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Further evidence on the rationality of interest rate expectations: A comprehensive study of developed and emerging economies

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ABSTRACT

This study performs unbiasedness and efficiency tests of three-month and twelve-month ahead interest rate forecasts of one short-term and one long-term security of 10 developed and 20 emerging economies by exploiting a new survey data source. The results of the country-specific unbiasedness tests are mixed. However, the panel-based unbiasedness test results show that forecasts are biased. The efficiency test results indicate that forecasters do not incorporate all available information into their forecasts. We also find that emerging markets' interest rates are more predictable than the developed markets' interest rates at the shorter horizon due mainly to high inflation in the emerging markets. We also check for the robustness of our findings by dividing the sample period into two sub-periods, before and after the global financial crisis of 2007. We did not find any significant difference in the sub-period results compared to the full period. By considering a new group of countries (emerging economies), a new data source, and a new estimation approach, our study contributes to the financial market efficiency literature, especially on emerging markets. Investors and monetary policy makers should use these data cautiously as forecasts are not efficient. The study also has implications for monetary policy transparency and independence.

1. Introduction

Interest rate expectations play an important role in determining economic activity at both micro- and macroeconomic levels as they are related to expectations of future inflation, and thus have an impact on consumer spending and investment decisions regarding capital spending, personal loans, mortgages, etc. They also affect policy makers' decisions related to the future pace and direction of the economy. Thus, it is important to understand how interest rate expectations are formed, whether experts' expectations are unbiased and efficient and whether policy makers should have any role in the process. Our objective in this study is to extend the limited work on interest rate expectations by examining the unbiasedness and efficiency properties of 3-month and 12-month ahead interest rate forecasts of one short-term and one long-term security for 30 different countries,[3] including 10 developed and 20 emerging economies. Then, we investigate the robustness of the results through re-estimating our models by dividing the sample period into two sub-periods: before and after the 2007/2009 global financial crisis. We also examine whether monetary policy transparency, independence, and inflation can explain the predictability of interest rates, especially for emerging economies. The results should shed light on the term premia of different financial instruments, the impacts of policy makers' decisions on the private sector's expert forecasts, and help in understanding the forward discount puzzle in the foreign exchange market.

The theoretical underpinning of the study goes back to Muth (1961), who proposes the rational expectations hypothesis, which asserts that the outcome of an economic activity will not differ systematically from what people expected it to be.[4] Muth argues that agents are utility-maximizers and will process information efficiently to predict the future. Within this context, expectations should be formed using all relevant information in the available data set. That is, all observed

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[3] Data description section provides details of the securities for each country.
[4] According to Muth (1961), "expectations will be identical to optimal forecasts (the best guess of the future) using all available information".

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pre-determined variables that matter for the model solution enter the expectations formation mechanism and nothing more. Additionally, expectations should be efficient in the sense that alternative forecasts should lead to errors with higher variance than rational expectations. Within the rational expectation hypothesis, Zarnowitz (1992) notes that rational expectations do not require all participants to act rationally as the actions of few agents will eliminate any excess profit opportunity in a market, and will make asset prices efficient.

There are several forms of expectations formation mechanisms discussed in the literature, such as adaptive expectations, regressive expectations, extrapolative expectations, and rational expectations (Takagi, 1991). These mechanisms differ from one another depending on the behavioral assumptions made about the agents' expectations-generating processes. However, regardless of which expectation formation mechanism is used by agents, an interesting question remains: how accurate are these forecasts?

Because of the importance of the roles played by expectations in many sectors of the economy, many central banks, businesses, and academic institutions survey experts' opinions on different macroeconomic variables, like interest rates, exchange rates, GDP growth rates, inflation rates, current accounts, unemployment rates, industrial production, etc. A number of businesses and newspapers, including the *Wall Street Journal*, the *Economist*, *Financial Times*, etc., collect and publish consensus surveys on important economic variables, which are of interest to their readers. Survey data are collected from both the experts and the public. However, the data collected from the experts have special significance, as they are the opinions of professionals.[5]

These surveys have also drawn considerable interest among professionals and academics, who attempt to understand the accuracy of these forecasts. Survey data are used as a proxy to unobservable expectations in economic models. Practitioners and policy makers use them to understand the influence of expectations on economic behavior. Researchers have used survey data on interest rates to understand the magnitude of term premium in interest rates, which has implications for the substitutability of financial assets of different maturities and across countries. However, the presence of nonzero term premium leads to the failure of rational expectations. The absence and the presence of the term premium provide important clues to the monetary authorities as to how to conduct monetary policy. The term premium also has implications for debt management policies by financial institutions. Finally, the literature acknowledges that the use of survey data makes empirical results more reliable compared to the data obtained from the GMM approach (Henzel and Wollmershäuser, 2008).

