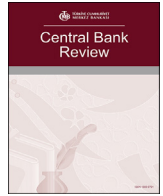Contents lists available at ScienceDirect

Central Bank Review

An evaluation of inflation expectations in Turkey[*]

Barış Soybilgen[*], Ege Yazgan

Istanbul Bilgi University, Turkey

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ABSTRACT

Expectations of inflation play a critical role in the process of price setting in the market. Central banks closely follow developments in inflation expectations to implement a successful monetary policy. The Central Bank of the Republic of Turkey (CBRT) conducts a survey of experts and decision makers in the financial and real sectors to reveal market expectations and predictions of current and future inflation. The survey is conducted every month. This paper examines the accuracy of these survey predictions using forecast evaluation techniques. We focus on both point and sign accuracy of the predictions. Although point predictions from CBRT surveys are compared with those of autoregressive models, sign predictions are evaluated on their value to a user. We also test the predictions for bias. Unlike the empirical evidence from other economies, our results show that autoregressive models outperform most of inflation expectations in forecasting inflation. This indicates that inflation expectations have poor point forecast accuracies. However, we show that sign predictions for all inflation expectations have value to a user.

1. Introduction

Due to its crucial role in the process of price setting and wage bargaining, inflation expectations are closely monitored by central banks. For central banks implementing inflation targeting regimes, the purpose of monitoring inflation expectations also includes the need of assessing whether the inflation target is credible or not. The long-term inflation "perceptions" tracked by inflation expectation surveys provides a good indicator of the credibility of the inflations target. If long-term inflation expectations are well anchored by the inflation target, this leads to a decline in inflation persistence. Hence, central banks can control inflation easier. On the other hand contrary to the central banks, inflation expectations surveys are generally used by the market players to assess the future course of inflation. In this paper, we analyze how useful these expectation surveys for the purpose of predicting future inflation for a specific economy.[1]

To monitor inflation expectations, the Central Bank of the Republic of Turkey (CBRT) introduced a semimonthly Survey of Expectations (SE) in August 2001 just before it implemented implicit inflation targeting in 2002.[2] The SE collects data on current month, 2 months ahead and 12 months ahead Consumer Price Index (CPI) inflation expectations as well as data on various other economic indicators.[3] In 2006, the CBRT switched from implicit to full-fledged inflation targeting when the initial policy matured and when macroeconomic and technical pre-conditions for inflation targeting appeared to be more satisfying. To meet the information requirements of the explicit inflation targeting regime, new questions were added to the SE in April 2006 including some that asked about one month ahead and 24 months ahead CPI inflation expectations.

Although the history of the CBRT's SE is relatively short, a number of studies have already analyzed the inflation expectations collected by the surveys. The bulk of these studies have questioned the rationality of these inflation expectations, which requires

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[*] Corresponding author.

E-mail addresses: baris.soybilgen@bilgi.edu.tr (B. Soybilgen), ege.yazgan@bilgi.edu.tr (E. Yazgan).

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[1] It should be noted that central banks, in addition to the above mentioned purpose, also use inflation expectations as a complementary source of information on future inflation besides their regular structural or reduced form models (Grothe and Meyler, 2015).

[2] Implicit inflation targeting was a stepping stone to full-fledged inflation targeting. The CBRT believed that adopting explicit inflation targeting prematurely posed a serious threat to the credibility of the CBRT (Kara, 2008).

[3] The content of these surveys was not immediately understood by the market. It took more than a year for the market to comprehend that SE presents the expectations of economic actors, not the forecasts of the CBRT (Kara, 2008).

simultaneous satisfaction of unbiasedness and efficiency conditions (Abdioğlu and Yılmaz, 2013; Kara and Küçük, 2005, 2010; Oral et al., 2011).[4] Kara and Küçük (2005) test both unbiasedness and efficiency of current month, 2 months ahead and 12 months ahead inflation expectations between August 2001 and April 2006. They show that only the current month inflation expectations satisfy both unbiasedness and efficiency conditions, while the others fail to satisfy those conditions. Kara and Küçük (2010) also analyze unbiasedness and efficiency of current month, 2 months ahead and 12 months ahead inflations expectations between August 2001 and October 2007 using time varying parameter approach. Kara and Küçük (2010) show that current month and 2 months ahead inflation expectations are unbiased, whereas 12 months ahead inflations expectations are biased. Furthermore, they point out that current month inflation expectations are efficient, whereas other inflation expectations cannot satisfy efficiency. 2 and 12 months ahead inflation expectations, though they are inefficient, the inefficiency diminishes throughout time. Finally, Oral et al. (2011) analyze unbiasedness of 12 month ahead inflation expectations using disaggregated sectoral data between August 2001 and November 2007 and conclude that inflation expectations are biased. However, the analysis period of these studies include implicit inflation targeting period where inflation had a strong downward trend. Therefore their results may not be easily projected to the current period of explicit inflation targeting regime where the CPI inflation rate is fluctuating between 5% and 10%. In a more recent study, Abdioğlu and Yılmaz (2013) test the rational expectation hypothesis for current month inflation expectations between 2005 and 2012 by using unbiasedness, autocorrelation, efficiency and orthogonality tests. They also find out that inflation expectations are biased, failing already one condition of rational expectation hypothesis.

