The Impact Of Monetary Policy On Stock Market Prices Under Different Regimes: The Evidence From Turkey

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Abstract

Determining of the effect of monetary policy on asset prices is of importance for both policy makers and financial market participants. The reason is that changes in financial asset pricesaffect investors' decisions. Also, so-called changes can lead to financial instability. Purpose of this study is to analyze how stock market returns in Turkey response to monetary policy over the period of 2002:01-2016:12 under low volatility and high volatility regimes. For this purpose, we used monthly policy interest rate and stock market returns and utilized from Markov Switching dynamic regression method. It follows from the results of analysis that there is negative relationship between policy interest rate and stock market returns in low volatility regime while the connection in question is insignificant in high volatility regime.

Keywords: Monetary Policy, Stock Market, Markov Regime Switching Model

Jel Codes: E52, E44, C22

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INTRODUCTION

It is of great important for policy makers to investigate effects of monetary policy on asset prices because of the fact that changes in the mentioned assets may induce financial instabilility. The initial step of the monetary transmission mechanism includes the transition from policy rate to financial asset prices. It is assumed that decisions by investor and consumer depend on the movements in financial assets. So-called changes affect both economic activity and inflation dynamics. Thus, generating confidental estimates relating to the response of asset prices to monetary policy is of importance to obtain effective policy decisions (Duran et. al., 2010).

The assets is considered as an important channel through which negative macroeconomic conditions lead to financial instability. Asset price bubbles increase the risk in a future correction of prices. This situation damage urgently financial institutions (Assenmacher-Wesche and Gerlach, 2008).

The relationship between asset prices and monetary policy is an importance because of several reasons. In terms of monetary policymakers, obtaining confidental policy decisions largely depends on the relationship in question. Monetary transmission mechanism induces to be transferred of short-run interest rate to asset prices. The changes in asset prices enhance private borrowing costs and worsen economic wealth. From the perspective of financial market participants, monetary policy crucially affects financial markets. Estimates of the response of asset prices to monetary policy is assumed to be a significant constituent of effective investment decisions and risk management strategies (Rigobon and Sack).

The aim of this study is to examine effect of monetary policy on asset prices and in particular on stock market by using Markov Switching dynamic regression method which allow to switch across different regimes. We separate regimes as low and high volatility periods. Therefore, the contribution of this paper is to investigate effect of policy rate on asset prices considering low volatility and high volatiliy regimes for Turkey. Contribution of this study to the literature is that the effect of monetary policy on asset prices is analyzed under different regimes.

LITERATURE

There are a number of studies in the literature that focus on the effects of monetary policy on asset prices and stock prices (Thorbecke, 1997; Bomfim, 2000; Rigobon and Sack, 2004). These studies indicated there is a significant connection between monetary policy and stock market prices. Thorbecke (1997) stated there are large effects of monetary policy on stock returns. Li, Iscan and Xu (2010) examined impacts of monetary policy shocks on stock prices using structural VAR for Canada and the United States. They found that in Canada the instant response of stock prices to a contractionary monetary policy shock is small while in United States the so-called response is relatively large.

Chatziantoniou, Filis and Floros (2017) analyzed effects of monetary policy shocks on UK housing market and the UK stock market. Firstly, they separated regimes as the high risk environment and low risk environment applied Markov regime switching modelling. Then, they performed probit regression in order to determine whether a monetary policy shock affects on the probability that both markets move across these two regimes. In the end of the study, they indicated that an increase in short term interest rate induce the stock market to remain at the high volatility regime. Besides, for both markets, raises in the level of inflation have a key role to play.

As examined studies for Turkey in literature, it is seen that short term interest rates affect negatively stock market prices (Duran, Ozlu and Unalmıs, 2010; Duran vd., 2012; Ozdemir and Otluoglu, 2015). Duran vd. (2012) examined effects of monetary policy on asset prices using the heteroscedasticity-based GMM in Turkey and found that rises in the policy rate induce a decline in stock prices. Gokalp (2016) analyzed the so-called relationship using Case Study and the GMM methods for the period May 2010 – November 2014. He used upper and lower bound of the interest rate corridor as monetary policy variable. In the end of the study, he obtained the findings that rises in upper bound of the corridor reduce the stock market prices, however; decreases in lower bound enhance stock market prices. However, we don't find so-called relationship investigating with regime switching model in literature for Turkey. Thus, we purpose to contribute the literature.

