THE COMMON EFFECTS OF INFLATION AND OUTPUT GROWTH UNCERTAINTY ON TURKISH ECONOMY

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Abstract

Real gross domestic product as economic performance and deposit interest rates and nominal exchange rates as monetary policy variables have been used to discuss the effects of inflation and the output growth uncertainties on these variables. The common effects of the uncertainty in these two indicators on monetary policy variables and economic performance were examined in contradistinction to other studies.An empirical study investigating the common effects of inflation and output growth uncertainty using the Turkish data set will be important and informative because the data cover both high- and low- inflation periods. This study uses multivariate generalized autoregressive conditional heteroscedasticity models to determine how inflation uncertainty and output growth uncertainty affect economic performance and monetary policy variables.

Keywords: Inflation uncertainty, output growth uncertainty, BEKK-MGARCH model, DCC-MGARCH model

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Introduction

Friedman (1977) showed that because of changing policy reactions to increasing inflation rates, higher inflation rates can result in higher uncertainty about future inflation. Ball (1992) concentrates on the first part of Friedman's hypothesis and constructs an asymmetric framework to show that uncertainties about policy makers' preferences affect inflation uncertainty only when the inflation is high. Azariadis and Smith (1996) show that when there is information friction in credit markets, higher inflation rates cause higher uncertainty. Pourgerami and Maskus (1987) along with Ungar and Zilberfarb (1993) show that because intermediaries can allocate more resources to inflation envisioning in higher inflationist periods, uncertainty about inflation decreases. Cukierman and Meltzer (1986) suggest that the positive relationship between average inflation rate and inflation uncertainty could stem from a positive causal effect of inflation uncertainty on the inflation rate. Devereux (1989) claims that due to the variability of real shocks that cause an increase in inflation and inflation uncertainty, there is a positive relationship between inflation and inflation uncertainty. Holland (1995) claims that in case the policy maker has a stabilizing intent, to minimize the cost of real inflation uncertainty, an increase in inflation uncertainty would give way to a tighter monetary policy reaction and a lower average inflation rate. Friedman (1977) claims that inflation could increase inflation uncertainty and have a negative effect on real economic activities and hence on economic growth. Pindyck (1991) argues that because inflation uncertainty increases uncertainty about potential returns on investments, it leads to a postponement of investments, which negatively affects output growth. Cukierman and Meltzer (1986) propose a model in which monetary policy increases both inflation and output growth, and surprise money supply shocks take place during monetary policy uncertainty. Dotsey and Sarte (2000) claim that variable monetary expansion causes a decrease in real monetary balance demand, including a decrease in consumption, and results in inflation uncertainty and monetary return uncertainty. Cox et al. (1981) shows that when there is a positive relationship between inflation uncertainty and interest rates, the uncertainty decreases consumption and investment expenditure through interest rate instruments, and further decreases output growth. Devereux (1989) shows that changes in real uncertainty can positively affect inflation rates. As discussed by Okun (1971), when there is a positive relationship between output uncertainty and inflation variability, according to Cukierman and Meltzer (1986) output uncertainty is positively correlated with inflation, however, according to Holland (1995) it is negatively correlated with inflation.

For many years, an inflationist structure was observed in Turkey, and Turkey has experienced many crises and an inability to attain financial stability. These situations brought policy makers into conflict with the economic actors. Although attempts have been made to lessen the effect of inflation, which obstructs financial activities, through monetary policies, limited success has been achieved in overcoming the inflation struggle because of macroeconomic imbalances and deficiencies in risk management. The inflation targeting has been implemented covertly in Turkey since 2002, and the country adopted this policy officially in 2006. Inflation rates, which chronically stood high before 2002, began gradually to decrease after 2003 and came down to single-digit figures after 2005. Therefore, for the Turkish economy, which has encountered both high and low inflation, an empirical study researching the real and nominal effects of inflation uncertainty is informative. It is possible to determine possible differences that can occur in the effects of inflation uncertainty during both high- and low-inflation periods. Although the effects of inflation uncertainty and output growth uncertainty on macroeconomic variables have been extensively studied for developed countries, a limited number of studies have been conducted for the same concerning the developing countries. To fill the gap between the inflation process and economic performance and monetary policy instruments in Turkey, our objective is to bring forward the relationships between inflation uncertainty, output growth uncertainty and other macroeconomic magnitudes.