As outlined above the previous studies have questioned the rationality of the survey expectations. Rationality is certainly a desirable property of a good predictor, however, it does not guarantee a good forecasting performance. Unlike previous literature, in this study, we analyze point and sign accuracy of Turkish inflation survey expectations. To accomplish this task, we conduct a thorough evaluation of forecasting performance of current month, next month, 2 months ahead, 12 months ahead and 24 months ahead CPI inflation expectations between January 2006 and November 2016. Furthermore, we also test unbiasedness of inflation expectations as in previous studies.

First, we test whether inflation expectations are biased using Mincer and Zarnowitz (1969) test as in Abdioğlu and Yılmaz (2013), Kara and Küçük (2005, 2010). We also perform Holden and Peel (1990) test. Unlike previous literature, we use a richer set of inflation expectations and a longer evaluation period for testing unbiasedness. Another distinguishing feature of our study is that we use both SEs collected in the 1st week and the 3rd week of each month. Results for Mincer and Zarnowitz (1969) test show that all inflation expectations are biased, whereas Holden and Peel (1990) test indicates that only 12 months ahead and 24 months ahead inflation expectations are biased.

Then, we analyze the point forecasting performance of inflation expectations by comparing the root mean square errors (RMSE) of inflation expectations with those of autoregressive (AR) models. If predictions of inflation expectations are informative for economic agents, they should be expected to outperform predictions of

benchmark statistical models. Ang et al. (2007) and Gil-Alana et al. (2012) analyze the forecasting performance of survey based inflation expectations for United States, and they show that survey based expectations outperform time series models. Furthermore, Grothe and Meyler (2015) test the prediction power of survey based inflation expectation for both United States and Euro Area and conclude that inflation expectations are informative predictors. In contrast to the literature, we show that AR models have higher predictive power than inflation expectations except current month inflation expectations.

Finally, we evaluate the sign forecasting performance of inflation expectations by using Fisher's exact test and the test used by Pesaran and Timmermann (1992, 2004) point out that the directional forecasting analysis is an increasingly popular metric for evaluating forecasting performance in the literature. Information about whether inflation will accelerate or decelerate in the future may help central banks for adjusting stance of monetary policy, so directional predictions of inflation expectations are also important for policy makers in central banks. Our results show that directional forecasting accuracy of inflation expectations are better than forecasting accuracy of a naive model, so they have the potential of providing value to decision makers.

The remainder of this paper proceeds as follows. Section 2 introduces the Survey of Expectations. Section 3 presents the results of unbiasedness tests. Section 4 shows the point forecasting performance of inflation expectations. Section 5 analyzes the sign forecasting performance of inflation expectations, and section 6 concludes.

2. Survey of expectations

The CBRT introduced the SE to the public in August 2001. The survey collects data on the expectations of decision makers in the financial and real sectors regarding inflation, interest rates, exchange rates, the current account deficit, and the GDP growth rate. In the initial version of the SE, there were 4 different questions on inflation expectations. In that initial version, respondents were expected to provide information on their expectations of the following: a) "current month monthly CPI inflation"; b) "2 months ahead monthly CPI inflation"; c) "end of year annual CPI inflation", and d) "one year (12 months) ahead annual CPI inflation". In April 2006, additional questions were added to the SE to meet the information requirements of the explicit inflation targeting regime. Regarding inflation, respondents were additionally asked to provide their expectations of "next month monthly CPI inflation", and "2 years (24 months) ahead annual CPI inflation". In this study, we evaluate the forecasting performance of all inflation expectations except "end of year annual CPI inflation" because forecasts of such fixed events require different analysis tools and should, therefore, be evaluated separately from the other "rolling type" forecasts.

In this study, we restrict our analysis to the period in which the full-fledged targeting policy was in effect. One of the reasons for this restriction is that inflation had a strong downward trend in the period of implicit inflation targeting. During the period of implicit inflation targeting, inflation reduced to single digits from 30%. Hence, along this downward trend, forecasters have easier time to predict inflation, so it should be a stark difference in the prediction power of inflation expectations between the implicit inflation targeting period and the explicit inflation targeting period where inflation doesn't have any clear trend. In addition to this, the new CPI was introduced in 2005, and the new CPI has a different structure than the old CPI. Therefore, expectation data before January 2006 are excluded from the analysis.

The CBRT conducted the SE semimonthly in the first and the third week of each month until the end of 2012. In the beginning of

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[4] Another strand of this literature has focused on the determinants of inflation expectations (Başkaya et al., 2008, 2010, 2012), whereas other recent studies have assessed the credibility of the CBRT by testing whether inflation expectations are anchored or not (Çiçek et al., 2011; Çiçek and Akar, 2014).