High-reliability management of critical infrastructures—the safe and continued provision of electricity, natural gas, telecommunications, transportation, and water—is a social imperative. Loss of service in interconnected critical infrastructure systems (ICISs) after hurricanes, earthquakes, floods, and tsunamis and their delayed large-scale recovery have turned these events into catastrophes. Reliability and Risk reveals a neglected management dimension and provides a new framework for understanding interconnected infrastructures, their potential for cascading failure, and how to improve their reliability and reduce risk of system failure. The book answers two questions: How are modern interconnected infrastructures managed and regulated for reliability? How can policy makers, analysts, managers, and citizenry better promote reliability in interconnected systems whose failures can scarcely be imagined? The current consensus is that the answers lie in better design, technology, and regulation, but the book argues that these have inevitable shortfalls and that it is dangerous to stop there. The framework developed in Reliability and Risk draws from first-of-its-kind research at the infrastructure crossroads of California, the California Delta, in the San Francisco Bay region. The book demonstrates that infrastructure reliability in an interconnected world must be managed by system professionals in real time.

Conclusion
Thomas D. Beamish

in Community at Risk: Biodefense and the Collective Search for Security
The Conclusion provides a synoptic comparative account of the book’s findings, arguments, and conclusions. The focus is what an analysis of local civics politics lends to an understanding of risk disputes. Importantly, the Conclusion, in focusing on the civic politics of risk, shows that common political rhetoric(s) such as claims to democracy, due process, progress, and justice can mean very different things in different civic contexts that hold considerable consequence for understanding what is and is not an acceptable risk. The same terms can mean very different things given social, historical, and material legacies and the civics and discourse that locally predominate. The Conclusion also reiterates the contribution that Community at Risk makes to an impressive stock of knowledge concerning risk management, perception, and dispute, as well as civic politics, organization, and community studies. The Conclusion’s intervention is, however, equal parts new findings and synthesis.

Community at Risk
Thomas D. Beamish

The anthrax attacks of 2001 provoked deep concern and urgency among U.S. security elites regarding bioterrorism. Coming after 9/11 and followed by the successive menace of West Nile virus, SARS, avian influenza, and most recently Ebola these events prompted the federal government to pursue an aggressive new biodefense agenda. Even given the purported menace of bio-catastrophe, however, the new federal risk management plans stirred controversy. Community at Risk provides a comparative view of that controversy as it ensued in three communities where universities sought to host and manage National Biocontainment Laboratories (NBL) on behalf of the federal government. NBLs are a cornerstone of federal biodefense plans; they are ultrasecure laboratories where research on the most dangerous diseases can be conducted and microbiological and biomedical applications can be rapidly developed and deployed. By comparing community responses, the book highlights the role that local civic political dynamics play in defining what is at stake and perceptions of acceptable and unacceptable risk. It explains the civic politics of risk as rooted in locally shared governance conventions, politicized relations, and resonant virtues that clustered in each community context as a prevailing civics and discourse. In one community, the prevailing civics and discourse helped to ease locals toward acceptance, while in the other two communities, they helped to intensify skepticism and risk dispute. Through comparative
Conceptual Footings of Risk and Governance
Thomas D. Beamish

Chapter 1 explains the theoretical backdrop and analytical framework that organize the book’s analysis. The chapter begins by outlining contemporary conditions in risk society where societal relations among civil society, government, and industry have been transformed in the twenty-first-century United States. In this context, risk and its management at the individual, local, and national levels have become the predominant concerns and bases for “risk dispute.” Chapter 1 also describes how previous scholarship has theorized risk management and risk perception, as well as civic and community engagement and risk dispute. The chapter ends with how Community at Risk contributes to this and related areas of research.

Wrong Assumptions and Risk Cultures
Ian I. Mitroff and Can M. Alpaslan

This chapter analyzes the incorrect assumptions and risk cultures that are the deep and hidden root causes of the financial crisis. It argues that the crisis was caused not simply by technical economic and regulatory failures but rather by the unconscious psychological and cultural assumptions prevalent in financial companies and financial markets. These assumptions are reductionist and incomplete in portraying human motivation reduced to self-interest, complex human emotions reduced to fear and greed, all available information about asset values reduced to market prices, and all information about the riskiness of assets reduced to asset price volatility. Such obsessive reductionism eventually led
to the failure of risk management. This chapter recommends moving financial companies from a culture of risk, selfishness, and narcissism to a culture of trust.