1. Econometric methodology

The generalized autoregressive conditional heteroskedasticity (GARCH) approach takes includes the time dependencies between conditional variances and co-variances between various markets and assets. Although multivariate GARCH (MGARCH) models fundamentally resemble univariate GARCH models, the significant difference between the two is the definitions of the equations that show how the co-variances of multivariate models move over time. To elicit these changes, performing analysis within the framework of multivariate modeling allows the researcher to obtain more realistic results. From the financial perspective, it facilitates taking better risk management decisions. MGARCH models allow the researcher to solve multivariate financial models requiring the variances and co-variances to be dependent on the vector ARMA type information set require modeling the variances and co-variances. Developing MGARCH models attempt to solve the dimension problem in financial modeling. The univariate ARCH/GARCH approach does consider the time dependency between variances and co-variances between various markets and assets. To explain time dependency, Bollerslev et al. (1988) expanded univariate ARCH/GARCH models with multivariate models under VEC parameterization. Because the VEC-GARCH model requires the estimation of too many parameters, and the positive definiteness of the co-variance matrix cannot always be satisfied, it has some inherent applicability problems. This model, which is developed as an alternative to the VEC-GARCH model, needs to have a structure in which the positive definiteness of the conditional variance matrix is guaranteed. Expansion from the univariate GARCH model to a model with n variables requires that random variables (ε_t) with n dimensions and a zero average be dependent on elements in the information set of the conditional variance-co-variance matrix. If H_t with respect to $\mathcal{F}_{t-1}{}'$ can be measured then the multivariate GARCH model is expressed as

$\varepsilon_t|\mathcal{F}_{t-1} \sim N(0, H_t)$.

Because H_t is a variance matrix, positive definiteness should be satisfied. From the perspective of applicability, structures in the form of factor or diagonal parameter matrix can be incorporated into the model. This model class makes the theoretical structure of unconditional moment, ergodicity, and stationarity conditions easier (He and Terasvirta, 2002a). Since it is difficult to secure the positive definiteness of H_t in VEC representation without bringing serious restrictions on parameters, the Baba-Engle-Kraft-Kroner (BEKK) model, which is a restricting version of the VEC-GARCH model, is used (Engle and Kroner,1995). As in the VEC model, the parameters of the BEKK model do not show a direct effect of the different lag terms of H_t's elements. Structurally, the conditional co-variance matrices of the BEKK-GARCH model satisfy positive definiteness. When C_0^*, A_{ik}^* and B_{ik}^* denote n x n parameter matrices, C_0^* denotes a triangle, C_{1k}^* denotes J x n parameter matrices and K determines generalization of summation limit process:

$$H_t = C_0^{*\prime} C_0^* + \sum_{k=1}^{K} C_{1k}^{*\prime} x_t x_t' C_{1k}^* + \sum_{k=1}^{K} \sum_{i=1}^{q} A_{ik}^{*\prime} \mathcal{E}_{t-i} \mathcal{E}_{t-i}' A_{ik}^* + \sum_{k=1}^{K} \sum_{i=1}^{p} B_{ik}^{*\prime} H_{t-i} B_{ik}^* \qquad (1)$$

