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Does the central bank directly respond to output and inflation uncertainties in Turkey?

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ABSTRACT

This paper investigates the role of inflation and output uncertainties on monetary policy rules in Turkey for the period 2002:01–2014:02. In the literature it is suggested that uncertainty is a key element in monetary policy, hence empirical models of monetary policy should regard to uncertainty. In this study, we estimate a forward-looking monetary reaction function of the Central Bank of the Republic of Turkey (CBRT). In addition to inflation and output gap variables, our reaction function also includes both the inflation and output growth uncertainties. Our results suggest that the Central Bank of the Republic of Turkey (CBRT) concerns with mainly price stability and significantly responds to inflation and growth uncertainties.

1. Introduction

The Taylor rule indicates that, the central bank should adjust the nominal interest rate in response to deviations of inflation from target and output from potential. According to this rule, the central bank raises the interest rates in response to inflation. On the other hand, it reduces interest rates to stimulate output. While the Taylor rule provides a simple and clear rule for monetary policy and explains monetary policy behaviour in many countries, this rule has some disadvantages. One of these disadvantages is that according to Taylor rule, central bank responds only to the inflation rate and the output gap. However, central banks may respond to other variables such as exchange rate, asset prices, monetary aggregates and so on to achieve price stability. In more open economies, for example, beside output gap and inflation, exchange rate is also important to describe the state of the economy. The other disadvantage is that the changes in the structure of the economy may lead to a change in the coefficients of optimal policy rule (Peersman and Smets, 1999). In the literature, there is not any consensus about what the efficient Taylor rule parameters should be. Taylor (1993) proposed a parameter of 1.5 on inflation and 0.5 on the output gap to explain the Fed's behaviour. While Clarida et al., (1999) estimate similar parameters for some countries other than US, Rudebusch and Svensson (1999) find larger optimal parameters for US. Ball (1997) also argues that an efficient parameter on the output gap should be larger than Taylor (1993)'s estimate. Brainard (1967) provides an explanation for this distinction between actual central bank behaviour and the optimal parameters which is suggested by these studies. He argues that uncertainty about the effects of policy on economy makes policymakers more conservative.

Uncertainties make conduct of monetary policy more complicated. Due to the measurement difficulties, policymakers cannot observe the current values of the inflation and output gap accurately when they set the interest rate. Therefore, they should predict them from the inflation and output gap data. Some studies examine how monetary policy should be conducted under data uncertainty. For example, Aoki (2003) states that if data uncertainty in one variable increases, the policy maker should respond less to the movements in that variable. In addition, Smets (2002), Peersman and Smets (1999), Rudebusch (2001) show that data uncertainty (particularly about the output gap) reduces the optimal coefficient on the output gap in a Taylor rule. Some other studies discuss the effects of inflation uncertainty on interest rates. However, these studies do not provide definite evidence about the effects of inflation uncertainty on nominal interest rates in both theoretical and empirical literature. Juster and Wachtel (1972a, b) and Juster and Taylor (1975) state that if inflation variability and nominal income do not move one for one, the variance of

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consumer's real income increases. Then, consumers intending to protect themselves against inflation will increase savings. As a result, according to loanable funds theory, interest rates decline. This implies a negative relationship between inflation uncertainty and interest rates. Some arguments such as market frictions and a positive relationship between inflation uncertainty and real rates may also give rise to a negative relationship between inflation uncertainty and nominal interest rates (e.g. Jorda and Salyer, 2003; Frankel and Lown, 1994). On the other hand, portfolio theory suggests a positive relationship (e.g. Markowitz, 1952). Namely, the variance of the rate of return is taken as a risk measure. Since inflation uncertainty increase the rate of return variability, risk-averse agents require (desire) higher yields. Asset pricing model, the Fisher hypothesis and the term structure theory also suggest a positive relationship between inflation uncertainty and nominal interest rates (e.g. Cox et al., 1981; Fama, 1975; Chan, 1994). Similarly, while some empirical studies such as Fama and Gibbons (1982), Mishkin (1992) and Berument (1999) find a positive relationship between inflation uncertainty and interest rates, some other studies such as Stulz (1986), Jorda and Salyer (2003), Berument et al. (2005) and Omay and Hasanov (2010) find a negative relationship.