A Busy Decade
Michael Berkowitz

in Learning From the Global Financial Crisis: Creatively, Reliably, and Sustainably

Published in print: 2012 Published Online: June 2013
Publisher: Stanford University Press

This chapter presents an account of the lessons that have been learned from the past decade of practice in the field of crisis management. This discipline, which in organizational contexts often focuses on operational risks, has undergone a series of significant transformations in response to the rise of global terrorism as well as the myriad threats associated with flu pandemics and climate change. The discussion looks at the tension between all-hazards and hazard-specific protocols, the relevance of testing the crisis management system on low-grade incidents, and the importance of communications. It remains to be seen whether functional crisis management systems can be built across institutional and national boundaries within the financial markets, much less in other markets.

Risk Communication, Local Civics, and Discourse
Thomas D. Beamish

in Community at Risk: Biodefense and the Collective Search for Security

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Publisher: Stanford University Press
DOI: 10.11126/

Chapter 2 sets up the analysis pursued in subsequent chapters. It does so through a focus on the “risk communication” strategies deployed by local universities that sought to secure funding and support for their bids for an NBL. It was in those strategies that the local civic dialogue began in each civic and community context. It is in part the great similarity in risk communication strategies, coupled with variable local response, that makes comparing them so informative. Chapter 2 provides an important justification for the book’s comparative argument: that variation at the community level was mostly a function of local civic dynamics, not distinctive university risk communication strategies. In the context of
established civics and discourse, even an issue like biodefense, while “new,” was locally understood via events, experiences, and beliefs that were a priori to it, requiring an analysis of such civic dimensions to apprehend and explain local response.

Introduction
Thomas D. Beamish

in Community at Risk: Biodefense and the Collective Search for Security
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Publisher: Stanford University Press DOI: 10.11126/stanford/9780804784429.003.0007
Item type: chapter

The Introduction develops the context within which the federal government’s biodefense plans emerged and on which they were justified, including 9/11, the anthrax attacks, and the successive menace presented by West Nile virus, SARS, and avian influenza and most recently Ebola. After discussing the context and moral panic that ensued over terrorism, which were used to justify the new federal biodefense agenda, the Introduction then turns to local manifestations of those plans and responses to them—the community cases whose civic responses are comparatively explored in Community at Risk. The Introduction then develops key terms and concepts that are relied on to investigate and understand the community cases as well as the research strategy deployed to gather relevant data, analyze it, and draw conclusions. The Introduction ends with a brief summary of how the book is organized by chapter.

Failures of High Reliability in Finance
Nathaniel I. Bush, Peter F. Martelli, and Karlene H. Roberts

in Learning From the Global Financial Crisis: Creatively, Reliably, and Sustainably
Published in print: 2012 Published Online: June 2013
Publisher: Stanford University Press DOI: 10.11126/stanford/9780804770095.003.0010
Item type: chapter

This chapter examines the deep organizational problems in the culture and tools of high finance that limit reliable performance only within a very narrow set of system conditions. It argues that overspecialization, control and conformity, insensitivity to unknown risks, and lack of flexibility in response contribute to systemic failures in the financial services industry. To prevent future systemic breakdowns, this chapter
Galveston, Texas
Thomas D. Beamish

in Community at Risk: Biodefense and the Collective Search for Security
Published in print: 2015 Published Online: September 2015
DOI: 10.11126/stanford/9780804784429.003.0005
Item type: chapter

Chapter 5 empirically assesses civic response in Galveston where a managed civics and discourse predominated, wherein the civically engaged mostly downplayed the risks posed by federal biodefense plans and a local NBL and, instead, emphasized its possible contributions to their island’s and the nation’s—even the world’s—“progress.” Residents expressed little of the skepticism shared in the other cases and mostly faith in the power of humankind, with the aid of enlightened leadership, scientific knowledge, technology, and economy to progressively improve and reshape their island community for the better. As with the other cases, Galveston’s civically engaged relied on claims and justifications that emerged from a specific civic and political history. That legacy and the civic relations, conventions, and virtues associated with that history helped ease locals toward accepting and eventually embracing biodefense plans and an NBL as an asset to both them and their collective future on the island.