can be written as BEKK (1,1,K) model. Equation (1) is positive definite under weak conditions. In addition, because the model contains all positive definite diagonal representations and almost all positive definite VEC representations, it is adequately general. The BEKK model directly concentrates on the model structure, notably as A and B matrices. The main advantage of this is that because there is no constraint requirement necessitating H_t to be positive definite, parameters can be easily estimated. One disadvantage, on the other hand, is that because parameters enter the model in the form of matrices, and are transposed, effects on H_t can easily be interpreted. While matrix A measures the ARCH effect in the model, each element of the matrix B (b_{ij}) represents continuity in conditional variance from the variable "i" to the variable "j." Using conditional variance and correlation in direct modeling of conditional co-variances is a relatively new approach. Conditional correlation models are much more convenient alternatives in the estimation and interpretation of parameters. These models, which are non-linear combinations of univariate GARCH models, allow for separate determination of individual conditional variances on the one hand, and of a conditional correlation matrix between the individual series on the other, or of another dependency criterion. Time dependent correlations are usually calculated by the cross product of returns and by multivariate GARCH models that are linear in their squares. The dynamic conditional correlation (DCC) model takes the change of conditional correlation over time into account. The multivariate models that are called DCC have the flexibility of parsimonious parametric models and relevant univariate GARCH models for correlations. In other words, the DCC estimators have the flexibility of univarate GARCH; however, they refrain from the complexity of multivariate GARCH. Despite being non-linear, they can be calculated by two-steps-methods or single variable methods that are based on probability function. These models, which directly parameterize the conditional correlations, can be estimated in two steps: the first being a series of univariate GARCH estimations and the second being correlation estimation. It is observed that under many circumstances they function well and provide reasonable empirical results. When $\varepsilon_t = D_t^{-1} r_t$ and $D_t = \text{diag}\{\sqrt{h_{i,t}}\}$, $R = E_{t-1}(\varepsilon_t \varepsilon_t') = D_t^{-1} H_t D_t^{-1}$ represents a correlation matrix containing conditional correlations:

$$H_t = D_t R D_t \qquad (2)$$

the dynamic conditional correlation model, which is a generalized form of the constant conditional correlation (CCC) estimator, is shown as follows:

$$H_t = D_t R_t D_t \qquad (3)$$

The only difference in the dynamic conditional correlation model is that R changes over time (Engle,2002). Parameterization of R requires that conditional variances be in integrity and it has the same requirements as H.

2. Common effect of inflation and output uncertainty

An MGARCH model consisting of inflation (π_t), output growth (og_t), exchange rate ($excr_t$), interest rate(ir_t), inflation uncertainty (h_{π_t}), and output uncertainty (h_{b_t}) can be writen as

$$\pi_t = a + a_1 D_k + \sum_{i=1}^{p} a_{2i}\, \pi_{t-i_{t-i}} + \sum_{i=1}^{p} a_{3i}\, og_{t-i} + \sum_{i=1}^{p} a_{4i}\, excr_{t-i} + \sum_{i=1}^{p} a_{5i}\, ir_{t-i} + \delta_1 \sqrt{h_{\pi_t}} + \gamma_1 D_k \sqrt{h_{\pi_t}} + \delta_2 \sqrt{h_{og_t}} + \gamma_2 D_k \sqrt{h_{og_t}} + \delta_3 \sqrt{h_{\pi_t} h_{og_t}} + \gamma_3 D_k \sqrt{h_{\pi_t} h_{og_t}} + \varepsilon_{1t}$$

$$og_t = b + b_1 D_k + \sum_{i=1}^{p} b_{2i}\, \pi_{t-i_{t-i}} + \sum_{i=1}^{p} b_{3i}\, og_{t-i} + \sum_{i=1}^{p} b_{4i}\, excr_{t-i} + \sum_{i=1}^{p} b_{5i}\, ir_{t-i} + \delta_4 \sqrt{h_{\pi_t}} + \gamma_4 D_k \sqrt{h_{\pi_t}} + \delta_5 \sqrt{h_{og_t}} + \gamma_5 D_k \sqrt{h_{og_t}} + \delta_6 \sqrt{h_{\pi_t} h_{og_t}} + \gamma_6 D_k \sqrt{h_{\pi_t} h_{og_t}} + \varepsilon_{2t}$$

