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Taylor rules and exchange rate predictability in emerging economies

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A B S T R A C T

This study demonstrates the relationship between exchange rate determination and an endogenous monetary policy represented by Taylor rules. We fill a gap in the literature by focusing on a group of fifteen emerging economies that adopted free-floating exchange rates and inflation targeting beginning in the mid-1990s. Because of the limited span of the time series, which is a common obstacle to studying emerging economies, we employ panel data regressions to produce more efficient estimates. Following the recent literature, we use a robust set of out-of-sample statistics, incorporating bootstrapped and asymptotic distributions for the Diebold-Mariano statistic, the Clark and West statistic and Theil's U ratio. By evaluating different specifications for the Taylor rule exchange rate model based on their out-of-sample performances, we find that a present-value forward-looking specification shows strong evidence of exchange rate predictability.

1. Introduction

This study aims to investigate the exchange rate predictability of fifteen emerging economies (i.e., Brazil, Chile, Czech Republic, Colombia, Hungary, Israel, Mexico, Peru, Philippines, Poland, Romania, South Africa, South Korea, Thailand and Turkey) that share similar monetary policy regimes and have adopted free-floating exchange rate regimes. We contribute to the literature by combining two promising approaches. First, we use panel data regression to analyze limited time-series data and increase forecasting efficiency. Second, we investigate more realistic endogenous monetary models by

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testing a robust set of models for an exchange rate on the basis of the Taylor (1993) rule.[1] We also respond to Rogoff and Stavrakeva's (2008) criticism of the predictability of exchange rate models with regard to the misinterpretation and biased use of out-of-sample statistics. In particular, we construct appropriate bootstrapped confidence intervals for the out-of-sample statistics from Diebold and Mariano (1995), Clark and West (2006, 2007) and Theil's U ratio.

To understand how this study relates to the literature on exchange rate predictability, we will first discuss the existing literature. Testing exchange rate models became popular after the major industrialized economies adopted floating exchange rates and abandoned the Bretton Woods system in the early 1970s.[2] Data on independently floating exchange rates have been used in several empirical studies, such as Bilson (1978), Hodrick (1978) and Putnan and Woodburry (1980). These studies found evidence supporting the exchange rate models of the 1970s: significant coefficients with the expected signs, acceptable model in-sample fits and satisfactory results of the diagnosis tests.

However, the empirical results changed drastically beginning in the 1980s with the publication of Meese and Rogoff's (1983) seminal paper. Using United-States-related exchange rate data for the United Kingdom, Japan and Germany, these authors concluded that, with a one-to twelve-month forecasting horizon, the random walk model performs at least as well as the exchange rate models of that time (i.e., the flexible price and sticky price monetary models and a hybrid model by Hooper and Morton (1982)).

A plethora of studies followed Meese and Rogoff's (1983) work. Some researchers, such as Mark (1995), claimed to have reversed the no-predictability results. Using innovative bootstrapping techniques and exchange rate data from 1973 to 1991 for Canada, Germany, Japan and Switzerland relative to the US dollar, Mark found support for forecasting monetary models at horizons between 12 and 16 quarters for some countries. However, this evidence of predictability was short lived. Subsequently, criticism came from Kilian (1999), who demonstrated that Mark's results were not robust to sample modifications and that they crucially depended on the assumed data-generating process. Furthermore, scholars have criticized Mark (1995) for implicitly assuming that the exchange rate and monetary fundamentals are cointegrated. Berkowitz and Giorgianni (2001) showed that if the assumption of cointegration is invalid, then the tests are biased toward rejecting the null hypothesis of no predictability.

Inconclusive results were common until the early to mid-2000s. Surveying the literature of the 1980s and 1990s, Sarno and Taylor (2002) claimed that 'The empirical results tended to be fragile in the sense that they were hard to replicate in different samples or countries.' Cheung et al. (2005) tested the predictability of the US dollar-based exchange rates of the Canadian dollar, British pound, Deutsche-mark, Japanese yen and Swiss franc using a wider range of models than those used in the 1980s and 1990s. The results of these tests were inconclusive, as Cheung et al. summarized: 'Model/specification/currency combinations that work well in one period do not necessarily work well in another period.'

Surprisingly, in the second half of the 2000s, a large number of studies claimed to have produced evidence of exchange rate out-of-sample performance. According to Engel et al. (2008), who emphasized the importance of the monetary policy rule and used exchange rate models determined by the expected present values of fundamentals, longer data spans and panel data provided hope for predicting exchange rates.

These studies focused on two alternative approaches. Some researchers (e.g., Groen, 2005; Mark and Sul, 2001; Rapach and Wohar, 2004) used larger panel data sets from a set of similar countries. Using unit root and panel cointegration techniques, these studies found evidence of predictability in the monetary model, especially over longer horizons. However, most of these studies used the old monetary models of the 1970s and 1980s.

Another line of research using more innovative and realistic models still focuses on country-by-country estimation but assumes that an endogenous monetary policy exists in exchange rate Taylor

[1] The estimation of reaction rules, as formulated by Taylor (1993), is the most traditional way to estimate the behavior of the central bank. This monetary policy is known in the literature as the Taylor rule and assumes that interest rates respond positively to inflation and output gaps. Thus, the Taylor rule follows a policy of leaning against the wind to control the level of economic activity and, consequently, inflation.

[2] Established in 1944, this system determined that each country should fix its exchange rate in relation to the U.S. dollar, which was convertible to a fixed amount of gold.