IEEE Systems Journal

Special Issue on

"Complex Systems in Finance and Economics"

CALL FOR PAPERS

GUEST EDITORS

Mark Flood, Office of Financial Research, U.S. Treasury, USA mark.flood@treasury.gov
Alex Lipton, Bank of America, US, and University of Oxford, UK alex.lipton@baml.com
David Quintana, Universidad Carlos III de Madrid, Spain dquintan@inf.uc3m.es
Antoaneta Serguieva, University College London, UK, and Bank of England, UK a.serguieva@ucl.ac.uk

SCOPE

Finance and economics are complex domains, in which multiple components – such as investors, trading venues, or intermediary firms – frequently interact to generate aggregate outcomes that may be desirable or undesirable, intended or unintended. The behavior of the underlying elements is often adaptive and the aggregate dynamics can be highly non-linear. The resulting complexity can therefore be difficult to measure, model and control. The recent financial crisis revealed how interconnections between institutions can provide feedback loops and propagation channels across the financial system, nationally and globally, spilling into the real economy. There is a great need for advances in the ways in which financial and economic systems are modeled, simulated, designed, controlled and regulated. The techniques and hybrid approaches emerging from the ongoing efforts of the systems community can help address the challenge.

This special issue seeks high quality contributions from both academics and practitioners on systems-related topics in finance and economics. Only submissions with a core systems or systems-of-systems component will be acceptable. Topics of interest include, but are not limited to:

- The financial system is not formally engineered, but has emerged organically as an amalgam of firms, trading venues, industry sectors, jurisdictions, and regulations. Operational risks are monitored and managed primarily at the level of system components (firms and trading venues), leaving a significant gap in our understanding of vulnerabilities at the level of the system as a whole and for various subsystems. The management of systemic financial fragilities is better---and improving rapidly since the 2007-09 crisis---but much remains to be done. Research topics of interest include the measurement, analysis and management of operational and financial hazards arising from the interaction of participants and subsystems of the financial system.
- A large and growing fraction of financial flows among system participants occur in the context of securities markets, both organized exchanges and decentralized over-the-counter markets. Understanding the financial system therefore requires a detailed understanding of securities market "microstructures." Relevant research topics include empirical analyses, theoretical models, and simulation studies of trading architectures, payment flows, and collateral deliveries.
- Economists have long recognized the important role of emergent, system-level phenomena, such as liquidity, complexity, and fragility, for the smooth functioning of the financial system. However, developing models and measures for these system-level phenomena can be maddeningly challenging, and most extant research has focused on isolated subsystems, such as equities markets, foreign exchange markets, etc. More research is needed to model emergent phenomena, especially as they affect multiple subsystems simultaneously.
- It is clear that financial stress can generate interesting dynamics, such as default spillovers and fire-sale feedback loops, as shocks propagate through the system. These dynamics can be very difficult to capture in closed-form theoretical models. System simulations, including agent-based simulations, are a natural alternative research methodology in this context. Interesting topics include simulation of the dynamics of global, national, or local financial systems or subsystems.
- The study of system dynamics naturally involves government supervisors, who have the resources and legal authorities to intervene in exigent circumstances. Policymakers' responses to evolving circumstances can have a significant impact---for good or for ill---on the ultimate outcome. There is therefore an important need for research into design of optimal policies for regulatory decision-making and analysis to control of systemic dynamics.
- Historically, systemic monitoring has involved a hodge-podge of supervisors, central banks, market participants and self-regulatory organizations relying on public market data, accounting statements, and on-site examinations to track the status of the system. As the pace of activity changes---for example, through the growth of high-frequency trading---the need also increases for improved tools and techniques for system instrumentation and monitoring, especially during episodes of financial crisis, when system state may evolve very rapidly and unpredictably.
- Systemic crises are rare events, typically with important idiosyncrasies. This presents significant challenges to purely econometric or statistical methodologies. A better understanding is needed of the appropriate tools, techniques, and policy frameworks for ex-post forensic data collection and analysis for systemic financial events, so that supervisors and system participants can draw the appropriate lessons from them.

SUBMISSION GUIDELINES

Authors are invited to submit original research contributions by following the detailed instructions given in the "Information for Authors" at http://www.ieeesystemsjournal.org. In the cover letter, authors should explicitly state that the paper is submitted to the "Complex Systems in Finance and Economics". Questions about the special issue should be directed to the Guest Editors.

SCHEDULE

Paper submission deadline:	Jan. 15, 2016	Final notification:	Oct. 30, 2016
Notification of the first review:	Apr. 15, 2016	Final manuscript:	Nov. 30, 2016
Revised paper submission:	May 30, 2016	Publication:	by advance posting in IEEE xplore as soon as authors approve galley proofs
Notification of the re-review:	Aug. 15, 2016		
Minor revision deadline:	Sep. 15, 2016	Expected inclusion in an issue:	2017