$$excr_t = c + c_1 D_k + \sum_{i=1}^{p} c_{2i}\, \pi_{t-i_{t-i}} + \sum_{i=1}^{p} c_{3i}\, og_{t-i} + \sum_{i=1}^{p} c_{4i}\, excr_{t-i} + \sum_{i=1}^{p} c_{5i}\, ir_{t-i} + \delta_7 \sqrt{h_{\pi_t}} + \gamma_7 D_k \sqrt{h_{\pi_t}} + \delta_8 \sqrt{h_{og_t}} + \gamma_8 D_k \sqrt{h_{og_t}} + \delta_9 \sqrt{h_{\pi_t} h_{og_t}} + \gamma_9 D_k \sqrt{h_{\pi_t} h_{og_t}} + \varepsilon_{3t}$$

$$ir_t = d + d_1 D_k + \sum_{i=1}^{p} d_{2i}\, \pi_{t-i_{t-i}} + \sum_{i=1}^{p} d_{3i}\, og_{t-i} + \sum_{i=1}^{p} d_{4i}\, excr_{t-i} + \sum_{i=1}^{p} d_{5i}\, ir_{t-i} + \delta_{10} \sqrt{h_{\pi_t}} + \gamma_{10} D_k \sqrt{h_{\pi_t}} + \delta_{11} \sqrt{h_{og_t}} + \gamma_{11} D_k \sqrt{h_{og_t}} + \delta_{12} \sqrt{h_{\pi_t} h_{og_t}} + \gamma_{12} D_k \sqrt{h_{\pi_t} h_{og_t}} + \varepsilon_{4t}$$

$$\varepsilon_{1t} = h_{\pi_t} * \eta_t, \quad \left(\eta_t = \frac{u_{t-1}}{\sqrt{h_{t-1}}}\right) \qquad \varepsilon_{2t} = h_{ogt} * \eta_t, \quad \left(\eta_t = \frac{u_{t-1}}{\sqrt{h_{t-1}}}\right)$$

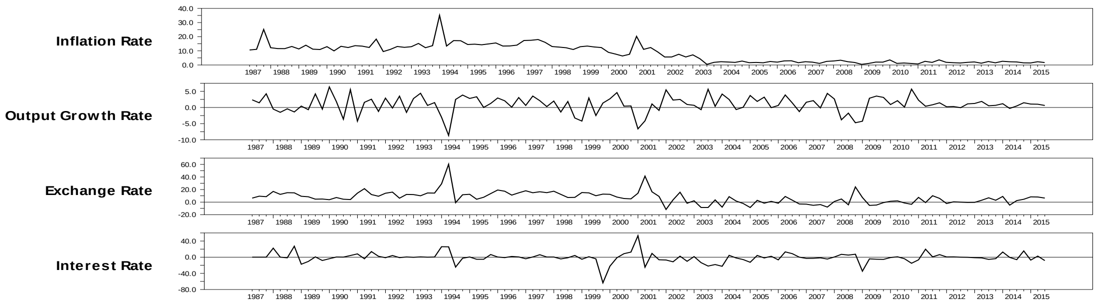
(4)

Dummy variable (D_k) located in the equation are defined as follows:

$$D_k = \begin{cases} 1, & 2003 - 2013 \text{ quarter periods} \\ 0, & \text{other periods} \end{cases}$$

The volatility and co-volatility of the variables used in this study is limited by using BEKK and DCC forms. BFGS optimization algorithm is used in full information maximum likelihood estimation., consumer price index, gross domestic product, nominal exchange rate and deposit interest rates are obtained for the 1987: Q1–2015: Q3 periods from the electronic data distribution system of the Central Bank of the Republic of Turkey (CBRT). The gross domestic product and consumer price index are adjusted from seasonal effects by Tramo/Seats method. After taking the logarithmic first differences, variables are multiplied by 100 to be expressed as percent changes. The variables trends over time are shown in. It can be observed from Figure-1 that inflation is at a high level prior to 2003 and tends to fall after 2003.