DATA AND METHODOLOGY

In this study, we aimed to examine effect of monetary policy on asset prices by considering regime switching in Turkey. We use monthly data covering the period 2002:01 – 2016:12. We use policy rate as a proxy for monetary policy, which is drawn from the International Financial Statistics (IFS) database of the IMF. BIST 100 index is used as stock market prices,

which is drawn from Yahoo Finance database. All variables are seasonally adjusted. We obtained stock market return by using the formula as follows:

$$R_{it} = \log\left(\frac{P_{it}}{P_{it-1}}\right) (1)$$

where P_{it} is close prices of stock market index in period t. Descriptive statistics for return of BIST 100 and percentage change in policy rate are shown in Table 1 As investigated Table 1, so-called return is seen not to have normal distribution. According to their skewness and kurtosis values, it exhibit leptucortic distribution.

Table 1: Descriptive Statistics

	DLBIST100SA	CPOLICY
Mean	0.009858	-0.082039
Median	0.017055	-0.358725
Maximum	0.267511	209.9906
Minimum	-0.281479	-54.32658
Std. Dev.	0.084783	19.33404
Skewness	-0.296961	8.376248
Kurtosis	4.082678	87.35919
Jarque-Bera	11.37348	55170.17
Probability	0.003391	0.000000
Sum	1.764586	-14.68501
Sum Sq. Dev.	1.279506	66537.29
Observations	179	179

Change in policy rate is illustrated in Figure 1. As examined Figure 1, it has been seen that there are two big spike in change of policy rate.

Figure 1: Change in Policy Rate

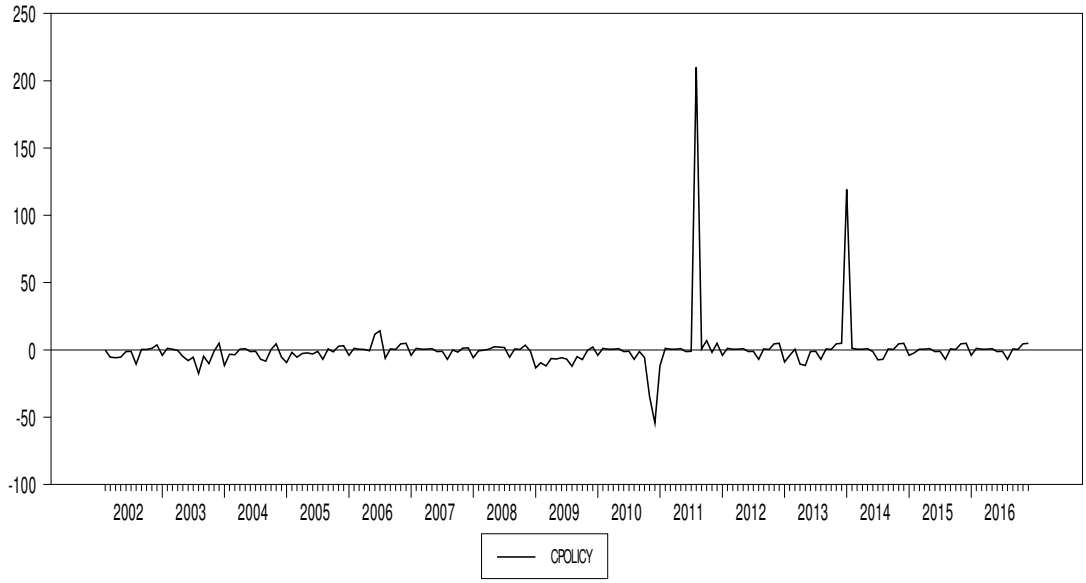
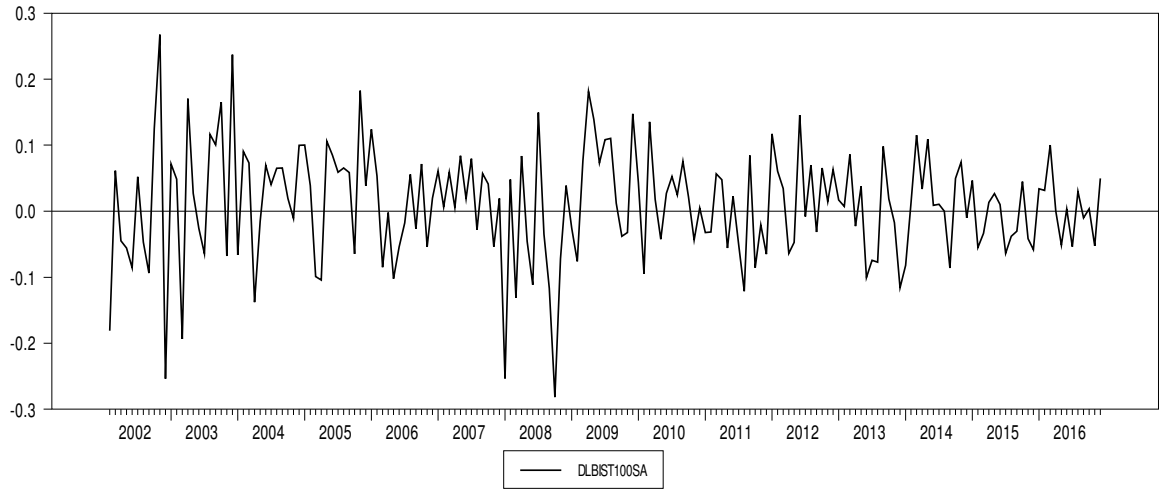


