

Wiley Finance Series

Risk Management

and Financial Institutions

Fifth Edition

JOHN C. HULL

WILEY

Risk Management and Financial Institutions

Founded in 1807, John Wiley & Sons is the oldest independent publishing company in the United States. With offices in North America, Europe, Australia, and Asia, Wiley is globally committed to developing and marketing print and electronic products and services for our customers' professional and personal knowledge and understanding.

The Wiley Finance series contains books written specifically for finance and investment professionals as well as sophisticated individual investors and their financial advisors. Book topics range from portfolio management to e-commerce, risk management, financial engineering, valuation and financial instrument analysis, as well as much more.

For a list of available titles, visit our Web site at www.WileyFinance.com.

Risk Management and Financial Institutions

Fifth Edition

John C. Hull

WILEY

Cover images: © Roman Sigaev/Shutterstock;
© Rawpixel.com/Shutterstock; © Chalerm Sak/Shutterstock
Cover design: Wiley

Copyright © 2018 by John C. Hull. All rights reserved.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey.

The Third Edition was published by John Wiley & Sons, Inc., in 2012. The first and second editions of this book were published by Prentice Hall in 2006 and 2009, respectively.

Published simultaneously in Canada.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600, or on the Web at www.copyright.com. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

For general information on our other products and services or for technical support, please contact our Customer Care Department within the United States at (800) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Cataloging-in-Publication Data:

Hull, John, 1946–

Risk management and financial institutions / John C. Hull. — Fifth Edition.
pages cm. — (Wiley finance series)

Includes index.

ISBN 978-1-119-44811-2 (cloth); ISBN 978-1-119-44816-7 (ePDF);

ISBN 978-1-119-44809-9 (ePUB)

1. Risk management. 2. Financial institutions—Management. I. Title.

HD61.H83 2015

332.1068'1—dc23

2014037477

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

To Michelle, Peter, and David

Contents in Brief

Business Snapshots	xxiii
Preface	xxv
Chapter 1 Introduction	1
Part 1: Financial Institutions and Their Trading	23
Chapter 2 Banks	25
Chapter 3 Insurance Companies and Pension Plans	47
Chapter 4 Mutual Funds, ETFs, and Hedge Funds	75
Chapter 5 Trading in Financial Markets	97
Chapter 6 The Credit Crisis of 2007–2008	127
Chapter 7 Valuation and Scenario Analysis: The Risk-Neutral and Real Worlds	145
Part 2: Market Risk	159
Chapter 8 How Traders Manage Their Risks	161
Chapter 9 Interest Rate Risk	185

Chapter 10	Volatility	213
Chapter 11	Correlations and Copulas	243
Chapter 12	Value at Risk and Expected Shortfall	269
Chapter 13	Historical Simulation and Extreme Value Theory	293
Chapter 14	Model-Building Approach	317
Part 3: Regulation		345
Chapter 15	Basel I, Basel II, and Solvency II	347
Chapter 16	Basel II.5, Basel III, and Other Post-Crisis Changes	377
Chapter 17	Regulation of the OTC Derivatives Market	399
Chapter 18	Fundamental Review of the Trading Book	415
Part 4: Credit Risk		429
Chapter 19	Estimating Default Probabilities	431
Chapter 20	CVA and DVA	459
Chapter 21	Credit Value at Risk	479
Part 5: Other Topics		495
Chapter 22	Scenario Analysis and Stress Testing	497
Chapter 23	Operational Risk	515
Chapter 24	Liquidity Risk	537
Chapter 25	Model Risk Management	565
Chapter 26	Economic Capital and RAROC	585
Chapter 27	Enterprise Risk Management	603
Chapter 28	Financial Innovation	621
Chapter 29	Risk Management Mistakes to Avoid	643