

Exchange Rate Forecasting Techniques And Applications

This paper presents a reduced-form model of the real exchange rate. Using multilateral cointegration methods, the model is implemented for the real effective exchange rates of the dollar, the mark, and the yen, over the period 1974-1993. In contrast to much other research using real exchange rates, there is evidence of significant and sensible long-run relationships for a simplified version as well as for the full version of the model. The estimated long-run relationships are used to produce dynamic equations, which outperform a random walk and produce sensible dynamic patterns in the context of an impulse response analysis.

This book provides an alternative view of the workings of foreign exchange markets. The authors' modeling approach is based on the idea that agents use simple forecasting rules and switch to those rules that have been shown to be the most profitable in the past. This selection mechanism is based on trial and error and is probably the best possible strategy in an uncertain world, the authors contend. It creates a rich dynamic in the foreign exchange markets and can generate bubbles and crashes. Sensitivity to initial conditions is a pervasive force in De Grauwe and Grimaldi's model. It explains why large exchange-rate changes and volatility clustering

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occur. It also has important implications for understanding how the news affects the exchange rate. De Grauwe and Grimaldi conclude that news in fundamentals has an unpredictable effect on the exchange rate. Sometimes, they maintain, it alters the exchange rate considerably; at other times it has no effect whatsoever. The authors also use their model to analyze the effects of official interventions in the foreign exchange market. They show that simple intervention rules of the "leaning-against-the-wind" variety can be effective in eliminating bubbles and crashes in the exchange rate. They further demonstrate how, quite paradoxically, by intervening in the foreign exchange market the central bank makes the market look more efficient. Clear and comprehensive, *The Exchange Rate in a Behavioral Finance Framework* is a must-have for analysts in foreign exchange markets as well as students of international finance and economics.

This three volume set (CCIS 1237-1239) constitutes the proceedings of the 18th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems, IPMU 2020, in June 2020. The conference was scheduled to take place in Lisbon, Portugal, at University of Lisbon, but due to COVID-19 pandemic it was held virtually. The 173 papers were carefully reviewed and selected from 213 submissions. The papers are organized in topical sections: homage to Enrique

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Ruspini; invited talks; foundations and mathematics; decision making, preferences and votes; optimization and uncertainty; games; real world applications; knowledge processing and creation; machine learning I; machine learning II; XAI; image processing; temporal data processing; text analysis and processing; fuzzy interval analysis; theoretical and applied aspects of imprecise probabilities; similarities in artificial intelligence; belief function theory and its applications; aggregation: theory and practice; aggregation: pre-aggregation functions and other generalizations of monotonicity; aggregation: aggregation of different data structures; fuzzy methods in data mining and knowledge discovery; computational intelligence for logistics and transportation problems; fuzzy implication functions; soft methods in statistics and data analysis; image understanding and explainable AI; fuzzy and generalized quantifier theory; mathematical methods towards dealing with uncertainty in applied sciences; statistical image processing and analysis, with applications in neuroimaging; interval uncertainty; discrete models and computational intelligence; current techniques to model, process and describe time series; mathematical fuzzy logic and graded reasoning models; formal concept analysis, rough sets, general operators and related topics; computational intelligence methods in information modelling, representation and processing.

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This paper presents a brief survey of the empirical literature on survey-based exchange rate expectations. The literature in general supports the presence of a non-zero risk premium and rejects the hypothesis of rational expectations. The crucial result is that, while short-run expectations tend to move away from some long-run "normal" values, long-run expectations tend to regress toward them. If this nature of short-run expectations increases the volatility of exchange rate movements, there may be a basis for some official measure to minimize short-run exchange rate movements.

We run a real exchange rate forecasting "horse race", which highlights that two principles hold. First, forecasts should not replicate the high volatility of exchange rates observed in sample. Second, models should exploit the mean reversion of the real exchange rate over long horizons. Abiding by these principles, an open-economy DSGE model performs well in real exchange rate forecasting. However, it fails to forecast nominal exchange rates better than the random walk. We find that the root cause is its inability to predict domestic and foreign inflation. This shortcoming leads us toward simpler ways to outperform the random walk.

