

REGULATION OF CENTRAL COUNTERPARTIES (CCPs)
IN LIGHT OF SYSTEMIC RISK

REGULATION OF CENTRAL
COUNTERPARTIES (CCPs)
IN LIGHT OF SYSTEMIC RISK

CCP Market Access Regimes
in Global Markets

Evarest CALLENS

 INTERSENTIA

Cambridge – Antwerp – Chicago

Intersentia Ltd
8 Wellington Mews | Wellington Street
Cambridge | CB1 1HW | United Kingdom
Tel.: +44 1223 736 170
Email: mail@intersentia.co.uk
www.intersentia.com | www.intersentia.co.uk

Distribution for the UK and the rest of the world (incl. Eastern Europe):

NBN International
1 Deltic Avenue, Rooksley
Milton Keynes MK13 8LD
United Kingdom
Tel.: +44 1752 202 301 | Fax: +44 1752 202 331
Email: orders@nbninternational.com

Distribution for Europe:

Lefebvre Sarrut Belgium NV
Hoogstraat 139/6
1000 Brussels
Belgium
Tel.: +32 3 680 15 50 | Fax: +32 3 658 71 21
Email: mail@intersentia.be

Distribution for the USA and Canada:

Independent Publishers Group
Order Department
814 North Franklin Street
Chicago, IL60610
USA
Tel.: +1 800 888 4741 (toll free) | Fax: +1312 337 5985
Email: orders@ipgbook.com

Regulation of Central Counterparties (CCPs) in Light of Systemic Risk. CCP
Market Access Regimes in Global Markets

© Evariest Callens 2022

The author has asserted the right under the Copyright, Designs and Patents Act 1988, to be identified as author of this work.

No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, without prior written permission from Intersentia, or as expressly permitted by law or under the terms agreed with the appropriate reprographic rights organisation. Enquiries concerning reproduction which may not be covered by the above should be addressed to Intersentia at the address above.

Cover image: Danny Juchtmans / www.dsigngraphics.be

ISBN 978-1-83970-240-2
D/2022/7849/55
NUR 826



British Library Cataloguing in Publication Data. A catalogue record for this book is available from the British Library.

“Of course, increased reliance on clearinghouses to address problems in other parts of the system increases further the need to ensure the safety of clearinghouses themselves. As Mark Twain’s character Pudd’nhead Wilson once opined, if you put all your eggs in one basket, you better watch that basket.”

Ben BERNANKE¹

¹ B. S. BERNANKE, *Clearinghouses, Financial Stability, and Financial Reform*, remarks at the 2011 Federal Reserve Bank of Atlanta Financial Markets Conference, Stone Mountain, Georgia, 4 April 2011, 9, available via <https://www.federalreserve.gov/newsevents/speech/files/bernanke20110404a.pdf>. At the time of the cited remarks, Ben BERNANKE served as the Chairman of the Board of Governors of the US Federal Reserve System.

PREFACE

This book is based on the doctoral research of Evariest Callens. On 15 September 2021, Evariest successfully defended his doctoral dissertation at the Aula Magna of Ghent University in the presence (on-premises and online) of colleagues, family, friends, and many interested attendees from around the globe.

The public defense of his dissertation and the publication of this book are the pinnacles of a still early but already successful research career, which started at the Financial Law Institute of Ghent University in early 2017. As supervisors, we were delighted to encounter this young and highly talented researcher who dared to take on the challenge of exploring the complex world of derivatives and central counterparties (CCPs).

Since the start of his research trajectory, we got to know Evariest as a highly motivated and loyal member of our research group. His track record so far is impressive. Alongside his doctoral research, he managed to realize multiple high-level publications in different fields of law and fulfilled various teaching assignments in the same splendid way. Moreover, in the early stage of his time as a doctoral researcher, he managed to combine his research activities with obtaining a master's degree in economics, which would later prove to be a valuable asset when writing on derivatives and financial markets.

This book offers readers an overview of the regulation of market access for central counterparties that clear over-the-counter (OTC) derivatives. The work is not limited to the European market and regulation in that it also provides readers with a US perspective. Along the same vein, the book is abundantly stuffed with insights from American legal and economic research, in addition to more traditional European legal sources.

