Rationality and forecasting accuracy of exchange rate expectations: Evidence from survey-based forecasts

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ABSTRACT

We examine rationality, forecasting accuracy, and economic value of the survey-based exchange rate forecasts for 10 developed and 23 developing countries at the 3-, 12-, and 24-month horizons. Using the data from two surveys for the period from 2004 to 2012, we find strong evidence that the forecasts for developing countries are biased at all forecast horizons. For developed countries, forecasts are strongly biased at the 3-month horizon, the bias decreases at the 12-month horizon, and increases again at the 24-month horizon. Based on the magnitude of the forecast errors and the direction of change, long-term forecasts are more accurate than short-term forecasts. Economic evaluation of the forecasts indicates that the forecasters are successful at generating positive economic profits, and economic gains of the forecasts for developed countries improve with the forecast horizon.

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1. Introduction

Exchange rate expectations play an important role in the literature on exchange rate determination. Understanding how exchange rate expectations are formed is crucial for both academic analysis and decision-making of practitioners and policymakers. Models of exchange rate determination in open-economy macroeconomics often rely on the assumption of the rationality of expectations.[1] In the absence of survey-based expectations, it is practically impossible to test the implications of theoretical exchange rate models, without running into a problem of joint hypothesis testing. For example, the uncovered interest parity (UIP), the condition that the expected exchange rate depreciation must equal the interest rate differential between the two countries, is typically tested assuming rational expectations because the expected exchange rate changes are unobservable. In the absence of survey-based expectations, the expected exchange rate depreciation is typically replaced with actual ex-post realizations of the exchange rate. Thus, testing the uncovered interest parity involves testing the combined assumption of no risk premium (or the validity of the UIP) and rational expectations.[2] Testing the rationality of market expectations helps to assess the validity of the rational expectations hypothesis and accurately interpret empirical results in similar

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  [1] Engel (1996) and Lewis (1995) survey the literature on studies that examine puzzles in foreign exchange rate markets assuming rational expectations.
  [2] This joint hypothesis, sometimes referred to as the risk-neutral efficient-markets hypothesis (RNEMH), is reviewed and tested with and without survey-based data in Chinn (2006).

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studies. In addition, it has been shown that the rationality assumption can have serious implications for evaluating the effectiveness of macroeconomic policies.

While the forecasts of macroeconomic variables have been studied for at least sixty years, the literature on survey-based exchange rate expectations goes back only to the late 1980s. Limited data availability and proprietary nature of the data are mainly responsible for short history of research on professional exchange rate forecasts. Following Dominguez (1986) and Frankel and Froot (1987), other studies have examined the nature of exchange rate expectations using survey data. Jongen et al. (2008) highlight five main issues in the literature on the role of exchange rate expectations: the forward discount puzzle, rationality of expectations, time-varying risk premium, heterogeneity of expectations, and forecasting accuracy of professional forecasters. In this paper, we focus our analysis on the rationality, predictive accuracy, and economic evaluation of survey-based exchange rate forecasts.

The rationality of exchange rate expectations is typically tested empirically by verifying whether the unbiasedness and orthogonality conditions are met.[3] Overall, previous studies tend to find evidence of irrationality and no predictive ability of professional exchange rate forecasts. For example, Dominguez (1986), Frankel and Froot (1987), Avraham et al. (1987), Cavaglia et al. (1993), Chinn and Frankel (1994), MacDonald and Marsh (1994), and more recently Cavusoglu and Neveu (2015) test whether survey-based exchange rate expectations are biased in a regression of the actual depreciation on the expected depreciation. In a review article, Jongen et al. (2008) conclude that the hypothesis of unbiasedness is rejected "for nearly all currencies and forecast horizons". Takagi (1991), MacDonald (2000), and Jongen et al. (2008) summarize the literature on survey-based expectations and report that exchange rate expectations are not rational and have low forecasting ability.