These arguments suggest that uncertainty is a key element in monetary policy, hence empirical models of monetary policy should regard to uncertainty. In this study, we have estimated the monetary reaction function of the CBRT. Apart from the previous studies for Turkey, we consider the reaction of the CBRT to uncertainties. Some studies (see Berument and Malatyalı (2000), Berument and Tasci (2004), Omay and Hasanov (2006), Gozgor (2012)) estimated the different specifications of the monetary policy rules for CBRT. However, none of these studies have concerned with the effect of uncertainty on monetary policy rule. Therefore, to fill this gap, we investigate whether the monetary policy responds to both inflation and output uncertainties by changing the interest rate in the case of Turkey. Additionally, previous studies generally investigate the affect of the uncertainty in the output and inflation on the coefficients of the optimal monetary policy rule. In this study, we focus directly on the parameters of output and inflation uncertainties. These uncertainties are included into the Taylor – type monetary policy rule. We apply Generalized Methods of Moments (GMM) for estimating monetary policy reaction function. Significant coefficients of inflation and output uncertainties suggest that the monetary authority takes these uncertainties into consideration while forming the interest rate rule. On the other hand, insignificant coefficients indicate that uncertainties have no explanatory power for the interest rate decisions. The results show that the CBRT concerns mainly with price stability after the adoption of the inflation targeting. We also conclude that the CBRT considers the inflation and output uncertainties in setting the policy rate.

Another contribution of our study is to include an indicator of global financial liquidity conditions in our reaction function separately. The experience of the global crisis indicates the importance of financial stability especially for emerging market economies. Capital flows towards Turkey like other emerging markets increased as a result of the expansionary monetary policies of advanced economies in the post-global crisis period. This surge in capital inflows supported domestic credit growth and caused appreciation of Turkish Lira. As a consequence of these developments, the current account deficit widened. Since the current account finance mainly depends on the short-term capital movements, the concerns about financial stability increased (Başçı and Kara, 2011). Therefore, since 2010, the CBRT has been implementing a new monetary policy concerning both financial stability and price stability.

In the traditional inflation targeting framework, financial stability is not separately included in the objective function and the central bank reacts to variables related with financial stability only indirectly through their impact on inflation (Kara, 2012). However, since late 2010, the CBRT has been explicitly concerned with financial stability. Since CBRT's reaction function could be affected from this policy shift, we extended our model. To capture the policy stance of advanced countries, we include the change in the ten-year treasury rate of the US Treasury as one of the explanatory variables. Our results show that the CBRT significantly responses to US treasury rate.

The next section introduces the literature. The third section summarizes the monetary policy of the CBRT. The forth section reports empirical model, data and empirical results. The final section concludes the paper.

2. Literature

Many studies investigate the effects of uncertainties on the coefficients in the Taylor rule. Bihan and Sahuc (2002) show that when parameter uncertainty is taken into account, inflation and output gap parameters decline in the optimal reaction function. Smets (1998) argues that output gap uncertainty affects the parameter in the monetary policy rule. He shows that higher uncertainty leads to a fall reaction coefficient on the output gap in simple Taylor rules for the US economy. Peersman and Smets (1999) show that estimation error in the output gap causes the weight of output gap in a Taylor rule to fall for EU5. The amount of this decline in this coefficient depends on the weights in the objective function. Similarly, Swanson (2004) shows that when one variable is more uncertain, the weight on the other variable may be larger. Orphanides (2003) emphasizes that the ignorance of the measurement errors of the data causes misleading decisions about the performance of the activist policies. They suggest less activist policies to provide economic stability when the noise in the data is taken into account. Ehrmann and Smets (2003) show that the performance of the Taylor rule is not affected by output gap uncertainty. Uncertainty about the output gap causes reaction coefficient on the output gap to fall only marginally. Martin and Milas (2009) find that when inflation and output gap are more certain, the weights of these variables are lower. The other finding is that when one variable is more uncertain, the weight of the other variable is larger.

Another line of the literature investigates the effects of inflation uncertainty on interest rate within the Fisher hypothesis framework. Berument et al. (2005) show that inflation uncertainty is important to explain interest rate for UK. Similarly, Berument (1999) suggests that expected inflation and inflation uncertainty have positive effect on interest rate for UK. Yuksel and Akdi (2009) find a significant effect of inflation risk on interest rate for US. Omay and Hasanov (2010) suggest a negative relationship between inflation uncertainty and the interest rate for US. They also show that this relationship is regime dependent and it is greater in low-inflationary periods.

Some studies discuss why the central bank should respond to uncertainties. Mishkin (2000) and Goodfriend (2007) provide some principles for central banks to avoid the creation of uncertainties. Montes (2010, p.95) states that "in modern economies, expectations play a decisive role as a transmission mechanism of monetary policies." Since monetary policy affects the economic performance through expectations in the inflation targeting regime, almost all inflation targeting central banks are concerned with the maintenance of credibility. Therefore, it is conceivable that the central banks respond to uncertainty shocks in order to improve the effectiveness of monetary policy.