Besides in-depth analyses of the relevant parts of the – sometimes highly technical – European Market Infrastructure Regulation (EMIR) and its US counterparts, the book also provides highly valuable insights on two topics of general interest, which the author rightfully considered as essential building blocks for his overall analysis. First, it provides a comprehensive overview of the legal aspects of the different steps in the clearing process of OTC derivatives, thereby defining the playing field for further analysis in the book. Secondly, the book contains an in-depth assessment of the concept of “systemic risk”. Although this concept has already been thoroughly explored in academic literature in the aftermath of the 2008 financial crisis, Evariest has managed to add original insights to the existing research. Furthermore, he has applied and adapted existing insights on systemic risk for the financial sector in general

to the specific situation of CCPs that clear OTC derivatives. The systemic risk concept that he has developed in this way serves as the main yardstick for his evaluation of the existing EU and US regimes on market access for CCPs.

This book comes at the right moment and will certainly help its readership in better understanding the recent, ongoing, and future evolutions in the European regulatory landscape for CCPs. The steeply increased legislative and regulatory attention for CCPs already dates back to the aftermath of the 2008 financial crisis. However, Brexit has given birth to completely new challenges for the EU financial market regulators and has further increased tensions around the market access regimes for systemically important CCPs. This book confronts the policy choices that were made in this respect with the overarching policy objective of CCP regulation, *i.e.* promoting financial stability and containing systemic risk. Moreover, the book sheds light on even more recent evolutions in the legislative and regulatory landscape for CCPs, particularly by examining the brand-new EU regulation on recovery and resolution of CCPs and the equivalence decision from the European Commission with regard to the UK regulatory framework for CCPs. Finally, current market conditions equally reinforce the timely character of the book. After a decade of relatively stable financial markets, an era of greater uncertainty seems to have commenced with, consecutively: the COVID-19 pandemic, major shortages in the supply chain, exploding oil and gas prices, and a devastating war directly at the borders of the EU. The robustness and risk absorbing capacity of CCPs will inevitably be tested in practice in the coming years. The same is true for the EU regulatory and supervisory framework for CCPs. In any case, it is clear that CCPs are the nuclear powerhouses of modern financial markets.

Evarest has managed to write a splendid book that goes beyond traditional legal analysis and combines insights from legal and economic literature. Furthermore, he proves to be more than just a specialist in financial regulation where he introduces insights from contract law, EU law, and even international trade law into his analysis.

As supervisors, it has been a pleasure to work with Evarest. In addition to his positive personality, we particularly appreciated his incredible working attitude and his loyalty. There cannot exist any doubt that the professional future of this talented young man will be bright, whether inside or outside academia. We wish him all the best!

Diederik BRULOOT
Eddy WYMEERSCH

Ghent, 26 March 2022

ACKNOWLEDGMENTS

During the last four years, I have explored the arcane but intriguing world of centrally cleared derivatives through my doctoral research at the Financial Law Institute of Ghent University, first as a teaching assistant (2017–2018) and later as a research fellow funded by the Special Research Fund of Ghent University (2019–2021). This book presents my current understanding of—and structured reflections on—the market access regimes for central counterparties (CCPs) that clear over-the-counter (OTC) derivatives. It forms the commercial edition of the doctoral dissertation that I submitted on 21 June 2021 and publicly defended on 15 September 2021. The work unveiled in this book has greatly benefited from valuable interactions with many people, some of whom I wish to explicitly name and thank in the remainder of this preface. Evidently, all remaining errors are my own.

First and foremost, I am greatly indebted to my promotor, Prof. Dr. Diederik Bruloot, who has always unconditionally supported my academic endeavors and has on many occasions intellectually challenged me, allowing me to refine my thoughts. Over the years, I have endlessly rearranged the structure of my work and this is not in small part due to the encouragements in that direction from Prof. Bruloot. Secondly, I am grateful to my co-promotor, Em. Prof. Dr. Eddy Wymeersch, who sparked my interest in derivatives and CCPs in early 2017, just days after I had started working at the Financial Law Institute. Prof. Wymeersch has also stimulated me to engage in the European and international academic arena. Thirdly, I am thankful to the third member of my doctoral guidance committee, Prof. Dr. Matthias Haentjens, who has greatly helped me to more accurately demarcate the scope of my research project. Fourthly, I am much obliged to the other members of the doctoral examination committee for the time and effort that they have invested in reviewing and discussing my doctoral dissertation: Prof. Dr. Dan Awrey, Klaus Löber, Prof. Dr. Michel Tison, and Prof. Dr. Reinhard Steennot.