Figure 2 illustrates return of BIST 100 index As examined Figure 2, volatility of stock market has seen to rise during the crisis period.

Figure 2: Return of BIST 100



Markov regime switching model proposed by Hamilton (1989) is one of the nonlinear time series models. In this model it is allowed that an economy changes from one regime to another or in other words, behaviour of time series becomes distinct in different regimes. The switching mechanism is controlled by an unobservable state variable that follows a first-order Markov chain (Kuan, 2012; Smith, 2002).

In two – regime Markov switching model it is assumed that the state variable S_t is unobserved and change based on a first – order Markov chain with transition probabilities:

$$P\left(S_t=i\middle|S_{t-1}=j,z_t\right)=P_{ij}\left(z_t\right)$$

The transition probabilities are influenced by a (qx1) vector of covariance-stationary exogenous or predetermined variables z_t , where z_t may include elements of x_t . The Markov chain is assumed to be stationary and to change independently of all of those elements of x_t not included in z_t^2 (Kim, Peger and Startz, 2008).

In this study, we used Markov switching dynamic regression in order to obtain behaviour of return of BIST 100 index in different regimes, which we defined regimes as low volatility and high volatility periods. Markov switching dynamic regression allows states to evolve based on a Markov process and for quick adjustments after a change of state. The model we estimated is as follows:

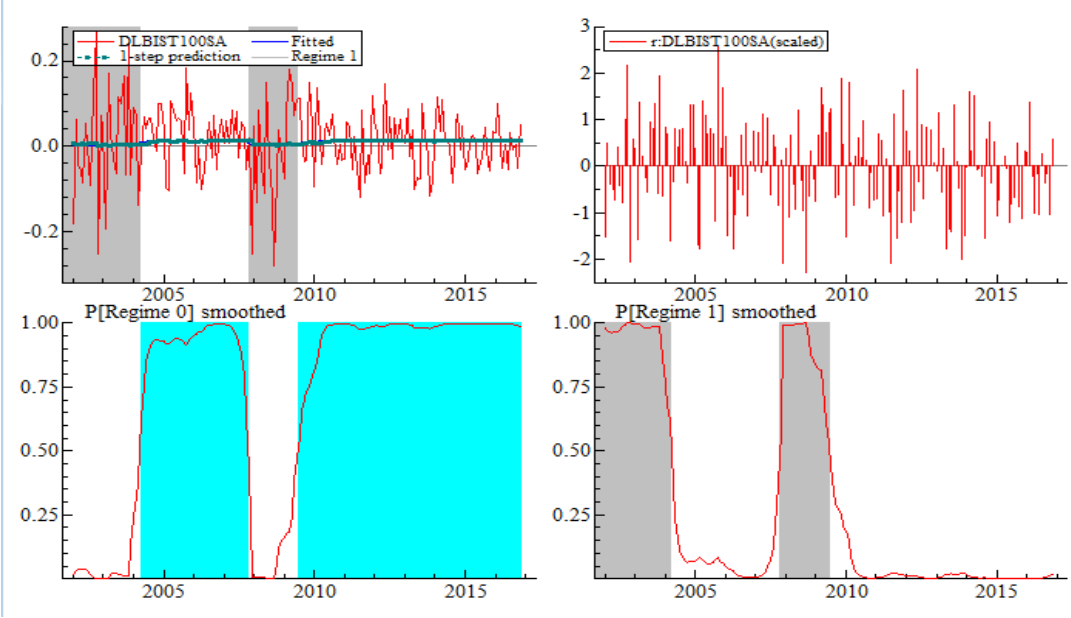
$$y_t=\mu_s+x_t\alpha+z_t\beta_s+\epsilon_{s,t}$$