The Infrastructure Society
Emery Roe and Paul R. Schulman

in Reliability and Risk: The Challenge of Managing Interconnected Infrastructures
Published in print: 2016 Published Online: January 2017
DOI: 10.11126/stanford/9780804793933.003.0001
Item type: chapter

This chapter introduces the book’s argument about the central role critical infrastructures for providing clean water, communications, transportation, electricity, flood protection, financial services, and major emergency response, among other contemporary essentials, have in society and for individual well-being. The capabilities of humans
to manage these complex and increasingly connected infrastructure systems are being stretched to their limits. Yet society insists these systems must have permanent continued and predictable operation at high levels of dependability and safety. This chapter reviews the literature on the pivotal role of infrastructures in present-day societies, discusses the major properties of these infrastructures, looks at the overarching priority that they be managed safely and continuously, and considers the risks from infrastructures being more and more interconnected and seemingly more and more vulnerable to large cross-system failure.

The Interinfrastructure Challenge
Emery Roe and Paul R. Schulman

in Reliability and Risk: The Challenge of Managing Interconnected Infrastructures

A great deal of policy and debate over interconnected infrastructures focuses on a subset of the major patterns and ways two or more infrastructures are interconnected. Cascading interinfrastructure failure, in which the failure of one triggers failure in another that is spatially near or otherwise functionally dependent on it, has received considered attention. However, at least five other types of interconnectivity in ICISs are of policy and management relevance, and these are introduced and implications drawn for subsequent chapters. The six ICISs are illustrated from our case study and through the secondary literature.

A Framework for ICIS Risk Management
Emery Roe and Paul R. Schulman

In the book’s framework, risks follow from reliability: the standard of reliability chosen, the special skills of reliability professionals to manage the way they do (including managing the risks that come from managing reliably), and the special features of the control rooms these
professionals work in and with. This chapter focuses on the risk side of reliability management and elaborates on the previous chapter’s framework building blocks for reliability management at the ICIS level: unpredictabilities that must be managed for reliability purposes (risk, uncertainty, ambiguity, and unstudied conditions), the control room’s comfort zone for these unpredictabilities, manifest versus latent risks and the implications of their difference for managing across four performance modes in the control room, and the importance of these building blocks and their implications for ICISs, including increased calls for coordination, innovation, and efficiency. Examples from the case study are used throughout.

The Full Cycle of Infrastructure Operations
Emery Roe and Paul R. Schulman

in Reliability and Risk: The Challenge of Managing Interconnected Infrastructures
Published in print: 2016 Published Online: January 2017
Item type: chapter

This chapter expands the discussion of how time and scale interact with risk when managing infrastructures for reliability. The whole cycle of infrastructure operations ranges from normal to disrupted, restored, failed, recovered, and new normal. Risks vary by the stage of the cycle, and each stage is managed for reliability differently. Thus, a disruption in one infrastructure of an ICIS requires not only zooming down to determine root causes but also zooming up to determine its impact on the entire infrastructure as a system and zooming across to determine how these impacts affect infrastructures interconnected with it. Two examples—the 2010 San Bruno gas explosion and the major nexus of infrastructure on an island in the Delta—illustrate how risk analysis is to be undertaken in the ICIS setting.

Interconnected Infrastructure Systems as a Complex Policy Problem
Emery Roe and Paul R. Schulman

in Reliability and Risk: The Challenge of Managing Interconnected Infrastructures
Published in print: 2016 Published Online: January 2017
Item type: chapter
The book’s findings and framework call for a rethinking of critical infrastructures as a policy problem in two major respects. First, this chapter reconsiders the many criticisms of leadership and regulation with respect to infrastructure performance. Second, the chapter asks, regarding another policy issue that the framework itself highlights, is there an ICIS—a system of infrastructure systems—to lead, evaluate, and regulate?

