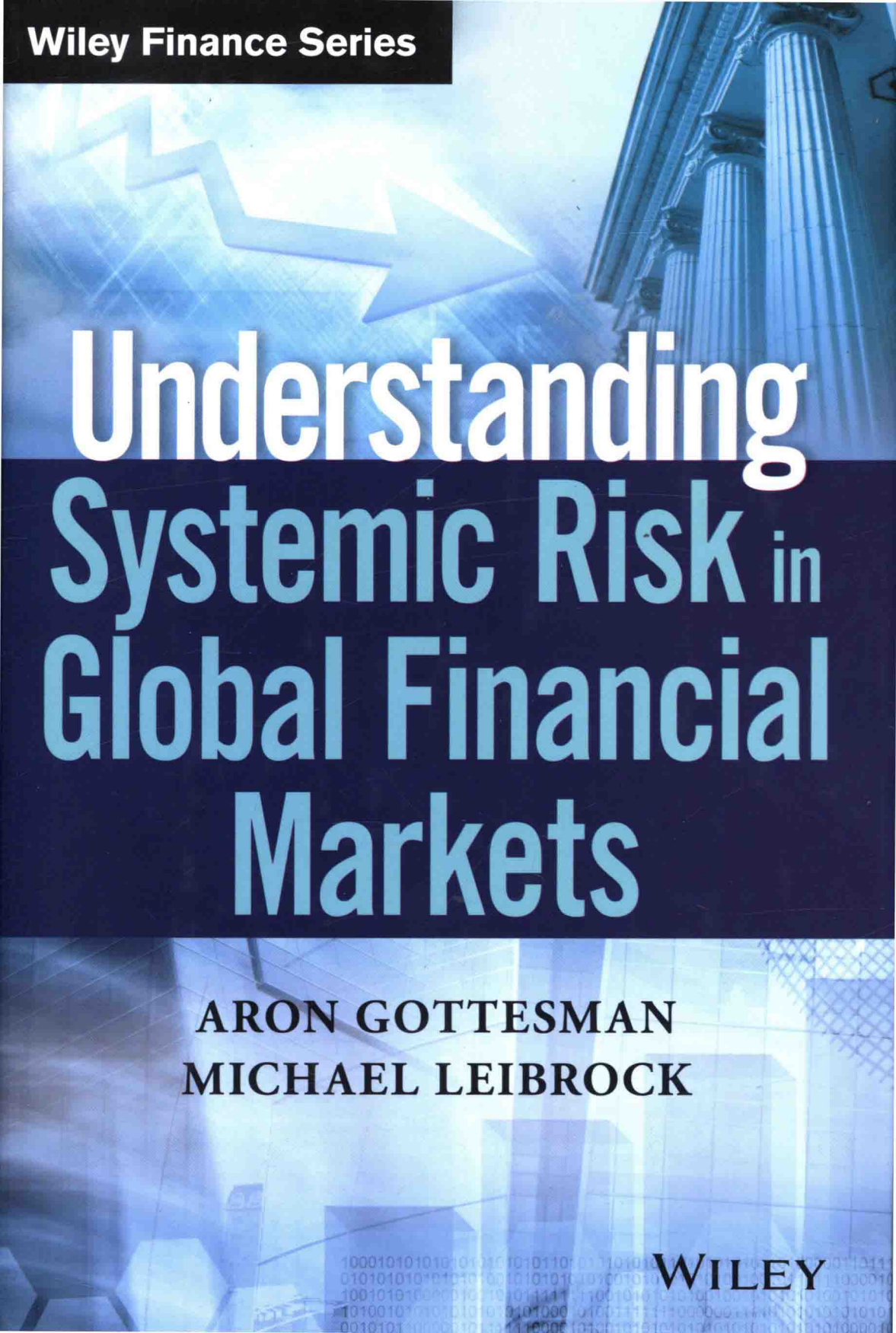


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# **Understanding Systemic Risk in Global Financial Markets**

**ARON GOTTESMAN  
MICHAEL LEIBROCK**

**WILEY**

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# **Understanding Systemic Risk in Global Financial Markets**



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ML

*To my wife, Roseann, and my children,  
Jaclyn, Victoria, and Michael*

AG

*In memory of my mother, Susan Rachel Raizel  
Gottesman z'l*





# Preface

**T**his book provides an in-depth introduction to systemic risk. Systemic risk is the risk that developments in the financial system will disrupt financial stability and the economy. We've written this book because the topic of systemic risk is arguably the most critical issue facing the financial services industry today and one whose impact can spill over into the broader economy with devastating effect on individual consumers and investors.

