## Contents

*Preface*  
Preface xi

*Introduction*  
1 Key Concepts: Algorithms, Artificial Intelligence, and More 13
A Algorithms 13  
B Artificial Intelligence 19  
C Machine Learning, Deep Learning, and More 23  
   i Natural Language Processing 28  
   ii Supervised Learning 30  
   iii Reinforcement Learning 33  
   iv Unsupervised Learning 33  
   v Deep Learning 34  
D Robots 37  
E Algo Bots 45

*Economic Definitions of Common Derivatives*  
2 Setting the Stage: Some Examples 50
A Setting the Stage: Some Examples 50  
B Financial Instruments and Financial Markets 56  
C Derivatives and Commodities 57  
D Exchange-Traded and Over-the-Counter Derivatives 58  
E The Spot Market: Outright Purchases and Forward Contracts 59  
F Futures Contracts 61  
G Options 70  
H Swaps 72

*Legal and Regulatory Definitions of Derivatives and Other Financial Instruments*  
3 Revisiting the Definition of Derivative 85
A Revisiting the Definition of Derivative 85  
B Security: The *Howey* Test and More 89
# Table of Contents

C Futures Contract: Undefined by Statute, Muddled by Case Law 97  
   i Sinva v. Merrill Lynch 104  
   ii CFTC v. Co Petro Marking Group 107  
   iii Financial Futures 115  
   iv Mallen v. Merrill Lynch 120  
   v CME v. SEC 126  
   vi Foreign Currency Market Background 132  
   vii CFTC v. Zelener 134  
   viii CFTC v. Erskine 140  

D Off-Exchange Leveraged Retail Foreign Exchange Transactions 149  

E Security Futures 151  

F Swap: The Dodd-Frank Act’s Broad Definition 151  

G Off-Exchange Retail Commodity Transactions 160  

H Returning to the Spot Market (By Way of Virtual Currencies) 166  

4 FinTech: From Science Fiction to Non-Fiction 175  
   A AI Systems for Financial Services 177  
   B Virtual Currencies and Related Digital Assets 185  
   C Conclusion: Science Fictional Thinking 198  

5 The Regulatory Framework for the US Derivatives Markets 199  

6 Gateways to the Futures Markets – FCMs 214  

7 Collective Investment Vehicles and Investment Advisors 219  

8 Salespeople, Supervisors, Owners, and Enumerated Others 229  

9 Trading Floor Denizens 238  

10 Regulating Digital Intermediaries 248  
   A Expanding Compulsory Registration under the Traditional Congressional Approach 249  
   B Beyond CEA Registration Categories: The Ethics of Autonomous Artificial Agents 256  