My work has also greatly benefitted from the thoughtful input from various scholars and practitioners in the EU and the US who were not directly involved with my doctoral dissertation. First, since 2018, I have had the pleasure to be affiliated with the European Banking Institute (EBI) in Frankfurt, first through the Young Researchers Group (2018–2021) and currently through the Associated Researchers Group (2021–present). The interactions with junior and senior members of the EBI and the numerous opportunities to present

and discuss ongoing work in an international environment have lowered the threshold for me—and, undoubtedly, fellow junior researchers—to cross-pollinate academically. Secondly, my thoughts on certain aspects of my doctoral research have benefitted from the interaction with junior and senior economists, lawyers, and policymakers affiliated with the Young Scholars Initiative from the Institute for New Economic Thinking in New York, which I joined in 2019. Thirdly, the US law components of this book have largely taken shape during my stint as a Visiting Researcher with the Graduate Program of Harvard Law School (September 2019–June 2020), where I had the opportunity to interact with many eminent US scholars and policymakers. My period at Harvard would not have been possible without the gracious financial and non-financial support from the Belgian American Educational Foundation (BAEF) and Prof. Dr. Emile Boulpaep. Fourthly, I am appreciative of the not previously mentioned professors affiliated with the Financial Law Institute, with all of whom I have had a pleasant professional relation: Prof. Dr. Hans De Wulf, Prof. Dr. Kristof Maresceau, Prof. Dr. Christoph Van der Elst, and Prof. Dr. Hein Vanhees. Fifthly, I am thankful for the many practitioners in my network (lawyers, bankers, and regulators) who have kept me informed about the developments and life outside of the protective walls of the university.

In my experience, the mental isolation that is perhaps inherent to specialized doctoral research is easily mitigated if one conducts his or her research at the Financial Law Institute of Ghent University. That is to say, at the Financial Law Institute, there exists a productive atmosphere of mutual reinforcement that has resulted in a myriad of fruitful academic conversations and high-quality research collaborations amongst the members of the Financial Law Institute. As a side effect—pleasant side effect, I must admit—the atmosphere at the Financial Law Institute has also produced lasting memories and friendships that reach far beyond the walls of the university. Besides the memorable lunches and after-work evenings in Ghent, I have fond recollections of professional and leisure trips with colleagues to Luxemburg, Leiden, Boston, New York, and Munich.

Throughout the years, I have unapologetically subjected innocent friends and family to my excitement for financial law. Looking back, these attempts to articulate technical matters in a comprehensible manner have proven immensely valuable for the final redaction of this book. I would like to explicitly express gratitude to my friends from high and law school, who have provided me with vital distraction and leisure in due time. The same is true for my friends from the faculty of economics, be it in a different manner.

The Greek proverb “*great minds think alike*” is often interpreted as a reflection of the intelligence of people that think alike, but this is most likely a misconstruction of the original saying “*great minds think alike, though fools seldom differ.*” The latter version of the proverb forms an accurate reflection of my closest personal relations. My thoughts on personal and professional matters

have benefitted the most from the counsel and perspectives of three people in particular: Mathieu, Karen, and Camila. It is with a spirit of gratitude that I look back at the rich interactions that we have had over the years and at the future that lies ahead. Finally, yet most importantly, I am deeply indebted to my family, particularly my parents and siblings. In their peculiar ways, they have latently but enormously contributed to all my endeavors, thereby *clearing* the way for me. For their love and patience, I am eternally grateful.

Evariest CALLENS
Paris, 31 January 2022

CONTENTS

<i>Preface</i>	vii
<i>Acknowledgments</i>	ix
<i>List of Acronyms</i>	xxiii
Introduction	1
Chapter 1.	
State of Play	3
§1. CCPs for OTC Derivatives	3
§2. Legislative and Regulatory Frameworks for Centrally Cleared Derivatives	7
§3. CCPs as Nuclear Powerhouses in Financial Markets	12
§4. Existing Research	13
Chapter 2.	
Research Project	17
§1. Research Gap and Proposition	17
§2. Research Questions	20
§3. Methodological Notes	21
§4. Scope	25
PART 1.	
OTC DERIVATIVES CLEARED THROUGH A CCP	29
Chapter 1.	
An Anatomization of Derivative Contracts	33
§1. A Conceptual Perspective on Derivatives	34
A. Conceptual Definition	34
B. All Derivatives Contain Identical and Comprehensible Building Blocks	38
1. Building Blocks	38
2. Combining Building Blocks	40
a. Swaps	40
b. Credit Default Swaps	41