Fig. 1: Trends over time



An augmented Dickey–Fuller (ADF) test is used to analyze stationarity of the variables. is used to determine the Optimal lag length is determined by Schwarz information criterion. In addition to the ADF test, the Phillips–Perron unit root test (PP) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test were performed to provide more robust results. It can be seen from Table 1 that output growth, inflation, exchange rate and interest rate changes do not have a unit root, and thus, the series are stationary. The Lagrange Multiplier (LM) test is applied to determine whether any ARCH effect remain in the residuals any longer. It is determined that the returns are not normally distributed and the presence of ARCH structure is at high-levels.

Tab. 1. Stationary test results (*0.01, **0.05 and ***0.10 test critical values)

	ADF Test Intercept and Trend	KPSS Test Intercept and Trend	PP Test Intercept and Trend
π_t	−4.29**	0.15*	−7.20**
og_t	−7.59**	0.08**	−12.74**
$excr_t$	−10.83**	0.14*	−12.83**
ir_t	−9.75**	0.09**	−9.71**

BEKK model definition that obtains reliable estimates with MGARCH model structure and provides ease comments according to other models approach is investigated to estimate the conditional mean and variance-covariance matrix, firstly. A one lag model with VAR structure has been established considering final prediction error criterion (FPA). Model parameter estimations are solved using full information maximum likelihood estimation method. The majority of parameters were found to be statistically significant in Table 2. For the ARCH and GARCH coefficients, 69% and 43% of the estimated parametersare significant, respectively. The distribution of own shocks of inflation, output growth, exchange rate, and interest rate on themselves is found highly significant, which indicate the presence of strong ARCH effects.

Tab. 2. BEKK Model Estimation Results (*0.01, **0.05, and*0.10 test critical values)**

Panel A: Conditional Mean Estimates							
π_t		$\mathrm{og_t}$		$excr_t$		ir_t	
Constant	−0.937	Constant	4.761	Constant	−1.450	Constant	−7.103
π_{t-1}	0.311	π_{t-1}	−0.166	π_{t-1}	1.096	π_{t-1}	0.614
$\mathrm{og_{t-1}}$	0.149	$\mathrm{og_{t-1}}$	−0.232	$\mathrm{og_{t-1}}$	−0.072	$\mathrm{og_{t-1}}$	0.223
excr_{t-1}	−0.005	excr_{t-1}	−0.001	excr_{t-1}	−0.049	excr_{t-1}	0.151
ir_{t-1}	-.0.008	ir_{t-1}	−0.006	ir_{t-1}	0.031	ir_{t-1}	0.033
D_k	2.007***	D_k	−0.450**	D_k	1.802***	D_k	1.203*
h_{π_t}	2.083**	h_{π_t}	0.683*	h_{π_t}	−3.264	h_{π_t}	−1.684*
$D_k * \mathrm{h}_{\pi_t}$	0.039**	$D_k * \mathrm{h}_{\pi_t}$	−3.838**	$D_k * \mathrm{h}_{\pi_t}$	8.282**	$D_k * \mathrm{h}_{\pi_t}$	2.258**
h_{og_t}	2.229**	h_{og_t}	−0.162*	h_{og_t}	2.129	h_{og_t}	0.741**
$D_k * \mathrm{h}_{og_t}$	−1.345**	$D_k * \mathrm{h}_{og_t}$	−2.512***	$D_k * \mathrm{h}_{og_t}$	−2.075	$D_k * \mathrm{h}_{og_t}$	−0.890***
$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	1.388**	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.040***	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	1.055	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.619**
$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.890**	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.219***	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	1.577	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.982**
Panel B: Conditional Variance-Covariance Estimates							
C(1,1)	0.252*	A(1,2)	0.041**	A(4,1)	0.057	B(2,4)	−0.006
C(2,1)	0.192	A(1,3)	0.810	A(4,2)	−0.047**	B(3,1)	0.011
C(2,2)	0.001*	A(1,4)	2.439***	A(4,3)	−0.023	B(3,2)	0.079
C(3,1)	3.516	A(2,1)	0.304**	A(4,4)	0.812**	B(3,3)	0.198**
C(3,2)	−0.073*	A(2,2)	0.690**	B(1,1)	0.204	B(3,4)	0.238
C(3,3)	0.024	A(2,3)	2.433***	B(1,2)	0,697***	B(4,1)	0.010
C(4,1)	1.074*	A(2,4)	−2.109**	B(1,3)	−0.261	B(4,2)	−0.337**
C(4,2)	−0.025	A(3,1)	0.027***	B(1,4)	0.551**	B(4,3)	0.1710
C(4,3)	−0.008*	A(3,2)	−0.055	B(2,1)	−0.947**	B(4,4)	0.476**
C(4,4)	0.001	A(3,3)	0.528***	B(2,2)	0.320		
A(1,1)	0.301**	A(3,4)	0.121	B(2,3)	−0.124***		