Toward Multiple Reliability Standards for Interconnected Infrastructure Systems
Emery Roe and Paul R. Schulman

in Reliability and Risk: The Challenge of Managing Interconnected Infrastructures
Published in print: 2016 Published Online: January 2017
DOI: 10.11126/stanford/9780804793933.003.0011
Item type: chapter

The book’s framework and analysis demonstrate that the high reliability of individual infrastructures is increasingly at its limits in an interconnected setting. Loss of service in one infrastructure cannot be precluded by another infrastructure that depends on it, which means that the standards for reliability within an ICIS setting are no longer those of only high reliability and its precluded-events standard. Other standards of reliability are also at work—where the focus is on avoided, inevitable, or compensable events—and this chapter discusses them. The types of risks to manage arise from the standards of reliability being followed (deciding the trade-offs among risks does not necessarily lead to reliability). Policy makers, legislators, regulators, and the public must better understand the implications of the real choices being made.

Marriage and Wealth Changes at Older Ages
Julie M. Zissimopoulos

in Lifecycle Events and Their Consequences: Job Loss, Family Change, and Declines in Health
Published in print: 2013 Published Online: January 2014
DOI: 10.11126/stanford/9780804785853.003.0009
Item type: chapter

This chapter presents an examination of the impact on net worth and savings of changes in family structure at older ages. The analysis demonstrates that married couples have more wealth than unmarried
individuals primarily due to the higher lifetime earnings and lower mortality risk of married couples compared to unmarried individuals. Divorce at older ages both divides and consumes wealth and has negative and long-lasting consequences on wealth accumulation while remarriage rebuilds assets.

Staying Afloat
Jeremy Baskes

Early modern, long-distance trade was fraught with risk and uncertainty, driving merchants to seek means to reduce them. In the traditional historiography on Spanish colonial trade, the role of risk is largely ignored. Instead, the guild (consulado) merchants are depicted as anti-competitive monopolists who manipulated markets and exploited colonial consumers. This book argues that much of the commercial behavior interpreted by modern historians as predatory was instead designed to reduce the uncertainty and risk of Atlantic world trade. It examines the development and use of maritime insurance in eighteenth-century Spain; the commercial strategies of Spanish merchants; the traditionally misunderstood effects of the 1778 promulgation of “comercio libre,” especially the financial chaos and bankruptcies that ensued; and other important topics. By elevating risk to the center of focus, this study makes a number of revisionist contributions to the late colonial economic history of the Spanish empire.

Houses of Horror
Annie McClanahan
in Dead Pledges: Debt, Crisis, and Twenty-First-Century Culture

Chapter 4 begins by noting that contemporary discourse on the economic crisis is profoundly shaped by the language of horror and fear. To understand why, this chapter turns to four post-crisis horror films that explicitly link fear, foreclosure, and financialized credit: Drag Me to Hell (dir. Sam Raimi), Dream Home (dir. Pang Ho-cheung), Mother’s Day (dir. Darren Lynn Bousman), and Crawlspace (dir. Josh Stolberg). All four films take up real estate lending, mortgage speculation, and foreclosure risk.
and locate horror in the “dead pledge” of the mortgage. Using horror and the home-invasion genre to explore the shifting understandings of ownership consequent to the housing crisis, these films frighteningly literalize the doctrine of caveat emptor. Exploring the relationship between “paying back” and “payback,” they suggest that introduction of speculative risk has shifted the social force of credit contracts from the promise of trust to the threat of revenge.

ARBITRAGE-FREE PRICING IN COMPLETE MARKETS

Patrick L. Anderson

in The Economics of Business Valuation: Towards a Value Functional Approach

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Item type: chapter

The author describes one of the breakthrough concepts of modern finance: the use of the no arbitrage principle in complete markets as the basis for the powerful mathematics of “risk neutral” or “equivalent martingale” pricing. This neoclassical finance model relies on two intertwined assumptions: the existence of complete markets, and the assumption that market participants will act to ensure that no arbitrage profits are possible. The author then presents strong evidence that both of these assumptions are lacking for private businesses and their investors, because markets for the equity in these firms are incomplete. The author argues that this severely undermines this model as a practical valuation tool. As with other principles, this assertion is tested by applying it to three actual companies.