3.	Regulatory Arbitrage	45
§2.	Derivatives Notions in EU and US Law	46
A.	EMIR	46
1.	Definition	46
2.	Covered Derivatives	48
B.	MiFID II and MiFIR	52
1.	Definition	52
2.	Ambiguity	53
3.	Implications	57
C.	US Law	58
§3.	Social Utility of Derivatives	60
A.	Risk and Risk Aversion	61
B.	Risk Redistribution v. Socially Detrimental Derivatives	63
1.	Risk Hedging and Diversification	63
2.	Speculation	67
a.	The Role of Speculative Derivatives	67
b.	Restraining Purely Speculative Derivatives?	69
3.	Other Potential Perils of Derivatives Usage	73
§4.	Differentiation Between Gambling, Derivatives, and Insurance?	73
A.	Diffuse Legal Treatment of Aleatory Contracts	73
B.	What Regulatory Framework for What Aleatory Contracts?	76
1.	Counterparty Objectives: Insurance v. Gambling	76
2.	Do Derivatives Have a Conceptual Common Denominator?	77
§5.	Intermediate Conclusions	81
Chapter 2.		
The Lifespan of Centrally Cleared OTC Derivatives		
§1.	Trading	86
A.	Over-the-Counter or Bilateral Trading	86
B.	Multilateral Trading	89
C.	Over-the-Counter v. Multilateral Trading	91
§2.	Central Clearing Through a CCP	94
A.	Risks That Have to Be Cleared	94
1.	Risk Management Derivative Contracts	94
2.	Emergence and Evolution of Derivative Market Value Through Market Risk	96
3.	Threat of Losing Derivative Market Value Through Counterparty Risk	97
4.	Indicative Data	99
a.	Notional Amounts	100
i.	What Do Notional Amounts Measure?	100
ii.	Data on Notional Amounts	101

b.	Gross Market Value.	108
c.	Net Market Value.	110
B.	Fundamentals of Central Clearing Through CCPs.	111
1.	CCPs, Clearing Members, and Clients	111
2.	Matched Book	117
3.	Continuity of Contracts Through Risk Mutualization.	118
C.	CCPs as Risk Managers.	119
1.	Legal Mechanisms for CCP Interposition.	119
2.	Margin Requirements	122
a.	Variation Margin Transmission Through the CCP.	122
i.	Collateralize-to-Market	122
ii.	Settle-to-Market.	125
b.	Initial Margin Posted by the Clearing Members	127
i.	Operation	127
ii.	Calibration	134
iii.	Procyclical Margin Requirements.	138
c.	Segregation	140
3.	Multilateral Netting	143
a.	Netting	143
b.	Netting Efficiency and Network Effects.	146
c.	Does Netting Through a CCP Have a Multilateral Character?	151
d.	Legal Forms of Netting Through a CCP	155
i.	Payment Netting	155
ii.	Novation Netting.	156
iii.	Portfolio Compression	158
iv.	Close-Out Netting	160
e.	Interoperability Arrangements	164
i.	The Case for and Against CCP Interoperability	164
ii.	Money-Market Instruments and Non-Derivative Transferable Securities	168
iii.	Derivatives.	173
D.	CCPs as Loss Absorbers	178
1.	Clearing Member Default	178
a.	Default Management Process	178
b.	Restoration of the CCP's Matched Book	182
c.	Allocation of the Losses Arising from Clearing Member Default.	186
i.	CCP Default Waterfall	186
ii.	CCP Default Fund	193
iii.	Other Micro-Prudential Requirements for CCPs.	197
iv.	The End of the CCP Waterfall	199
d.	Portability of Client Positions and Assets	200

2.	Insolvency Law Carve-Outs for Derivative Contracts	201
a.	Regular Insolvency Law Obstacles to Risk Mitigating Strategies.	201
b.	Disapplication for CCPs of Regular Insolvency Law: Settlement Finality Directive.	202
c.	Specialized Insolvency Regime for All Derivatives Market Participants: Financial Collateral Directive	205
d.	Resolution Regimes.	210
3.	Distributed Ledger Technology	214
E.	Effects of CCPs on Counterparty Risk Dynamics	216
1.	Homogenization and Empirical Effects	216
2.	Conceptual Basis for Counterparty Risk Effects	219
3.	Moral Hazard and Adverse Selection	224
F.	The Crucial Role of Market Liquidity	227
1.	Efficient Markets v. Market Liquidity Risk.	227
a.	Efficient Markets	227
b.	Market Liquidity Derivatives.	230
c.	Theoretical Foundations for Market Liquidity Risk	234
2.	Why Market Liquidity Is Critical for Central Clearing Through a CCP	240
3.	Fungibility	243
§3.	Intermediate Conclusions.	245
PART 2.		
REGIMES FOR CCP MARKET ACCESS 249		
Chapter 1.		
Regulatory Interventionism in OTC Derivatives Markets. 253		
§1.	G20 Stimulus for Legislative and Regulatory Intervention.	254
A.	G20 Commitments.	254
B.	International Reaction to the G20 Commitments	258
§2.	EU and US Post-Crisis Interventions in OTC Derivatives Markets	259
A.	EU	259
1.	Legislation and Regulation at the EU Level	259
a.	Early Reactions: Focus on Credit Derivatives.	259
b.	EMIR.	262
c.	Role of the Regulators.	263
2.	Legislation and Regulation by the Member States.	265
B.	US	266
1.	Legislative Intervention in Derivatives Markets	266
2.	Division of Powers Between the CFTC and the SEC for Derivatives Markets Regulation	267

