responses can be estimated from process (6) with $\Psi_j = \Phi_j \mathrm{A}^{-1}\mathrm{B}$. On the other hand, long-run restrictions are placed on $\Psi = \Phi\mathrm{A}^{-1}\mathrm{B}$ (Breitung, Brüggemann, and Lütkepohl, 2007:167). In this study, SVAR models contain three variables, thereby it is implied that the second residual has a zero long-run effect on the first variable, whereas the third residual does not affect on the first and second variable in the long-run.

4. Empirical Results and Analysis

We estimate Balanchard-Quah type SVAR models with 3-variables depending on VAR model with constant terms. For determining the optimal lag lengths of the models AIC is employed; accordingly AIC suggests a lag length of 3 for the models with the time series vectors $(ind_t^{cze}, irt_t^{cze}, vol_t^{cze})'$ and $(ind_t^{rus}, irt_t^{rus}, vol_t^{rus})'$, whereas AIC imposes a lag lengths of 2 and 4 for the model with the time series vectors $(ind_t^{pol}, irt_t^{pol}, vol_t^{pol})'$ and $(ind_t^{tur}, irt_t^{tur}, vol_t^{tur})'$ respectively. In order to identify the structural shocks of the SVAR models, we imposed restrictions in line with the classical theory's assumptions. More precisely, it is assumed that nominal variable (annualized volatility of stock price index) has no effect on real variables (inter-bank call money interest rate in real terms and industrial production) in the long-run and industrial production is only driven by its own shocks or namely the supply shocks. Within this framework, IRFs are used to especially show how stock price variability and output react to a positive one standard deviation shock in real interest rates for the next 36 months. In figures, the impulse responses are represented by white lines, whereas green lines show Efron Percentile upper and lower confidence bands.

Figure 1. Resp. of vol_t^{cze} to irt_t^{cze}

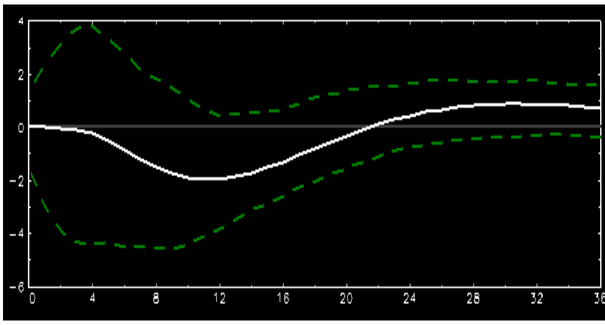


Figure 2. Resp. of vol_t^{pol} to irt_t^{pol}

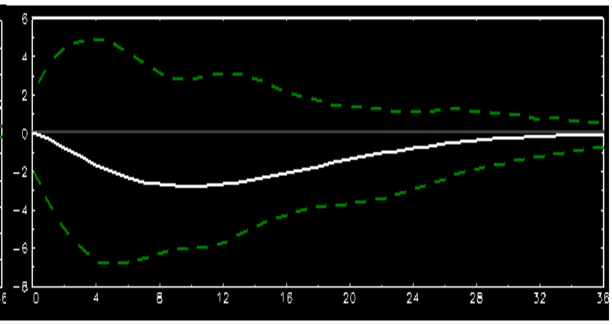


Figure 3. Resp. of vol_t^{rus} to irt_t^{rus}

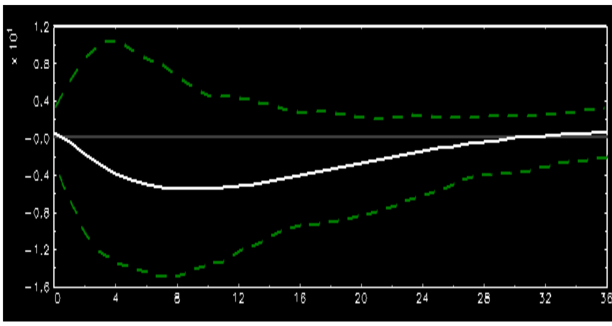
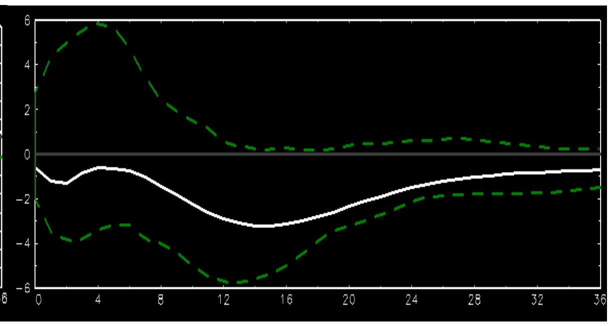


Figure 4. Resp. of vol_t^{tur} to irt_t^{tur}



Figures 1-4 indicate that response of stock price volatility to a positive one standard deviation shock in interest rates is not statistically significant. These findings expose that central banks in Czech Republic, Poland, Russian Federation and Turkey may not influence risk perception by changing their interest rate policy. Accordingly, the results imply that for analyzing the changes in stock prices in Czech Republic, Poland, Russian Federation and Turkey; as well as other financial and economic risks (credit, concentration, market, currency, equity, commodity, liquidity, refinancing, operational, legal, reputational, volatility, settlement, profit, systemic), political, psychological and sociological factors affecting risk perception of investors should be examined similar to Vlaev et al. (2009), Wang et al. (2011) and Riaz et al. (2012). Our findings also imply that in these countries; expected investment performance is a key factor for motivating investments in stock markets, thus an investor may continue to invest although a high level of risk towards the stock market is perceived.