where; y_t is return of BIST 100 index, μ_s is state-dependent intercept, x_t is vector of exogenous variable, which is policy rate, with state invariant coefficients α , z_t is vector of exogenous variable, which is policy rate, with state-dependent coefficients β_s and $\epsilon_{s,t}$ $iid\,N\left(0,\sigma_s^2\right)$.

EMPIRICAL RESULTS

We applied Markov Switching approach so as to see the effect of monetary policy on return of BIST100 index between different regimes. Therefore, we investigated so-called impact in low and high volatility regimes based on the variance-covariance matrix of stock prices. We estimated MS(2) model. Model estimation results are shown in Table 2 and the smoothed regime probabilities for so-called model are seen in Figure 3.

Figure 3:Smoothed Regime Probabilities



As examined Figure 3, shaded areas in Regime 0 correspond to low volatility regime and other areas are relating to high volaitily regime. Regime 1 reflects high volatility regime because of comprising 2007 global financial crisis which started in United States and then expanding the European area.

Table 2: MS(2) Model Estimation Results

	Regime 0 (Low volatility regime)	Regime 1 (High volatility regime)
constant	0.0112897	0.00702959
	(0.006945)	(0.01540)
Sigma	0.0567756***	0.111691***
	(0.007405)	(0.01561)
$p(0\|0)$	0.913615***	
	(0.07224)	
$p(1\|1)$		0.906773***
		(0.05832)
Cpolicy	-0.000629106**	-0.00108456
	(0.0002435)	(0.001666)
Diagnostic Tests		
Log-likelihood	199.796374	
AIC	-2.14297625	
SC	-2.00052325	
Linearity LR test	18.744***	
ARCH(5)	0.39741	
Dates		
	04.2004 – 10.2007	01.2002 – 03.2004
	07.2009 – 11.2016	11.2007 – 06.2009

Note: *, **, *** represent respectively 0.1, 0.05 and 0.01 significant levels. The values in parenthesis represent standart errors.

Table 2 reports MS(2) model estimation results. Regime 1 has lower average return and higher volatility σ_1 than Regime 0. Thus, Regime 1 is characterised by high volatility regime. As examined diagnostic tests relating to the estimated model, linearity LR test is rejected. This result obtained the LR test verify that the model is nonlinear. Therefore, the model we estimated is valid.

We include percentage change in policy rate (cpolicy) to see whether monetary policy affects return of BIST 100 in low and high volatility regime. It is inferred from estimated results that monetary policy affects negatively and signigicantly on stock market returns only in low volatility regime. However, there is no an significant effect of monetary policy on return of BIST 100 index in high volatility regime.

Table 3: Regime Probabilities

	Regime 0, t	Regime 1, t	Observation	Percentage	Average Duration (months)
Regime 0, t+1	0.91361	0.093227	132	73.74%	66
Regime 1, t+1	0.086385	0.90677	47	26.26%	23.50

The regime properties for MS(2) model is exhibited in Table 3. The transition probability from regime 0 to regime 0 is 0.91361 and probability from regime 1 to regime 1 is 0.90677. This situation states that regimes are persistence.

CONCLUSION

In this study we analyzes impact of policy rate on stock market returns for Turkey using Markov switching dynamic regression. We seperate regimes as low volatility and high volatility periods. Our findings suggest that policy rate affects negatively and signigicantly on stock market returns only in low volatility regime. However, significant relationship between policy rate and stock market returns can not be found in high volatilitu regime. These result are quietly useful for policy marker.

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