11 States of Mind: From Zero to Specific Intent 265  
   A Strict Liability 273  
   B Reasonableness (Negligence) 274  
   C Recklessness 275
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Intent</td>
<td>276</td>
</tr>
<tr>
<td>E</td>
<td>Specific Intent</td>
<td>277</td>
</tr>
<tr>
<td>12</td>
<td>Market Manipulation: Then and Now</td>
<td>280</td>
</tr>
<tr>
<td>13</td>
<td>Fraud Is Many Things (for Humans and Robots)</td>
<td>290</td>
</tr>
<tr>
<td>A</td>
<td>Quintessential Fraud: Ponzi Schemes</td>
<td>290</td>
</tr>
<tr>
<td>B</td>
<td>[Robot] Paperback Writers and Other Automated Communications</td>
<td>292</td>
</tr>
<tr>
<td>C</td>
<td>“Well-Designed” Honest Robots</td>
<td>293</td>
</tr>
<tr>
<td>D</td>
<td>Unpredictable AI Bots</td>
<td>294</td>
</tr>
<tr>
<td>E</td>
<td>Criminally Minded Robots</td>
<td>296</td>
</tr>
<tr>
<td>F</td>
<td>The Concept of Fraud Is Open-Ended</td>
<td>298</td>
</tr>
<tr>
<td>G</td>
<td>Antifraud Provisions in the CEA and CFTC Regulations</td>
<td>300</td>
</tr>
<tr>
<td>H</td>
<td>The Legal Mechanics of Fraud</td>
<td>301</td>
</tr>
<tr>
<td>I</td>
<td>Fraud-Based Manipulation: Trading Activities as Fraudulent Conduct</td>
<td>302</td>
</tr>
<tr>
<td>J</td>
<td>Congress Empowers the CFTC to Combat Reckless Manipulation</td>
<td>304</td>
</tr>
<tr>
<td>K</td>
<td>Market Manipulation as a Form of Fraud</td>
<td>307</td>
</tr>
<tr>
<td>L</td>
<td>“Manipulative” as a Term of Art</td>
<td>308</td>
</tr>
<tr>
<td>M</td>
<td>Case Study: The London Whale’s Reckless, Fraudulent Manipulation</td>
<td>312</td>
</tr>
<tr>
<td>N</td>
<td>Market Manipulation by False Reports</td>
<td>319</td>
</tr>
<tr>
<td>O</td>
<td>Spoofing as Trading Activity that Constitutes Non-Bona Fide Prices and False Reports</td>
<td>321</td>
</tr>
<tr>
<td>P</td>
<td>Reckless Market Manipulation by False Reports</td>
<td>324</td>
</tr>
<tr>
<td>14</td>
<td>Disruptive Trading Practices</td>
<td>326</td>
</tr>
<tr>
<td>A</td>
<td>Wash Trades</td>
<td>329</td>
</tr>
<tr>
<td>B</td>
<td>Causing Non-Bona Fide Prices To Be Reported</td>
<td>330</td>
</tr>
<tr>
<td>C</td>
<td>Violating Bids and Offers</td>
<td>331</td>
</tr>
<tr>
<td>D</td>
<td>Banging (or Marking) the Close</td>
<td>333</td>
</tr>
<tr>
<td>15</td>
<td>Spoofing: Market Disruption Made Easy by Technology</td>
<td>335</td>
</tr>
<tr>
<td>A</td>
<td>Financial Market Will-o’the-Wisps</td>
<td>335</td>
</tr>
<tr>
<td>B</td>
<td>The Anti-Spoofing Provision’s Text</td>
<td>340</td>
</tr>
<tr>
<td>C</td>
<td>A Spoof by Any Other Name</td>
<td>344</td>
</tr>
<tr>
<td>D</td>
<td>Pre-Dodd-Frank Act Efforts to Combat Spoofing in Futures</td>
<td>347</td>
</tr>
<tr>
<td>E</td>
<td>Pre-Dodd-Frank Act Efforts to Combat Spoofing in Securities</td>
<td>349</td>
</tr>
</tbody>
</table>
## Contents

F  The Coscia Case: The First Use of the Anti-Spoofing Provision 355
G  The Hound of Hounslow and the Flash Crash 370
H  Other Post–Dodd-Frank Act Anti-Spoofing Efforts 381
I  Some Takeaways from the Spoofing Enforcement Actions 385
J  Alternative Solutions: Speed Bumps and Tax 388

16  Adequately Supervising the Overseers of Algo Bots 391
   A  Duty to Supervise Employees Who Establish, Monitor, and Maintain Electronic Trading Platforms 398
   B  Regulation 166.3 as Applied to ATS-Directed Trading Practices 402
   C  Limitations of Failure-to-Supervise Claims 408

17  Flash Events 411
   A  The Flash Crash of May 6, 2010 413
   B  Other Flash Events, Market Disruptions, and Glitches 416
   C  Financial Markets as Fast Moving, Interconnected, and Complex 423
      i  Speed 423
      ii  Interconnectedness 425
      iii  Complexity (and Fragility) 426
   D  Potential Policy Responses to Flash Events and Algorithmic Disruptions 430
      i  Insurance Overview 431
      ii  Turing Registry and Robot Insurance 432
      iii  Market Disruption Fund 439

18  Algo Bots All over the World 448
   A  The G20 Nations and the Pittsburgh Summit 448
   B  EU Financial Markets Regulation 452

19  Conclusion 462

Index 467