a.	Exclusive Jurisdiction CFTC	268
i.	Futures	269
ii.	Swaps	273
b.	Derivatives That Fall Under the Jurisdiction of the SEC... ..	274
c.	Other Exceptions to the Exclusive Jurisdiction of the CFTC	277
§3.	CCPs as Rule-Makers	278
A.	Risk v. Reward	278
B.	CCP Governance	282
§4.	Regulatory Incentives to Centrally Clear OTC Derivatives Through CCPs	286
A.	The EMIR Central Clearing Obligation	287
1.	Affected Market Participants	288
a.	Principles	288
i.	EU Entities: Financial and Non-Financial Counterparties	288
ii.	Extraterritorial Application EMIR Clearing Obligation	293
b.	Exemptions	294
c.	Relation to the MiFIR Derivatives Trading Obligation... ..	296
2.	Affected Derivative Contracts	298
a.	Identification Process	298
b.	Identified Derivatives	301
3.	Enforcement	304
B.	Risk Mitigation Requirements for OTC Derivatives Not Cleared by a CCP	306
C.	Prudential Requirements for the Derivatives Positions of Banks... ..	311
1.	Centrally Cleared Derivatives Under the Basel Accords	311
2.	Prudential Requirements	314
a.	Capital Requirements	314
b.	Capital	316
c.	RWA	317
i.	Cumulative RWA	317
ii.	Calculation Approaches of RWA for Credit Risk	319
iii.	RWA for Market Risk	327
§5.	Intermediate Conclusions	329
 Chapter 2.		
Systemic Risk in Centrally Cleared OTC Derivatives Markets		
§1.	Macro Risks in Financial Markets	334
A.	Systemic Risk	334
B.	Propagation Risk and Simultaneous Risk	338

C.	Justification of the Regulation of Macro Risks in Derivatives Markets	340
§2.	Systemic Risk in the Narrow Sense of the Word.....	343
A.	Trigger Event with Systemic Consequences.....	343
B.	Propagation Channels	345
1.	Systematization	345
2.	Domino Effects	347
a.	Narrative.....	347
b.	Theoretical Basis: Robust yet Fragile Systems.....	348
c.	Are Domino Effects Plausible?	352
d.	Connectedness in Derivatives Markets in Practice	356
i.	Lehman Brothers	356
ii.	AIG.....	360
e.	Role of CCPs.....	362
3.	Fire Sale Spirals	364
a.	Funding Liquidity Risk.....	365
b.	Fire Sale Spirals	366
c.	Mechanisms Reinforcing Fire Sale Losses.....	373
4.	Informational Propagation	374
a.	Informational Propagation in Derivatives Markets.....	374
b.	Determinants of Informational Propagation	379
c.	Role of CCP Interposition	380
d.	Reporting Obligation	383
§3.	Systematic Risk.....	387
§4.	Intermediate Conclusions.....	390
Chapter 3.		
	EU and US CCP Market Access Regimes.....	395
§1.	EU Regime	397
A.	Relevant Authorities	397
B.	Authorization and Supervision EU CCPs	402
1.	Authorization	402
a.	Authorization Requirement.....	402
b.	Scope of the Authorization Requirement	403
c.	Distribution of Powers in the Authorization Process	407
i.	Competent Authorities	407
ii.	CCP Colleges and ESMA	408
iii.	Autonomous Powers ESMA.....	411
d.	Current Authorizations	412
2.	Supervision	413
a.	Decentralized but Less Formalized	413
b.	Supervisory and Investigatory Powers.....	414