The effects of individual shock distribution are in the range between 0.30 and 0.81. Considering the cross-shock on inflation series, significant effects of interest rates, and output growth rate are determined on inflation. The significant effect of inflation, interest rates, and output growth have been observed when cross-shocks are examined in the growth series. When the GARCH series are examined, the lagged effects of volatility distributions on inflation, growth, exchange rate, and interest rate are determined as 0.204, 0.320, 0.198, and 0.476, respectively. This indicates that its past own shocks are more efficient than the other parameters, such as past volatilities shocks, in the determination of future volatility on exchange rate. The significant effect of interest rate and output growth on inflation and the significant effect of exchange rate and inflation on growth are found in the context of cross-volatility on GARCH parameters.

Tab. 3. DCC Model Estimation Results (*0.01, **0.05, and*0.10 test critical values)**

Panel A: Model Parameter Estimates							
π_t		og_t		$excr_t$		ir_t	
Constant	8.288	Constant	2.008	Constant	−3.410	Constant	−1.929
π_{t-1}	0.101	π_{t-1}	−0.044	π_{t-1}	0.753	π_{t-1}	0.581
og_{t-1}	−0.115	og_{t-1}	−0.124	og_{t-1}	−0.227	og_{t-1}	1.231
excr_{t-1}	0.082	excr_{t-1}	−0.030	excr_{t-1}	0.163	excr_{t-1}	0.1911
ir_{t-1}	−0.005	ir_{t-1}	−0.076	ir_{t-1}	0.068	ir_{t-1}	0.021
D_k	−6.216*	D_k	0.850***	D_k	−1.518**	D_k	8.220*
h_{π_t}	0.371**	h_{π_t}	3.127*	h_{π_t}	0.283*	h_{π_t}	−0.084*
$D_k * \mathrm{h}_{\pi_t}$	−0.402**	$D_k * \mathrm{h}_{\pi_t}$	0.163**	$D_k * \mathrm{h}_{\pi_t}$	−0.998*	$D_k * \mathrm{h}_{\pi_t}$	0.321**
h_{og_t}	0.379**	h_{og_t}	−0.283***	h_{og_t}	−0.207**	h_{og_t}	−1.811*
$D_k * \mathrm{h}_{og_t}$	−0.205**	$D_k * \mathrm{h}_{og_t}$	0.789**	$D_k * \mathrm{h}_{og_t}$	0.638**	$D_k * \mathrm{h}_{og_t}$	2.789***
$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.048***	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.013**	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.061**	$\mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.079***
$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.018**	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	−0.016***	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.011***	$D_k * \mathrm{h}_{\pi_t} * \mathrm{h}_{og_t}$	0.099**

Panel B: GARCH Parameter Estimates					
C(1)	1.907	A(1)	0.104*	B(1)	0.353
C(2)	5.521*	A(2)	0.240	B(2)	0.149**
C(3)	3.111	A(3)	0.447*	B(3)	0.180*
C(4)	9.130*	A(4)	0.430***	B(4)	0.080*