Recent studies show that monetary policy transparency and independence have a significant impact on inflation and interest rate expectations and forecasts. Further, the transparency contributes to improving macroeconomic stability, and hence advancing the welfare of the society. Researchers have found evidence that central banks' transparency helps fix private sector's expectations (Cruijsen and Demertzis, 2007). Studies also show that central banks all over the world have become more transparent.[6] For example, Dincer and Eichengreen (2014) compile a transparency index and independence index for 120 central banks from 1998 to 2010, and conclude that there has been a substantial rise in transparency throughout the world, which includes many emerging and developing economies. Middeldorp (2011) uses the transparency index of Dincer and Eichengreen (2007) for twenty-four developed and developing economies and finds that the monetary policy transparency contributes to reducing the forecast errors of professional forecasts of interest rates, and decreasing the interest rate volatility of short-term interest rates. Chortareas et al. (2012) showed that transparency has reduced the bias in UK interest rates. Swanson (2006) also found that the US short-term interest rate forecasts have improved due to improved transparency. Improved transparency contributes to improved predictability, which contributes to improved private sectors' forecasts of interest rates and other macroeconomic variables, as shown by Morris and Shin (2002) and Woodford (2005). Transparency also improved inflation forecasts. For example, Kabundi et al. (2015) show that central bank transparency has improved inflation forecasts in South Africa.

Many studies investigated the properties of survey-based expectations on exchange rates and inflation rates. However, very few studies investigated the hypothesis of whether interest rate expectations are rational and whether agents use all available information efficiently, especially for the emerging markets. Besides, most emerging economies have gone through financial reforms and these markets have become more open and competitive. Thus, readers will find a comparison of interest rates predictability between developed and emerging markets interesting.

The remainder of the paper is organized as follows. Section 2 presents the literature review. Section 3 provides the data description. Section 4 presents the methodology and Section 5 analyses the estimated results. Section 6 concludes the paper.

2. Literature review

The rational expectation hypothesis has been tested in many areas of economics, particularly in financial markets, as these markets are considered highly efficient. In the foreign exchange market, researchers use forward rates and survey data on exchange rate expectations as a measure of expectations. For example, Froot and Frankel (1989), Frankel and Froot (1987) point out that survey data provide a better measure of expectations since they do not contain a component for risk premium as no transactions take place. Takagi (1991) notes three characteristics of survey data on expectations of future exchange rates. First, the dispersion of expectations tends to increase with the forecast horizon. Second, changes in the expected exchange rate tend to be underestimated, which means that part of the actual exchange rate movements is unexpected. Third, the long-run expectations tend to reverse the direction of short-run expectations. This phenomenon is referred to as the *twist* in the literature. A recent survey of literature in this area is available in Jongen et al. (2008). The majority of the studies conclude that expectations are not rational, especially at the horizons longer than one month.

There are also many studies related to the rationality of inflation expectations, using the surveys of experts' opinions as well as those of the public. Most of these studies investigate the inflation expectations of the developed economics. The evidence on the rationality of inflation expectations seems to be mixed. For example, Rich (1989) uses consumer survey data from a US data source and cannot reject rationality of inflation expectations. Smyth (1992) rejects unbiasedness of Michigan consumer survey data. Thomas (1999) analyzes a number of consumer survey data from the US and finds that expectations are not biased in general. Oral et al. (2011) use the consensus survey data collected from professionals published by the Turkish central bank but could not find evidence of rationality of expectations. However, Keane and Runkle (1990) test the rationality of individual price forecasts on a panel of professional forecasters, and conclude that the forecasts are unbiased and efficient. Souleles (2004) conducts a comprehensive study using the Michigan micro-data and finds that consumer expectations are biased and are time-varying. He also finds that expectations are inefficient. Gil-Alana et al. (2012) show that the survey-based forecasts outperform traditional out-of-sample predictions of US quarterly

[5] Consensus survey data, which are some sorts of averages of expert opinions, carry unique information, as they are the means of the expectations of the experts, and not the public in general. The survey data do not contain any risk premium since there is no risk-taking transaction is taking place. The data can provide valuable information about the efficiency of the expectations formation process by economic agents.

[6] Dincer and Eichengreen (2014), Geraats (2009), Eijffinger and Geraats (2006), Crowe and Meade (2008), and Fry et al. (2000), Chang et al. (2014).