c.	Sanctions	415
i.	Competence to Sanction	415
ii.	Punishable Infringements	418
d.	Supervisory Scrutiny of CCP Shareholder Structures	419
3.	Lack of Centralized EU CCP Authorization and Supervision	421
a.	The Case for Centralization	422
b.	Fiscal Constraints	425
c.	Other National Sensitivities	430
d.	<i>Meroni</i> Constraints?	431
e.	Pivotal Role of CCPs	434
C.	Recognition and Supervision Third Country CCPs	437
1.	Market Access Third Country CCPs	437
2.	Systemically Important v. Non-Systemically Important Third Country CCPs	440
a.	EMIR	440
b.	ESMA's Proposal	441
c.	Final Text Commission Delegated Regulation	443
d.	Categorization by ESMA	447
3.	Recognition Criteria	448
a.	Overview and Process	448
b.	All Third Country CCPs	450
i.	Equivalence Decision from the European Commission	450
ii.	Other Criteria to Be Assessed by ESMA	465
iii.	Mutual Recognition	467
c.	Systemically Important Third Country CCPs	476
i.	Compliance EMIR	477
ii.	Other Conditions	480
iii.	Too Systemically Important Third Country CCPs	480
iv.	ECB CCP Location Policy	484
4.	Current Recognitions	488
5.	Supervision	490
a.	Supervisory and Investigatory Powers	490
i.	Systemically Important Third Country CCPs	490
ii.	All Third Country CCPs	491
b.	Sanctions	491
i.	Spectrum of Supervisory Measures	491
ii.	Withdrawal of Recognition	494
6.	Recognition of UK CCPs After Brexit	495
a.	Implications Brexit for UK CCPs and Market Liquidity	495
b.	Current Status of UK CCPs	497
c.	Future Outlook	500

7.	Adverse Effects of Third Country CCP Market Access Without Sufficient Deference	502
a.	CCP Market Access Regimes and Risk Containment	502
b.	Prohibition to Clear for EU Market Participants	503
c.	National Treatment as CCP Market Access Paradigm	508
d.	Inward-Looking Regimes for CCP Market Access Are Hard to Justify in Light of Systemic Risk.	511
e.	Lex Ferenda	514
§2.	US Regime	519
A.	Registration	519
1.	Observance DCO Core Principles and CFTC Rules and Regulations	519
2.	Current Registrations With the CFTC	523
3.	Alternative or Comparable Compliance for Non-Systemically Important Foreign CCPs	523
a.	Novel Approach to Registration of Foreign CCPs	523
b.	Criteria for Registration Through Alternative Compliance	526
i.	Non-Systemically Important CCPs: The Double Initial Margin Test	526
ii.	CFTC Decision on Compliance Home Country Regulation	530
iii.	Good Regulatory Standing and Cooperation With Home Country Supervisor	532
iv.	Additional Requirements	533
B.	Exemptions From Registration	533
1.	The Power to Grant Exemptions	533
2.	No Exemptions to Clear US Customer Positions	536
3.	Codified Exemption Criteria	538
a.	Eligibility Criteria: Output-Based Comparison of Regulatory and Supervisory Regimes	538
b.	Additional Exemption Requirements	539
§3.	Intermediate Conclusions	540
 Chapter 4.		
	EU CCP Recovery and Resolution Regime	549
§1.	CCP Failures	550
§2.	EU Regulation on CCP Recovery and Resolution	552
A.	Overview	552
B.	Relevant Authorities	556
C.	Recovery and Resolution Planning	559
1.	Recovery Planning	559
a.	Recovery Plans	559
b.	Recovery Tools	561

c.	Supervisory Scrutiny.....	564
d.	The Fine Line Between the CCP Default Waterfall and the CCP Recovery Toolkit	567
2.	Resolution Planning.....	568
a.	Resolution Plans	568
b.	Resolvability Assessment	570
D.	Early Intervention Measures	572
E.	Resolution	573
1.	Objectives.....	573
2.	Conditions	574
3.	General Principles.....	576
4.	Resolution Tools	578
a.	Overview.....	578
b.	Position Allocation	580
c.	Loss Allocation	581
d.	Write-Down and Conversion	582
e.	Sale of Business and Bridge CCP	584
f.	Resolution Powers	587
5.	Government Stabilization Tools.....	589
a.	Technical Analysis.....	589
b.	Policy Considerations.....	592
6.	Access to Central Bank Liquidity.....	596
a.	CCP Access to Central Bank Liquidity	596
b.	Possibilities.....	598
i.	Intraday Credit.....	598
ii.	Marginal Lending Facility	598
iii.	Emergency Liquidity Assistance.....	599
iv.	Liquidity Support in Foreign Currencies.....	602
c.	Policy Considerations.....	604
F.	Administrative Penalties for Infringements of the Regulation.....	605
§3.	Intermediate Conclusions.....	607
	General Conclusions	609
	<i>Bibliography</i>	<i>625</i>