The Credit Crisis of 2007–2009 was an important catalyst for this book. Yet financial crises have been occurring for centuries, often driven by very similar factors to the Credit Crisis of 2007–2009. One of our objectives is to help you develop a deep understanding of systemic risk through meaningful exploration of the lengthy history of crises and the commonalities across the crises.

We also feel there is a need for systemic risk to be viewed by practitioners as a distinct risk discipline, one that can be analyzed and monitored in an organized and repeatable fashion, much like longstanding risks such as market risk, credit risk, and operational risk have been for decades. Hence, another of our objectives is to provide you the contours of the discipline of systemic risk.

This book can be used either as an introductory text or as an accompaniment to a quantitative treatment of risk. We do not assume that the reader has sophisticated understanding of finance or math, nor have we assumed that he or she has hours to decipher our arguments. Instead, this book provides straightforward, plain-talking explanations that are directly related to those issues that matter most to practitioners. Audiences for this book include:

- Individuals and university students learning about risk management for the first time who do not have extensive math or finance backgrounds.
- Practitioners in “middle-office” and “back-office” roles in financial institutions, such as those in risk management, operations, technology, information security and compliance that require a broad understanding of the types of risks posed by systemically important financial institutions and who have a need to identify such risks to do their jobs.

- Practitioners, regulators, and academics who want to understand how regulation and clearinghouses function as risk-mitigating utilities for the financial industry.

This book consists of 16 chapters and an appendix. Here is a brief summary of the material that is covered in each chapter.

The first three chapters of this book introduce the concept of systemic risk and explore its history. *Chapter 1* provides a high-level introduction to the topic of systemic risk, including definitions provided by industry, academic, and regulatory experts, and explains the importance of enhancing understanding of systemic risk. *Chapter 2* provides a summary of prior systemic events and identifies common drivers of these events based on several hundred years of evidence. *Chapter 3* provides an overview of the events surrounding the Credit Crisis of 2007–2009, which had a devastating impact on the both the financial industry and economies of the United States and Europe.

Chapters 4–6 delve deeper into systemic risk. *Chapter 4* explores one of several theories that help explain why financial crises have been occurring for centuries, including those that address economic cycles, behavioral biases, and the role the human brain plays in risk taking and decision making. *Chapter 5* discusses the critical role that data plays in the effective monitoring of systemic risks, including key industry advancements such as the Legal Entity Identifier and the creation of the Office of Financial Research, aimed at addressing certain information gaps that contributed to the Credit Crisis of 2007–2009. *Chapter 6* defines macroprudential and microprudential oversight and offers important distinctions between the two regulatory oversight approaches.

Chapters 7 and 8 introduce regulatory regimes in various jurisdictions. *Chapter 7* provides an introduction to U.S. financial regulation and the approaches of the various U.S. regulators and introduces the Dodd-Frank Act of 2010. *Chapter 8* turns to international regulatory regimes, providing an introduction to several key international regulators and standards that facilitate international approaches and coordination.