The performances were compared in two ways: (i) forecast accuracy and (ii) transforming their forecasts into a more effective technical trading rule. The results were obtained with real FX trading data,

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and the results showed that the method introduced in this work outperforms the other popular methods. Furthermore, we conducted a thorough investigation of optimal parameter choice with different distance measures. We adopted the concept of distance based weighting to the NN and compared the performances with traditional unweighted NN algorithm based forecasting. Time series forecasting methods, such as Auto regressive integrated moving average process (ARIMA), are widely used in many ares of time series as a forecasting technique. We compared the performances of proposed Mahalanobis distance based k-NN forecasting procedure with the traditional general ARIM- based forecasting algorithm. In this case the forecasts were also transformed into a technical trading strategy to create buy and sell signals. The two methods were evaluated for their forecasting accuracy and trading performances. Multi-step ahead forecasting is an important aspect of time series forecasting. Even though many researchers claim that the k-Nearest Neighbor forecasting procedure outperforms the linear forecasting methods for financial time series data, and the available work in the literature supports this claim with one step ahead forecasting. One of our goals in this work was to improve FX trading with multi-step ahead forecasting. A popular multi-step ahead forecasting strategy was adopted in our work to obtain more than one day ahead forecasts. We

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performed a comparative study on the performance of single step ahead trading strategy and multi-step ahead trading strategy by using five foreign currency data with Mahalanobis distance based k-nearest neighbor algorithm.

"This paper attacks the Meese-Rogoff puzzle from a different perspective: out-of-sample interval forecasting. Most studies in the literature focus on point forecasts. In this paper, we apply Robust Semiparametric (RS) interval forecasting to a group of Taylor rule models. Forecast intervals for twelve OECD exchange rates are generated and modified tests of Giacomini and White (2006) are conducted to compare the performance of Taylor rule models and the random walk. Our contribution is twofold. First, we find that in general, Taylor rule models generate tighter forecast intervals than the random walk, given that their intervals cover out-of-sample exchange rate realizations equally well. This result is more pronounced at longer horizons. Our results suggest a connection between exchange rates and economic fundamentals: economic variables contain information useful in forecasting the distributions of exchange rates. The benchmark Taylor rule model is also found to perform better than the monetary and PPP models. Second, the inference framework proposed in this paper for forecast-interval evaluation can be applied in a broader context, such as inflation forecasting, not just to the models and interval forecasting methods used in this paper"--Page [2].

This text explains the methods and aspects of exchange rate forecasting, including purchasing power, parity, interest rate differentials and technical analysis. Guidelines for reducing risk with forecasting strategies are included, as are techniques for co

Historical and recent developments at international financial

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markets show that it is easy to lose money, while it is difficult to predict future developments and optimize decision-making towards maximizing returns and minimizing risk. One of the reasons of our inability to make reliable predictions and to make optimal decisions is the growing complexity of the global economy. This is especially true for the foreign exchange market (FX market) which is considered as one of the largest and most liquid financial markets. Its degree of efficiency and its complexity is one of the starting points of this volume. From the high complexity of the FX market, Christian Ullrich deduces the necessity to use tools from machine learning and artificial intelligence, e.g., support vector machines, and to combine such methods with sophisticated financial modeling techniques. The suitability of this combination of ideas is demonstrated by an empirical study and by simulation. I am pleased to introduce this book to its audience, hoping that it will provide the reader with interesting ideas to support the understanding of FX markets and to help to improve risk management in difficult times. Moreover, I hope that its publication will stimulate further research to contribute to the solution of the many open questions in this area.

Praise for Handbook of Exchange Rates “This book is remarkable. I expect it to become the anchor reference for people working in the foreign exchange field.” —Richard K. Lyons, Dean and Professor of Finance, Haas School of Business, University of California Berkeley “It is quite easily the most wide ranging treasury of expertise on the forex market I have ever come across. I will be keeping a copy close to my fingertips.” —Jim O’Neill, Chairman, Goldman Sachs Asset Management How should we evaluate the forecasting power of models? What are appropriate loss functions for major market participants? Is the exchange rate the only means of adjustment? Handbook of Exchange Rates answers

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these questions and many more, equipping readers with the relevant concepts and policies for working in today's international economic climate. Featuring contributions written by leading specialists from the global financial arena, this handbook provides a collection of original ideas on foreign exchange (FX) rates in four succinct sections:

- **Overview** introduces the history of the FX market and exchange rate regimes, discussing key instruments in the trading environment as well as macro and micro approaches to FX determination.
- **Exchange Rate Models and Methods** focuses on forecasting exchange rates, featuring methodological contributions on the statistical methods for evaluating forecast performance, parity relationships, fair value models, and flow-based models.
- **FX Markets and Products** outlines active currency management, currency hedging, hedge accounting; high frequency and algorithmic trading in FX; and FX strategy-based products.
- **FX Markets and Policy** explores the current policies in place in global markets and presents a framework for analyzing financial crises. Throughout the book, topics are explored in-depth alongside their founding principles. Each chapter uses real-world examples from the financial industry and concludes with a summary that outlines key points and concepts.

Handbook of Exchange Rates is an essential reference for fund managers and investors as well as practitioners and researchers working in finance, banking, business, and econometrics. The book also serves as a valuable supplement for courses on economics, business, and international finance at the upper-undergraduate and graduate levels.

Models and Strategies for Exchange Rate

Forecasting Michael R. Rosenberg Getting an accurate exchange rate is critical for any company doing business in today's global economy. Exchange Rate

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Determination--written by the number one-ranked foreign exchange team in the world--examines the methods used to accurately and profitably forecast foreign exchange rates. This hands-on guidebook uses extensive charts and tables to examine currency option markets, productivity trends and exchange rates; technical analysis methods to improve currency forecasting accuracy; and more.

Predicting foreign exchange rates has presented a long-standing challenge for economists. However, the recent advances in computational techniques, statistical methods, newer datasets on emerging market currencies, etc., offer some hope. While we are still unable to beat a driftless random walk model, there has been serious progress in the field. This book provides an in-depth assessment of the use of novel statistical approaches and machine learning tools in predicting foreign exchange rate movement. First, it offers a historical account of how exchange rate regimes have evolved over time, which is critical to understanding turning points in a historical time series. It then presents an overview of the previous attempts at modeling exchange rates, and how different methods fared during this process. At the core sections of the book, the author examines the time series characteristics of exchange rates and how contemporary statistics and machine learning can be useful in improving predictive power, compared to previous methods used. Exchange rate determination is an active research area, and this book will appeal to graduate-level students of international economics, international finance, open economy macroeconomics, and management. The book is written in a clear, engaging, and straightforward way, and will greatly improve access to this much-needed knowledge in the field.

Exchange Rate Forecasting: Techniques and Applications Springer

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For the past 30 years international monetary economists have believed that exchange rate models cannot outperform the random walk in out-of-sample forecasting as a result of the 1983 paper written by Richard Meese and Kenneth Rogoff. Marking the culmination of their extensive research into the Meese-Rogoff puzzle, Moosa and Burns challenge the orthodoxy by demonstrating that the naïve random walk model can be outperformed by exchange rate models when forecasting accuracy is measured by metrics that do not rely exclusively on the magnitude of forecasting error. The authors present compelling evidence, supported by their own measure: the 'adjusted root mean square error', to finally solve the Meese-Rogoff puzzle and provide a new alternative. Demystifying the Meese-Rogoff Puzzle will appeal to academics with an interest in exchange rate economics and international monetary economics. It will also be a useful resource for central banks and financial institutions. An introduction to the hatching out and maturation of a baby penguin.

"This paper compares the true, ex-ante forecasting performance of a micro-based model against both a standard macro model and a random walk. In contrast to existing literature, which is focused on longer horizon forecasting, we examine forecasting over horizons from one day to one month (the one-month horizon being where micro and macro

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analysis begin to overlap). Over our 3-year forecasting sample, we find that the micro-based model consistently out-performs both the random walk and the macro model. Micro-based forecasts account for almost 16 per cent of the sample variance in monthly spot rate changes. These results provide a level of empirical validation as yet unattained by other models. Our result that the micro-based model out-performs the macro model does not imply that macro fundamentals will never explain exchange rates. Quite the contrary, our findings are in fact consistent with the view that the principal driver of exchange rates is standard macro fundamentals. In Evans and Lyons (2004b) we report firm evidence that the non-public information that we exploit here for forecasting exchange rates is also useful for forecasting macro fundamentals themselves"--NBER website