Panel C: Corelation Parameter Estimates			
DCC(1)	0.110**	DCC(2)	0.830***

Even if the autocorrelation function is observed in the critical value for all series, the autocorrelation is determined in some lags of the residual squares. Therefore, BEKK model can be determined as misspecified. Thus, the model structure to determine the effect of uncertainty on the economic variables are examined as a dynamic conditional correlation model. Strong time-dependent correlations between variables emerge the dynamic structure. A dynamic structure can be mentioned because the null hypothesis is rejected, so there is no constant correlation. Many of the GARCH and correlation model parameter estimates given in Table 3 is found statistically significant.When the autocorrelation function of residuals and residual squares are analyzed, an autocorrelation problem is no longer found.

3. Conclusion

Due to more inflation uncertainty, the increase in inflation is an expected result for the pre-2003 period. The increase in inflation uncertainty means a rise in unexpected inflation. The actual inflation is the sum of expected inflation and unexpected inflation; therefore, the increase in unexpected inflation leads to an increase in inflation. The main purpose of the CBRT is to ensure the long-term price stability, and it becomes more independent from the political process after 2003. As inflation uncertainty increases with rising inflation, the “stabilizing” monetary authorities respond by implementing tighter monetary policies to minimize the inflation uncertainty and the negative welfare effects associated with uncertainty. While more inflation uncertainty has a positive effect on the exchange rate for the pre-2003 period, this effect is negative in the period after 2003. More inflation uncertainty increases domestic prices, so nominal exchange rate also increases in the pre-2003 period. Flexible exchange rate system was implemented under implicit and explicit inflation targeting regime in the post-2003 period. More uncertainty influences interest rates positively and inflation negatively in the post-2003 period; as a natural result, exchange rate is influenced negatively. In the pre-2003 period, more inflation uncertainty is an increasing effect on economic growth. More inflation uncertainty creates a reducing effect on economic growth in the post-2003 period. The increase in inflation uncertainty reduces the nominal interest rate in the period before 2003. A severe increase in government borrowing is the basic phenomena that determines market interest rate for the pre-2003 period. The banks become the main actors in financing the government. Given that deposits as a source of funding for banks, the decreasing effect of more inflation uncertainty on deposit interest rates is a reflection of the behavior of the banks’ increasing profit margin. The increase in nominal interest rate as an impact of more inflation uncertainty is an expected result in the period after 2003. The most capital inflow to Turkey was experienced in the post-2003 period. In this sense, nominal interest rates are increasing due to the reduction in hot money flows as inflation uncertainty increases. When examining the pre-2003 and post-2003 periods, it is observed that the Central bank benefits from the environment of uncertainty to hide the inflationary policies in the effort to produce inflation/output balance.The more output uncertainty in the pre-2003 period constitutes a reducing effect on growth. Uncertainty has a deterrent effect on investment. While more uncertainty increases the value of the investment opportunities of firm,it reduces the amount of actual investment and thus a reduction in production volume occurs. This effect is reversed back in the post-2003 period in which low inflation is observed. High interest rates raises the risk perception and brings the exchange rate instability. At the end of this process, the beginning of instability in exchange rates affect the corporate sector first and then influence all sectors, and by reducing economic efficiency, it effects the output negatively. Post-2003 period, the central banks became more independent and modified the structure of monetary policy with inflation targeting, savings are turned to high-yield investment, and distributed more effectively. Domestic nominal interest rate reduction is taking place by capital inflows increasing liquidity; as a result, the domestic spending is increased, so aggregate demand is increased. This situation leads to an increase in the exchange rate. The effects of inflation uncertainty is greater than that of output uncertainty on the determination of output. The effects of inflation uncertainty are greater than that of output uncertainty on the determination of interest rates. It is observed that inflation uncertainty influences monetary policy instruments more than the growth uncertainty when the common effects are studied together. Unlike monetary aggregates or the exchange rate targeting regime, switching to inflation targeting which is one of the monetary policy strategies to achieve price stability explains the rationale in a context of the Central Bank implementation.

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