Figures 5-8 show that real output is not influenced by the changes in interest rates parallel to the classical theory's assumptions. It is revealed that central banks of these countries may not promote the real economic activity by implementing expansionary monetary policy in line with the findings of Plosser and Rouwenhorst (1994), Stock and Watson (2001) and Aksoy and Leon-Ledesma (2005), Ozcelebi (2012); moreover these policies may have inflationary effects in Czech Republic, Poland, Russian Federation and Turkey. On the other hand, changes in the interest rates may influence the dynamics of money and capital markets, thus interrelations between money and capital markets should be determined and taken into consideration by the central banks for maintaining financial stability.

We also used diagnostic checks whether our SVAR models provide an adequate representation of the time series of interest. Within this context, we employed residual (Breusch–Godfrey test for autocorrelation and a multivariate extension of the univariate ARCH-LM test) tests[9].

Figure 5. Resp. of ind_t^{cze} to irt_t^{cze}

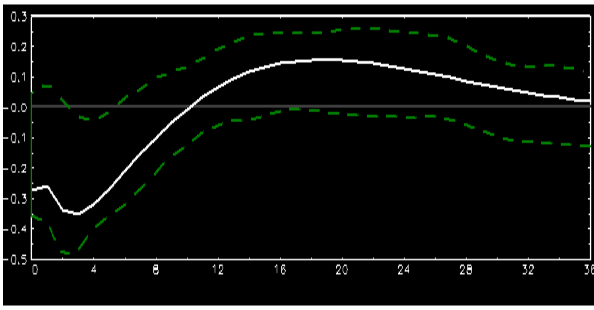


Figure 6. Resp. of ind_t^{pol} to irt_t^{pol}

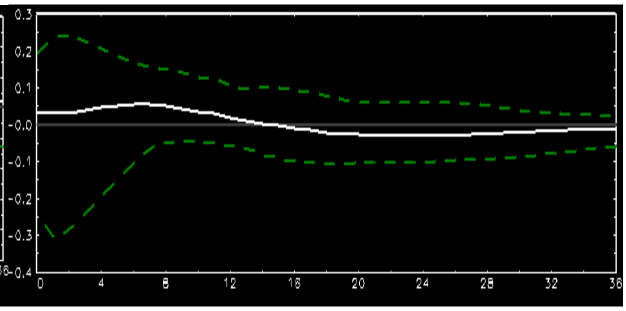


Figure 7. Resp. of ind_t^{rus} to irt_t^{rus}

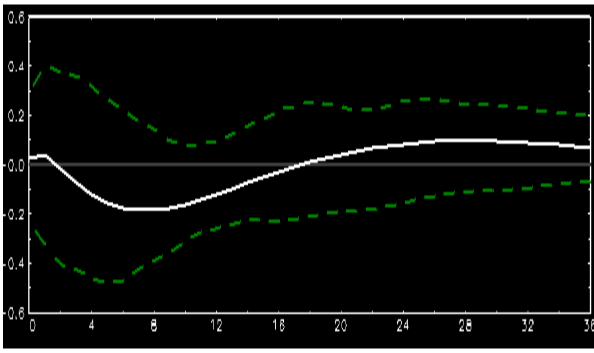


Figure 8. Resp. of ind_t^{tur} to irt_t^{tur}

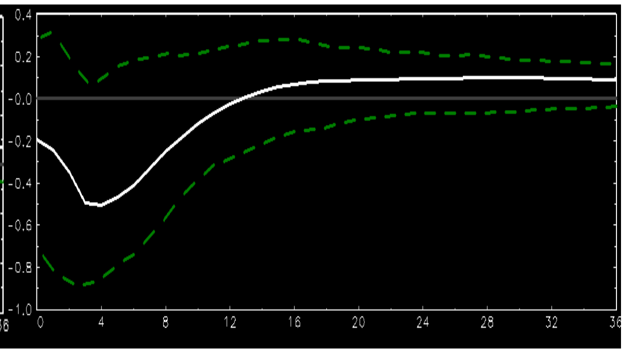


Table 2. Diagnostic checks for SVAR models

Test Statistics and p -values for the sample countries	**Breusch–Godfrey test**	**MARCH-LM**
Czech Republic	2,01 (0,69)	2,86 (0,51)
Poland	2,79 (0,59)	2,53 (0,66)
Russian Federation	3,47 (0,34)	4,26 (0,17)
Turkey	2,16 (0,63)	1,96 (0,88)
Appr. distribution	χ (5)	χ (5)

[9] For the details of the diognastic tests of VAR-type of models, see (Lütkepohl, 2007b: pp. 86-158).

As shown in Table 2, p -values of the test statistics reveal that no autocorrelation and ARCH effect are detected in the residuals of all the four models. Thereby, we provide evidence for the robustness of our estimations and policy implications with diagnostic tests in addition to the consideration of alternative ordering of variables in the models.

5. Conclusion

The US stock price bubble which broke out in 1990s and burst in March 2000 lead to a modest recession to which many central banks respond by reducing interest rates in order to avoid the consequences of this economic downturn. That the low interest rate policy in 2000s is also one of the key factors for asset price bubble in the crisis erupted in August 2007 in US has underlined the importance of better understanding of monetary policy transmission mechanism. The crisis has contributed to the existing debate drawing attention on the relationship between monetary policy and risk perception which is reflected in risk taking channel of transmission mechanism.

We found that monetary policy implications do not have significant effect on risk perception of investors in stock markets in the countries we examined. It implies that monetary policy stance is not incorporated into the investment decisions in stock markets for the cases of Czech Republic, Poland, Russian Federation and Turkey. Besides, the expected investment performance is likely to play a more motivating role than the changes in monetary policy. Thus, the role of behavioral factors affecting the risk perception and hereby investment decisions of investors in these stock markets should be examined. The issue of the role of risk perception in monetary transmission mechanism through stock price volatility requires further research using several other indicators and empirical models for capturing the role of risk perception accurately.

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