Foreign exchange intervention is widely used as a policy tool, particularly in emerging markets, but many facets of this tool remain limited, especially in the context of flexible exchange rate regimes. The Latin American experience can be informative because some of its largest countries adopted floating exchange rate regimes and inflation targeting while continuing to intervene in foreign exchange markets. This edited volume reviews detailed accounts from several Latin American countries' central banks, and it provides insight into

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how and with what aim many interventions were decided and implemented. This book documents the effectiveness of intervention and pays special attention to the role of foreign exchange intervention policy within inflation-targeting monetary frameworks. The main lesson from Latin America's foreign exchange interventions, in the context of inflation targeting, is that the region has had a considerable degree of success. Transparency and a clear communication policy have been key. For economies that are not highly dollarized, rules-based intervention helped contain financial instability and build international reserves while preserving inflation targets. The Latin American experience can help other countries in the design and implementation of their policies.

It is a well known fact that a naive random walk generates better exchange rate forecasts than economic models. The exchange rate is episodically unstable and the switching nature is inconsistent with a linear representation. However, empirical evidence in favour of non-linear models such as regime switching models, neural networks or non-parametric ones is weak. The present paper adopts an econometric method, which incorporates dynamic model averaging (DMA) and selection (DMS). The DMA / DMS framework adds additionally layers of flexibility by allowing parameters as well as the entire forecasting model to evolve over time. In addition

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this paper takes a different approach by forecasting exchange rates at a daily frequency. Thereby financial data is used as a proxy for macro-economic fundamentals and technical indicators are included in the set of potential predictor variables. The paper shows strong empirical evidence in favour of the employed model in the period before the bankruptcy of Lehman Brothers. During the financial crisis predictability in terms of the mean squared forecast error breaks down. The time-varying evolution of fundamental and technical forecasts allows investigating the evolution of the influence of two types of agents (fundamentalists and chartists) believed to operate in the foreign exchange market. With the internationalization of Renminbi (RMB), the gradual liberalization of China's capital account and the recent reform of the RMB pricing mechanism, the RMB exchange rate has been volatile. This book examines how we can forecast exchange rate reliably. It explains how we can do so through a new methodology for exchange rate forecasting. The book also analyzes the dynamic relationship between exchange rate and the exchange rate data decomposition and integration, the domestic economic situation, the international economic situation and the public's expectations and how these interactions would affect the exchange rate. The book also explains why this comprehensive integrated approach is the best model for optimizing accuracy in exchange rate forecasting.

An integrated approach to recent developments in the

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understanding of foreign exchange markets covers the theory of efficient markets developed in finance and the models used to explain exchange rates in macroeconomics.

Forecasting exchange rates is a variable that preoccupies economists, businesses and governments, being more critical to more people than any other variable. In Exchange Rate Forecasting the author sets out to provide a concise survey of the techniques of forecasting - bringing together the various forecasting methods and applying them to the exchange rate in a highly accessible and readable manner. Highly practical in approach, the book provides an understanding of the techniques of forecasting with an emphasis on its applications and use in business decision-making, such as hedging, speculation, investment, financing and capital budgeting. In addition, the author also considers recent developments in the field, notably neural networks and chaos, again, with easy-to-understand explanations of these "rocket science" areas. The practical approach to forecasting is also reflected in the number of examples that pepper the text, whilst descriptions of some of the software packages that are used in practice to generate forecasts are also provided.

This paper provides a selective overview of nonlinear exchange rate models recently proposed in the literature and assesses their contribution to understanding exchange rate behavior. Two key questions are examined. The first question is whether nonlinear autoregressive models of real exchange rates help resolve the "purchasing power parity (PPP) puzzles."

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The second question is whether recently developed nonlinear, regime-switching vector equilibrium correction models of the nominal exchange rate can beat a random walk model, the standard benchmark in the exchange rate literature, in terms of out-of-sample forecasting performance. Finally, issues related to the adequateness of standard methods of evaluation of (linear and nonlinear) exchange rate models are discussed with reference to different forecast accuracy criteria.

This paper examines the dynamics of the foreign exchange market. The first half addresses a number of key questions regarding the forecasts of future exchange rates made by market participants, by means of updated estimates using survey data. Here we follow most of the theoretical and empirical literature in acting as if all market participants share the same expectation. The second half then addresses the possibility of heterogeneous expectations, particularly the distinction between “chartists” and “fundamentalists,” and the implications for trading in the foreign exchange market and for the formation of speculative bubbles.

