

The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics
and Operations Management
Dept of Industrial Engineering & Decision Analytics
Joint Seminar Announcement



Operational Risk Management: A Stochastic Control Framework with Preventive and Corrective Controls

by

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Time : **11:00 am - 12:15 pm**
Venue : **Room 1001, LSK Business Building**



Abstract: We propose a general modeling framework for operational risk management of financial firms. We consider operational risk events as shocks to a financial firm's value process, and then study capital investments in preventive and corrective controls to mitigate risk losses. The optimal decisions are made in three scenarios: (i) preventive control only, (ii) corrective control only, and (iii) joint controls. We characterize the optimal control policies within a general modeling framework that comprises these three scenarios, and then discuss an exponential risk reduction function. We conclude our work with an application of our model to a data set from a commercial bank. We find that through a proper investment strategy, we can achieve a significant performance improvement, especially when the risk severity level is high. Moreover, with controls, the value of the firm tends to increase relative to the value of the firm without controls. Hence the controls are essentially smoothing out the jump losses and increasing the value of the firm. At the bank we analyze we find that with a joint control strategy the bank can achieve profit increases from 7.45% to 11.62% when the risk reduction efficiencies of the two controls are high. In general, our modeling framework, which combines a typical operational risk process with stochastic control, may suggest a new research direction in operations management and operational risk management.

(This paper is joint work with Yuqian Xu (University of Illinois - Urbana Champaign) and Lingjiong Zhu (Florida State University))

Bio: Michael Pinedo is the Julius Schlesinger Professor of Operations Management at New York University's Stern School of Business. He received an Ir. degree in Mechanical Engineering from Delft University of Technology in 1973 and a Ph.D. in Operations Research from the University of California at Berkeley in 1978. His research focuses on the modeling of production and service systems, and in particular planning and scheduling systems. He is author of *Scheduling: Theory, Algorithms and Systems* (Springer), and *Planning and Scheduling in Manufacturing and Services* (Springer), and coauthor of *Queueing Networks: Customers, Signals and Product Form Solutions* (Wiley). Recently, his research has also focused on operational risk in financial services. He is co-editor of *Creating Value in Financial Services: Strategies, Operations, and Technologies* (Kluwer), and co-editor of *Global Asset Management – Strategies, Risks, Processes and Technologies* (Palgrave/McMillan). Professor Pinedo has been actively involved in industrial systems development. He supervised the development and implementation of two scheduling systems for International Paper and participated in the development of systems at Goldman Sachs, Philips, Siemens, and Merck. Professor Pinedo is editor of the *Journal of Scheduling* (Springer), department editor of *Production and Operations Management* and Associate Editor of *Annals of Operations Research*.