Editorial

Nonlinear Problems: Mathematical Modeling, Analyzing, and Computing for Finance 2016

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Modern financial markets encapsulate vast number of interconnected financial entities, instruments, and strategies. Understanding these complex dynamical systems requires multidisciplinary efforts from a wide range of quantitative fields including mathematics, statistics, data mining, and operations research. While conventional financial research focuses mostly on linear models of variables of interest, they cannot cope with real-world financial phenomena. In the past decade, we have seen significant progress in our fundamental understanding of dynamical financial and economic behaviors, from both the micro- and macroprospective, using nonlinear systems and methodologies. Powerful techniques borrowed from traditional nonlinear models and new methods invented have been brought to almost every aspect of financial research, including asset pricing, risk management, and financial forecasting. Still, there exist many challenging problems. In spite of the amount of published results recently focused on dynamical financial and economic behaviors, there remain many challenging open questions.

The aim of this special issue is to gather recent research efforts on the development and applications of nonlinear techniques to address the critical issues in finance and to see the latest developments. The original papers explored in

this special issue include a wide variety of topics such as the following.

Financial Time Series Modeling and Forecasting. J. Ma et al. explore the influence of tax arrangement on the regional industrial structure by setting up a panel data econometric model based on the evaluation and analysis of the regional industrial structure in China. R. Chen and B. Pan investigate the Chinese stock index futures price fluctuation and prediction basing on complementary ensemble empirical mode decomposition.

Risk Assessment and Credit Analysis. J. Dong et al. investigate the impact of equity financing on the financing efficiency of listed companies as a whole and select 300 listed companies in the Shanghai and Shenzhen Stock Exchange as decision-making units.

Asset Pricing and Arbitrage Techniques. C. Xie and Y. Wang use the Baidu Searching Index as the agent variable to detect the effect of online investor sentiment on the asset price movement in the Chinese stock market. H. Wang et al. select improved maximum likelihood method to show that the share option pricing performance of Hang Seng

Index is better and pricing error of at-the-money options is the smallest. W. Huang et al. provide empirical evidence that suggests a nontrivial relationship between the kurtosis and skewness of asset prices. Z. Zhou and X. Gao develop numerical methods for pricing American options with time-fractional PDE models.

Portfolio Selection and Optimization. Z. Piao et al. dealt with a model about capital misallocation and its influencing factors of integrated financing, capital operation, and investment performance. C. Wang et al. develop a model to investigate the entry strategies of private investors to the elderly care service market, with the purpose of explaining the reasons behind dilemma of low signing rate plaguing China's Public-Private Partnership projects. X. Li and T. Tian develop a new Cost-Profit model for measuring the optimal scale of China's foreign exchange reserve. H. Chang and X. Li dealt with the optimal consumption and portfolio decision with convertible bond in affine interest rate and Heston's SV framework. M. Wang et al. consider multistage investment actions with the emission cap.

Nonlinear Dynamical System for Finance. L. Li et al. study the nonlinear autoregressive dynamics of stock index returns in seven major advanced economies (G7) and China. J. Wang et al. investigate how and why external monitoring can alleviate contracting inefficiency caused by information asymmetry between investors and the manager. L. Zhao and Z. Zhao study the stability and Hopf bifurcation of currency supply delay in an opened Kaldorian business cycle model and a nonlinear business cycle model.

We received 66 papers in the interdisciplinary research fields. This special issue includes 16 high-quality peer-reviewed articles. These articles contain several new, novel, and innovative techniques and ideas that may stimulate further research in every branch of pure and applied sciences.

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