Editorial

Financial Time Series: Methods and Models

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Abstract: The statistical analysis of financial time series is a rich and diversified research field whose inherent complexity requires an interdisciplinary approach, gathering together several disciplines, such as statistics, economics, and computational sciences. This special issue of the *Journal of Risk and Financial Management* on "Financial Time Series: Methods & Models" contributes to the evolution of research on the analysis of financial time series by presenting a diversified collection of scientific contributions exploring different lines of research within this field.

1. Introduction

In recent years, the evolution of research on the analysis of financial time series has been characterized by some distinguishable trends: an increase in the diversity of topics covered, with richer and stronger connections with other disciplines; a focus on increasingly complex models; and a renewed attention to the role of computational techniques. The development of all these patterns should be regarded as a response to the rapidly changing needs of financial analysis, which are constantly posing new challenges to researchers and practitioners.

Some important side factors have significantly contributed, among others, to shape this process: the increasing availability of high-frequency financial data, the substantial changes in the risk management sector driven by the Basle agreements, the continuous increase in the computational power, and, last but not least, the progresses in the area of machine learning that have disclosed new frontiers to researchers and practitioners.

2. Outline of the Volume

This special issue presents a collection of papers addressing a diversified set of topics of interest for the analysis of financial time series, evenly balanced between empirical and theoretical contributions. More theoretically-oriented papers focus on issues related to multivariate modeling of returns and volatility, paying specific attention to computational issues, modeling of common trends in stock market returns and integration with machine learning techniques.

In the paper by Coretto et al. (2020), the leading idea is to exploit information on the cross-sectional distribution of assets volatilities in order to build parsimonious models for forecasting conditional variances in large dimensional panels of stocks. At each time point, the stocks are assigned to homogeneous volatility clusters by means of a robust clustering algorithm based on a mixture probability model. This approach indirectly relates the identified clusters to factors characterized by different relative volatility levels and possibly different dynamic properties. The conditional variance of each asset is then described by a dynamic

model in which the parameters are time varying, driven by the dynamics of these latent factors. Although the forecasting model is globally multivariate, conditionally on the group structure of the cross-sectional distribution of stock volatilities, it can be represented as a set of univariate specifications.

Agoraki et al. (2019) focuses on the Vector Autoregressive Model (VAR) and on the issue of testing for the presence of cointegration and common trends evaluating the role exerted by data transformations. In particular, they consider the transformations related to currency conversions and their implications on the long-run cointegration relationship. In an empirical application focusing on data from the USA, the UK, Japan, and Germany, the authors exemplify their approach finding evidences supporting the existence of cointegration in bilateral models of each country with the USA. Moreover, they show the cointegration has been established in the aftermath of the 1987 stock market crisis.

Finally, the contribution of Caporin et al. (2020) focuses on the computational aspects related to the estimation of conditional correlation models. By providing the analytical gradient for a class of models, the authors put a step forward to the implementation, on a variety of statistical and econometric software, of routines for model estimation which might be feasible in larger dimensions and capable of preserving the interdependence between correlations. They also provide an empirical example showing the benefits of using the analytical gradient as opposed to the more common adoption of numerical gradients.

On the other hand, a focus on emerging markets is a common feature to all the empirically-targeted papers included in this Special Issue. The research questions investigated in these papers are related to different topics of interest for the analysis of financial time series, such as: the occurrence of structural breaks, the relationship between financial structure and economic growth, and market efficiency.

Due to their rapid evolution, the analysis of structural breaks is a highly relevant issue in the statistical modeling of the volatility of emerging markets. The paper by De Gaetano (2018) moves into this direction providing evidence of the presence of structural breaks in the stock market volatility of BRICS countries by using a binary segmentation algorithm that allows to account for the presence of multiple breaks. Particular forecast combinations, generated by the same model but over different estimation windows, are then implemented as a strategy for improving volatility forecasting accuracy in the presence of breaks.

Another debated issue in the analysis of emerging markets is related to market efficiency and its link with market liquidity conditions. Gbenro and Moussa (2019) provide an empirical investigation of market efficiency in the West African Regional Stock Market (BRVM), using non-linear autoregressive conditionally heteroskedastic models to estimate the speed of mean reversion for two stock market indices. Their findings provide some evidence of the presence of market inefficiencies in the West African Regional Stock Market, in which intensity is, however slightly, reducing over time.

Wang et al. (2019) focus on the impact of the financial structure, proxied by a financial development index, and of population well-being, as measured by a misery index, on economic growth of Pakistan. They also control for other relevant drivers of economic growth, including interest rates and trade openness. By employing bound testing for cointegration, they identify the long-run and short-run dynamic and show the relevant impact of both the financial development and misery indexes. Building on these evidences, they provide policy recommendations for stimulating economic growth in Pakistan.

Conflicts of Interest: The authors declare no conflict of interest.

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