LIST OF ACRONYMS

A-IRB	Advanced internal ratings-based
ABS	Asset backed security
ACPR	Autorité de Contrôle Prudentiel et de Résolution
AFM	Autoriteit Financiële Markten
AIF	Alternative investment fund
AIFM	Alternative investment fund manager
AIFMD	Alternative Investment Fund Managers Directive (2011/61)
AIG	American International Group
AMF	Autorité des Marchés Financiers
ATI	Additional tier 1 capital
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht
BCBS	Basel Committee on Banking Supervision (BIS)
BIS	Bank for International Settlements
BME	Bolsas y Mercados Españoles S.A.
BoE	Bank of England
BRRD	Bank Recovery and Resolution Directive (2014/59)
BSM-model	Black-Scholes-Merton model
CAPM	Capital Asset Pricing Model
CASS	Client asset sourcebook (from the FCA)
CBOE	Chicago Board Options Exchange
CBOT	Chicago Board of Trade
CCF	Credit conversion factor
CCIL	Clearing Corporation of India
CCP	Central counterparty
CCP.A	CCP Austria Abwicklungsstelle für Börsengeschäfte GmbH
CC&G	Cassa di Compensazione e Garanzia S.p.A.
CD	Credit derivative
CDO	Collateralized debt obligation
CDO ²	Squared collateralized debt obligation
CDS	Credit default swap
CEA	Commodity Exchange Act
CEM	Current exposure method
CESAME Group	Clearing and Settlement Advisory and Monitoring Expert Group (European Commission)
CESR	Committee of European Securities Regulators

CET1	Common equity tier 1 capital
CFR	US Code of Federal Regulations
CFTC	Commodity Futures Trading Commission
CJEU	Court of Justice of the European Union
CLAM	Caisse de Liquidation des Affaires en Marchandises
CME	Chicago Mercantile Exchange
CME TR	CME Trade Repository Ltd.
CMU	Capital markets union
CO	Commodity
CoCos	Contingent convertible capital instruments
COMEX	Commodity Exchange
COMI	Centre of main interests
COVID-19	Coronavirus disease 2019
CPMI	Committee on Payments and Market Infrastructures (previously: CPSS)
CPSS	Committee on Payment and Settlement Systems (now: CPMI)
CRA	Credit rating agency
CRD I	Capital Requirements Directive I package (2006/48 and 2006/49)
CRD II	Capital Requirements Directive II package (2009/111, 2009/27, and 2009/83)
CRD III	Capital Requirements Directive III (2010/76)
CRD IV	Capital Requirements Directive IV (2013/36)
CRD V	Capital Requirements Directive V (2019/878)
CRM	Credit risk mitigation
CRR I	Capital Requirements Regulation I (575/2013)
CRR II	Capital Requirements Regulation II (2019/876)
CSA	Credit Support Annex
CSD	Central securities depository
CTM	Collateralized-to-market
CU	Currency
CVA	Credit valuation adjustment
DCO	Derivatives clearing organization
DDRIE	DTCC Data Repository (Ireland) Plc.
DDRL	DTCC Derivatives Repository Plc.
DLT	Distributed ledger technology
DMC	Default management committee
DMG	Default management group
DMP	Default management process
DNB	De Nederlandsche Bank
DRMWG	Default Risk Management Working Group

D-SIB	Domestic systemically important bank
DTCC	Depository Trust & Clearing Corporation
EACH	European Association of CCP Clearing Houses
EAD	Exposure at default
EBA	European Banking Authority
EBF	European Banking Federation
EBI	European Banking Institute
ECB	European Central Bank
ECMH	Efficient capital market hypothesis
ECJ	European Court of Justice
EE	Expected exposure
EEA	European Economic Area
EIOPA	European Insurance and Occupational Pensions Authority
ELA	Emergency liquidity assistance
EMA	European Master Agreement
EMF	European Monetary Fund
EMH	Efficient market hypothesis
EMIR	European Market Infrastructure Regulation (648/2012)
EMIR 2.2	European Market Infrastructure Regulation 2.2 (2019/2099)
EMIR Refit	European Market Infrastructure Regulation Regulatory fitness and performance (2019/834)
EONIA	Euro Overnight Index Average
EPE	Expected positive exposure
EQ	Equity
ESAs	European Supervisory Authorities (EBA, EIOPA, and ESMA)
ESC	European Securities Committee (European Commission)
ESCB	European System of Central Banks
ESFS	European System of Financial Supervision
ESM	European Stability Mechanism
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
ETC	Exchange-traded commodity
ETN	Exchange-traded note
EU	European Union
F-IRB	Foundation internal ratings-based
FASB	Financial Accounting Standards Board
FBF	French Banking Federation
FC	Financial counterparty
FC-	Financial counterparty not exceeding the clearing threshold
FC+	Financial counterparty exceeding the clearing threshold
FCA	Financial Conduct Authority