This book discusses capital markets and investment decision-making, focusing on the globalisation of the world economy. It presents empirically tested results from Indian and Southwest Asian stock markets and offers valuable insights into the working of Indian capital markets. The book is divided into four parts: the first part examines capital-market operations, particularly clearance and settlement processes, and stock market operations. The second part then addresses the functioning of global markets and investment decisions;

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more specifically it explores calendar anomalies, dependencies, overreaction effect, causality effect and stock returns volatility in South Asia, U.S. and global stock markets as a whole. Part three covers issues relating to capital structure, values of firm and investment strategies. Lastly, part four discusses emerging issues in finance like behavioral finance, Islamic finance, and international financial reporting standards. The book fills the gap in the existing finance literature and helps fund managers and individual investors make more accurate investment decisions.

Since Meese and Rogoff (1983) results showed that no model could outperform a random walk in predicting exchange rates. Many papers have tried to find a forecasting methodology that could beat the random walk, at least for certain forecasting periods. This Element compares the Purchasing Power Parity, the Uncovered Interest Rate, the Sticky Price, the Bayesian Model Averaging, and the Bayesian Vector Autoregression models to the random walk benchmark in forecasting exchange rates between most South American currencies and the US Dollar, and between the Paraguayan Guarani and the Brazilian Real and the Argentinian Peso. Forecasts are evaluated under the criteria of Root Mean Square Error, Direction of Change, and the Diebold-Mariano statistic. The results indicate that the two Bayesian models have greater forecasting power and that there is little evidence in favor of using the other three fundamentals models, except Purchasing Power Parity at longer forecasting horizons.

This dissertation analyses the following three interrelated

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issues within an efficient market context. 1. Comparative forecasting accuracy of forward exchange-rates vis-a-vis the spot rate predictions marketed by a number of foreign-exchange forecasting services. 2. The existence of "premiums" imbedded in forward exchange-rates. 2. The existence of "premiums" imbedded in forward exchange-rates. 3. Excess profit opportunities in speculative trading strategies on currency futures contracts based on the "trading-signals" marketed by another group of foreign-exchange forecasting services. Track records of twelve future spot exchange-rate forecasting services and four technical exchange rate trend analyzing services are used to compare their predictive performances with that of forward exchange rates and with currency futures contracts. Seven major currencies vis-a-vis the U.S. Dollar are examined during a period of seven years, from 1974 through 1980. The study reveals the following. 1. Foreign-exchange forecasting services in general do not provide more accurate point estimates of the future spot rates than those provided by the forward rates. 2. Both forward rates and forecasts marketed by those services are found to be biased predictors of the future spot rates implying the existence of "premiums" both in forward rates and in those predictions. The premiums are found to be consistently and significantly positive during the study period. This important finding helps to eliminate much of the ambiguity pertaining to the issue of "forward rate bias" in foreign-exchange literature. 3. The statistical analyses used in the study do not provide support for rejecting the notion of inefficiency in the market for

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foreign-exchange. Although the findings regarding the market efficiency may be due to the inappropriateness of the market model which was jointly tested with the null hypothesis of "efficiency", they may remain valid until either better statistical techniques or more appropriate equilibrium models are developed.

This paper shows that there are two regularities in foreign exchange markets in advanced countries with exible regimes. First, real exchange rates are mean-reverting, as implied by the Purchasing Power Parity model. Second, the adjustment takes place via nominal exchange rates. These features of the data can be exploited, even on the back of a napkin, to generate nominal exchange rate forecasts that outperform the random walk. The secret is to avoid estimating the pace of mean reversion and assume that relative prices are unchanged. Direct forecasting or panel data techniques are better than the random walk but fail to beat this simple calibrated model.

This book focuses on forecasting foreign exchange rates via artificial neural networks (ANNs), creating and applying the highly useful computational techniques of Artificial Neural Networks (ANNs) to foreign-exchange rate forecasting. The result is an up-to-date review of the most recent research developments in forecasting foreign exchange rates coupled with a highly useful methodological approach to predicting rate changes in foreign currency exchanges.

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