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Dynamic expectation formation in the foreign exchange market



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This paper investigates the time-varying nature of expectation formation rules for institutional investors in the foreign exchange market. Using a dataset of survey expectations for four exchange rates, we first distinguish three different general rules. We find a momentum rule, a fundamental rule, and a rule that takes advantage of interest differentials between countries. Apart from heterogeneity in expectation formation rules, we show that the rules are time-varying conditional on a number of different factors, such as the sign of the most recent return, the forecast horizon, the distance to the PPP rate, and the extent to which the rule produces forecast errors vis-à-vis the market exchange rate.

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1. Introduction

Several foreign exchange market anomalies (e.g. excessive trade, momentum, forward premium puzzle) cannot be fully explained within the traditional framework. Also, non-fundamental strategies such as carry trade (Menkhoff et al., 2012a) and momentum (Menkhoff et al., 2012b) can be profitable. In addition, there is ample evidence of investors having expectations that are non-rational in the traditional sense, and also heterogeneous (Ito, 1990; Cavaglia et al., 1993; MacDonald and Marsh, 1996; Menkhoff et al., 2009; Jongen et al., 2012a,b). Several approaches have been suggested in the literature to address these issues. For example, the scapegoat approach (Bacchetta and van Wincoop, 2009; Sarno

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and Valente, 2009) assumes that exchange rates can be explained by varying fundamentals over time. The learning approach (see e.g. Markiewicz, 2012; De Grauwe and Markiewicz, 2013) poses that agents in the foreign exchange market behave as econometricians and attempt to learn the true data generating process from the empirical data. In this paper, we follow the behavioral finance literature and use survey data to test whether expectations are formed using heuristics, and whether the use of these heuristics is time-varying following the theoretical work of De Grauwe and Grimaldi (2006) and Spronk et al. (2013).

The assumption of rational market participants with homogeneous expectations, once firmly rooted in financial theory, is losing ground in favor of alternative assumptions of agent behavior such as bounded rationality and heterogeneous expectations. Bounded rationality of market participants was already introduced by Simon (1957). In this framework it is assumed that agents are boundedly rational and that they use certain rules of thumb, heuristics, to form expectations about future asset prices. Various attempts have been made to determine what these rules of thumb are and how they are being used, ranging from theoretical models to lab experiments and survey analyses.

The main theoretical contributions come from Frankel and Froot (1987b), De Long et al. (1990) and Lux (1998). Frankel and Froot (1987b) develop a model with three types of actors: chartists ('trend followers'), fundamentalists ('model followers') and portfolio managers. The portfolio manager is the only actor who buys and sells assets, and he receives input from the two other types. Therefore, he makes trades that can be seen as a weighted average between the chartist and the fundamentalist expectations. Lux' (1998) also makes this distinction between chartist and fundamentalist strategies. De Long et al. (1990) make a distinction between noise traders and sophisticated traders. In this model, the noise traders create a risky investment environment and are able to obtain excess returns without having access to inside information. Because of the presence of this group in the market, prices can deviate significantly from their fundamental value for longer periods of time. All of these authors explain various market anomalies and stylized facts with their models of investor behavior.

The presence and behavior of different types of agents in financial markets has been examined in a number of ways. Schmalensee (1976) was one of the first to use experimental methods to reveal expectation formation processes for time series, in particular with respect to technical rules. De Bondt (1993) and Bloomfield and Hales (2002) use classroom experiments and find evidence of trend-following behavior, where Bloomfield and Hales (2002) also find support for the assumption in Barberis et al. (1998) that investors perceive past trend reversals as an indicator for the probability of future reversals even though they are aware of the random walk character. Hommes et al. (2005) illustrate coordination of expectations among participants in an experimental setting.

As an alternative method to measure expectations, attempts have been made to directly measure investor expectations and expectation formation rules. To this end, both quantitative and qualitative surveys have been conducted. Taylor and Allen (1992) show, based on a questionnaire survey, that 90% of the foreign exchange dealers based in London use some form of technical analysis in forming expectations about future exchange rates, particularly for short-term horizons. The foreign exchange dealers further expressed that they see fundamental and technical analyses as complementary strategies for making forecasts and that technical analysis can serve as a self-fulfilling mechanism. Various quantitative surveys have been evaluated as well (among others, Ito, 1990; Cavaglia et al., 1993; MacDonald and Marsh, 1996; Branch, 2004; Menkhoff et al., 2009). They all find heterogeneity in expectations, and most of them attribute this to extrapolative, regressive and adaptive expectations (for an overview, see Jongen et al., 2008). However, all these studies assume static and non-time-varying expectation formation.

Branch (2004) investigates inflation expectations and finds that agents switch between different exogenously determined forecasting techniques (VAR, naïve and adaptive) based on the mean squared prediction errors of the strategies. This paper extends Branch (2004) by introducing dynamics in expectation formation strategies for financial markets, being the foreign exchange market, where feedback effects from expectations to realizations can be stronger than in the case of inflation. In addition, the forecasting rules are estimated endogenously. Whereas Branch (2004) optimizes the forecasting rules exogenously on realized inflation, we estimate the forecasting rules endogenously on the survey expectations. This approach allows for more flexibility in results as it does not presume consistency between expectations and realizations.

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