FCD	Financial Collateral Directive (2002/47)
FCM	Futures commission merchant
FESE	Federation of European Securities Exchanges
FIA	Futures Industry Association
FMI	Financial market infrastructure
FMU	Financial market utility
FR	Federal Register
FRA	Forward rate agreement
FRANDT	Fair, reasonable, non-discriminatory, and transparent
FSB	Financial Stability Board
FSF	Financial Stability Forum
FSI	Financial Stability Institute (BIS)
FSMA	Financial Services and Markets Authority (Belgium)
FSOC	Financial Stability Oversight Council
FX	Foreign exchange
G20	Group of Twenty
GATS	General Agreement on Trade in Services
GDP	Gross domestic product
GNFV	Gross negative fair value
GPFV	Gross positive fair value
G-SIB	Global systemically important bank
G-SIFI	Global systemically important financial institution
ICE	Intercontinental Exchange
ICE TVEL	ICE Trade Vault Europe Ltd.
ICL	Intraday credit line
IFRS	International Financial Reporting Standards
IM	Initial margin
IMA	Internal models approach
IMM	Internal models method
IORP	Institution for occupational retirement provision
IOSCO	International Organization of Securities Commissions
IRB	Internal ratings-based
IRD	Interest rate derivative
IRS	Interest rate swap
IRSG	International Regulatory Strategy Group
ISD	Investment Services Directive (93/22)
ISDA	International Swaps and Derivatives Association
ITS	Implementing technical standards
KDPW	Krajowy Depozyt Papierów Wartościowych S.A.
KLCCH	Kuala Lumpur Commodity Clearing House
KWG	Kreditwesengesetz
LCR	Liquidity coverage ratio

LGD	Loss given default
LOLR	Lender of last resort
LSEG	London Stock Exchange Group PLC
M	Effective maturity
MAR	Market Abuse Regulation (596/2014)
MiFID I	Markets in Financial Instruments Directive I (2004/39)
MiFID II	Markets in Financial Instruments Directive II (2014/65)
MiFIR	Markets in Financial Instruments Regulation (600/2014)
MPOR	Margin period of risk
MTF	Multilateral trading facility
NATR	NEX Abide Trade Repository AB
NBB	National Bank of Belgium
NCA	National competent authority
NCCE	Net current credit exposure
NCWO	No creditor worse off
NFA	National Futures Association
NFC	Non-financial counterparty
NFC-	Non-financial counterparty not exceeding the clearing threshold
NFC+	Non-financial counterparty exceeding the clearing threshold
NSFR	Net stable funding ratio
NYMEX	New York Mercantile Exchange
OCC	Office of the Comptroller of the Currency
ODRF	OTC Derivatives Regulators' Forum
ODRG	OTC Derivatives Regulators Group
ODSG	OTC Derivatives Supervisors Group
OIS	Overnight index swap
OJ	Official Journal of the European Union
OLA	Orderly liquidation authority
OTC	Over-the-counter
OTF	Organized trading facility
PD	Probability of default
PEICL	Principles of European Insurance Contract Law
PFE	Potential future exposure
PFMI	Principles for Financial Market Infrastructures (CPMI-IOSCO)
QCCP	Qualifying central counterparty
RC	Replacement cost
REH	Rational expectations hypothesis
RTS	Regulatory technical standard
RWA	Risk-weighted assets
SA-CCR	Standardized approach to counterparty credit risk exposure

SBSA	Security-based swap agreement
SEBI	Securities and Exchange Board of India
SEC	US Securities and Exchange Commission
SFD	Settlement Finality Directive (98/26)
SFTR	Securities Financing Transaction Regulation (2015/2365)
SIFI	Systemically important financial institution
SIFMA	Securities and Financial Markets Association
SM	Standardized method
SME	Small- to medium-sized enterprise
SRB	Single Resolution Board
SRF	Single Resolution Fund
SRM	Single Resolution Mechanism
SRO	Self-regulatory organization
SSM	Single Supervisory Mechanism
STM	Settled-to-market
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer system
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
TIW	Trade Information Warehouse
TLAC	Total loss-absorbing capacity
TR	Trade repository
UCITS	Undertaking for the collective investment in transferable securities
UK	United Kingdom
US	United States of America
USC	United States Code
USI	Unique swap identifier
UTI	Unique trade identifier
VM	Variation margin
VMGH	Variation margin gains haircutting
WFE	World Federation of Exchanges
WTO	World Trade Organization
YTD	Year to date