Previous studies on the rationality of exchange rate expectations focus almost exclusively on the developed countries. The exceptions are Frankel and Chinn (1993), who use 3- and 12-month forecasts from *Currency Forecasters' Digest* for 17 countries (15 of which are developed) to study the relative role of time-varying risk premium and rational expectations for the forward discount bias, and Chinn and Frankel (1994, 2002), who study survey-based expectations for a set of 24 countries (that includes 14 advanced economies) at the same forecast horizons as Frankel and Chinn (1993), and find less bias for minor currencies than for major currencies.[4]

There are three main differences between our approach to testing for rationality of exchange rate expectations and that of the earlier studies. First, we substantially expand the list of emerging economies in our sample. Using survey data on 23 emerging countries and 10 developed countries, we identify new patterns in the behavior of exchange rate forecasts for the two groups of countries that have considerable volatility differences. Another notable difference is that our sample includes the Euro/U.S. dollar forecasts instead of the European Monetary System (EMS) countries individually. Second, in addition to *Currency Forecasters' Digest*, currently known as *FX4Casts*, we analyze survey-based expectations for the same 33 countries from *Consensus Economics* dataset. Third, we estimate the regressions for 3-, 12-, and 24-month ahead forecasts country-by-country instead of pooling forecasts across a diverse group of countries as in many earlier studies. We focus on the period between January 2004 and December 2012. Using the longest available sample period for all currencies and all forecast horizons in both datasets, we compare the results between different forecast horizons, different currencies, and two data providers.[5]

Using two datasets allows us to study two sets of forecasts that are produced by different samples of respondents. While *Consensus Economics* surveys a wider sample of respondents that includes investment banks, large non-financial enterprises, consulting firms, and university economists, *FX4Casts* sample includes only large financial institutions that might have stronger incentives to provide accurate forecasts and, thus, could provide a superior representation of the behavior of market participants. Thus, we are able to assess the robustness of the results and extract additional insights into the behavior of market participants.

In order to assess the rationality of exchange rate expectations, we use conventional tests for unbiasedness and orthogonality. Overall, we find the evidence that the null of unbiasedness is strongly rejected at all three forecast horizons for developing countries. For developed countries, we find that the forecast bias has a nonlinear relationship with the forecast horizon. Survey forecasts for developed countries are strongly biased at the 3-month horizon, the forecast bias decreases at the 12-month horizon, and increases again at the 24-month horizon. Cavusoglu and Neveu (2015) consider 5 major currencies in *FX4Casts* and find that the forecasts mostly appear to be unbiased in the long run, but are biased in the short run. Our results confirm their findings in the short run, but show that the forecast bias increases substantially at longer forecast horizons. We also test for the orthogonality of forecast errors using 2 different criteria, to analyze the efficiency of exchange rate forecasts. Orthogonality tests reveal that professional forecasters in *FX4Casts* are very efficient at the short forecast horizon.

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[3] Pesaran (1987) specifies four conditions of rationality: unbiasedness, orthogonality of the forecast errors to variables in the information set available to market participants, serial correlation in the forecast errors only up to order $h - 1$, and orthogonality of the forecast errors to past variables that are expected to form the expectations. We focus on the former two conditions, which are conventionally tested in the literature. Since we use aggregate forecasts, we cannot test the serial correlation condition because we are unable to control for heterogeneity across forecasters, which might introduce serial correlation in the forecast errors. The last condition requires the knowledge of the information set of survey participants, which we do not have.

[4] Frankel and Poonawala (2010) replace exchange rate expectations with realized exchange rates for 21 developed and 14 developing countries from 1996 to 2004 and confirm that the forward rate is a less biased predictor of the future exchange rate in emerging market currencies than in advanced economies. Bansal and Dahlquist (2000) find that the uncovered interest parity puzzle is limited only to developed countries and the situations where the interest rate differential is positive.

[5] The results using the longest sample period for each individual country are available from the authors upon request.