Chapters 9–14 explore in detail many elements of how systemic financial risk is managed. *Chapter 9* delves into the designation of entities as systemically important, including Systemically Important Financial Institutions (SIFIs), Systemically Important Financial Market Utilities (SIFMUs), and Globally Systemically Important Banks (G-SIBs). *Chapter 10* explores the Volcker Rule of the Dodd-Frank Act, which sets prohibitions, requirements, and limitations in relation to the trading and private fund activities of banking entities and systemically risky non-bank financial companies. *Chapter 11* provides an introduction to counterparty credit risk, and studies sources

of counterparty credit risk and how counterparty credit risk is managed. *Chapter 12* explores Title VII of the Dodd-Frank Act, which works to reduce the counterparty exposure faced by participants in the OTC derivatives market through setting mandatory clearing and other requirements. *Chapter 13* explores the Basel Accords—multinational accords that set minimum capital requirements for banks—that were established in order to strengthen the soundness and stability of the international banking system. *Chapter 14* studies the concept of “lender of last resort,” including its benefits, risks, various views of its function, and its application.

Chapters 15 and 16 tie together the concepts explored throughout this book. *Chapter 15* introduces the topic of interconnectedness, explains how this risk manifested itself during the Credit Crisis of 2007–2009, and illustrates the ways in which interconnectedness has become a key consideration in several post-crisis regulatory developments. *Chapter 16* looks ahead to the outlook and likelihood of future systemic events and includes a number of recent examples of top systemic concerns as published by several large financial institutions and regulatory bodies.

This book also includes an appendix that provides a detailed taxonomy and literature review of some of the key quantitative models that are used to measure systemic risk in different ways.

To allow you to test your understanding, each chapter concludes with a number of *Knowledge Check* questions, the solutions to which are provided in the appendix. The *Knowledge Check* questions can be used to ensure absorption of the material both when you learn the material for the first time and also when you review.

We hope this book provides you with a comprehensive understanding of systemic risk!



# Acknowledgments

**ML**

I'm grateful to my former professors at Pace University's Lubin School of Business for providing me the foundation of scientific research I relied upon when completing this book. A special thanks to my co-author and doctoral advisor, Aron Gottesman, whose guidance and vision was critical to the success of this book. I'm also grateful to many former industry colleagues from whom I learned so much over the years, particularly while working together through some of the financial crises covered in this book. Finally, this book would not have been possible without the tremendous support of my wife, Roseann, and the patience of my children, Jaclyn, Victoria, and Michael.

**AG**

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**Aron Gottesman** is Professor of Finance and the Chair of the Department of Finance and Economics at the Lubin School of Business at Pace University in Manhattan. He holds a PhD in Finance, an MBA in Finance, and a BA in Psychology, all from York University. He has published articles in academic journals including the *Journal of Financial Intermediation*, *Journal of Banking and Finance*, *Journal of Empirical Finance*, and the *Journal of Financial Markets*, among others. He has also previously authored or co-authored several books including, most recently, *Derivatives Essentials: An Introduction to Forwards, Futures, Options, and Swaps* (Wiley Finance, 2016). Aron Gottesman's research has been cited in newspapers and popular magazines, including the *Wall Street Journal*, the *New York Times*, *Forbes* magazine, and *Business Week*. He teaches courses on derivative securities, financial markets, and asset management. Aron Gottesman also presents workshops to financial institutions. His website can be accessed at [www.arongottesman.com](http://www.arongottesman.com).

**Michael Leibrock** is managing director, chief systemic risk officer, and head of Counterparty Credit Risk for the Depository Trust & Clearing Corporation (DTCC). Michael Leibrock currently serves as co-chair of DTCC's Systemic Risk Council and as chair of the Model Risk Governance Committee. He has conducted numerous newspaper and magazine interviews on risk topics, as well as several video interviews on *TabbForum.com*, which include "Building an Interconnectedness Risk Program" (Dec. 2016), "Unintended Risks of Regulations" (Dec. 2014), and "The Top Systemic Threats to the Capital Markets" (Aug. 2013). Michael Leibrock holds an MBA in Finance from Fordham University and a doctorate in Finance and International Economics from Pace University's Lubin School of Business. He has previously served as an adjunct professor at New Jersey City University and Monmouth University. Michael Leibrock's prior academic research has covered topics such as predictors of bank defaults, sovereign default analysis, and a doctoral dissertation titled "Systemic Risk and an Extension of the Black Scholes Merton Option Pricing Model for U.S. Banks."



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