

*Has technology changed the nature of
risks in financial markets?*

Darrell Duffie
Graduate School of Business
Stanford University

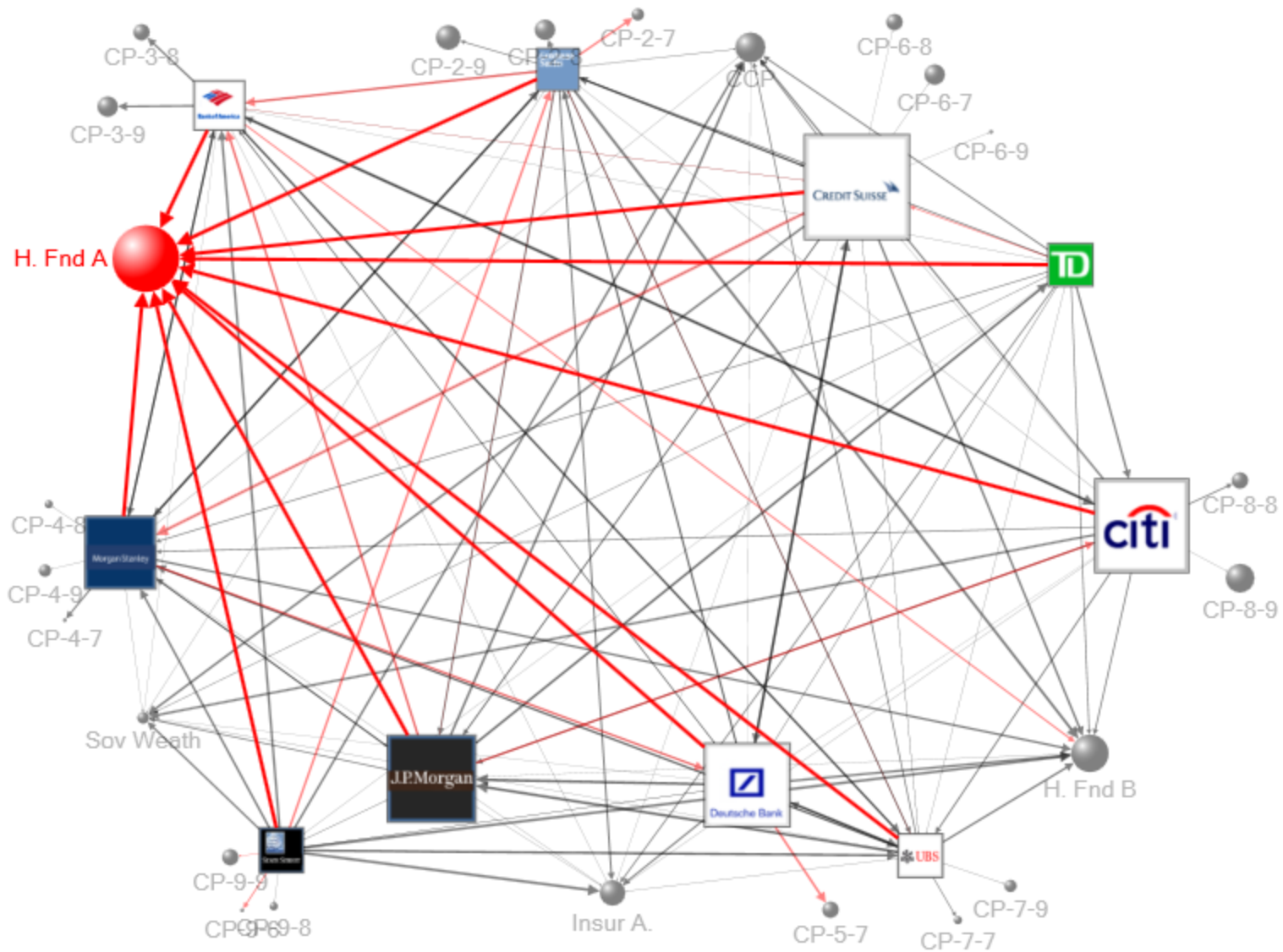
14th BIS Annual Conference

Bank for International Settlements, Lucerne, June 26, 2015

Swap Data Repositories Went Wrong

- Failures of scope, design, and coordination.
- Now: re-scope and re-design SDRs.
- Stage One: SIFI reporting.
- Stage Two: apply distributed network technology, such digital ledger blockchains.
- Trade monitoring versus systemic risk monitoring.

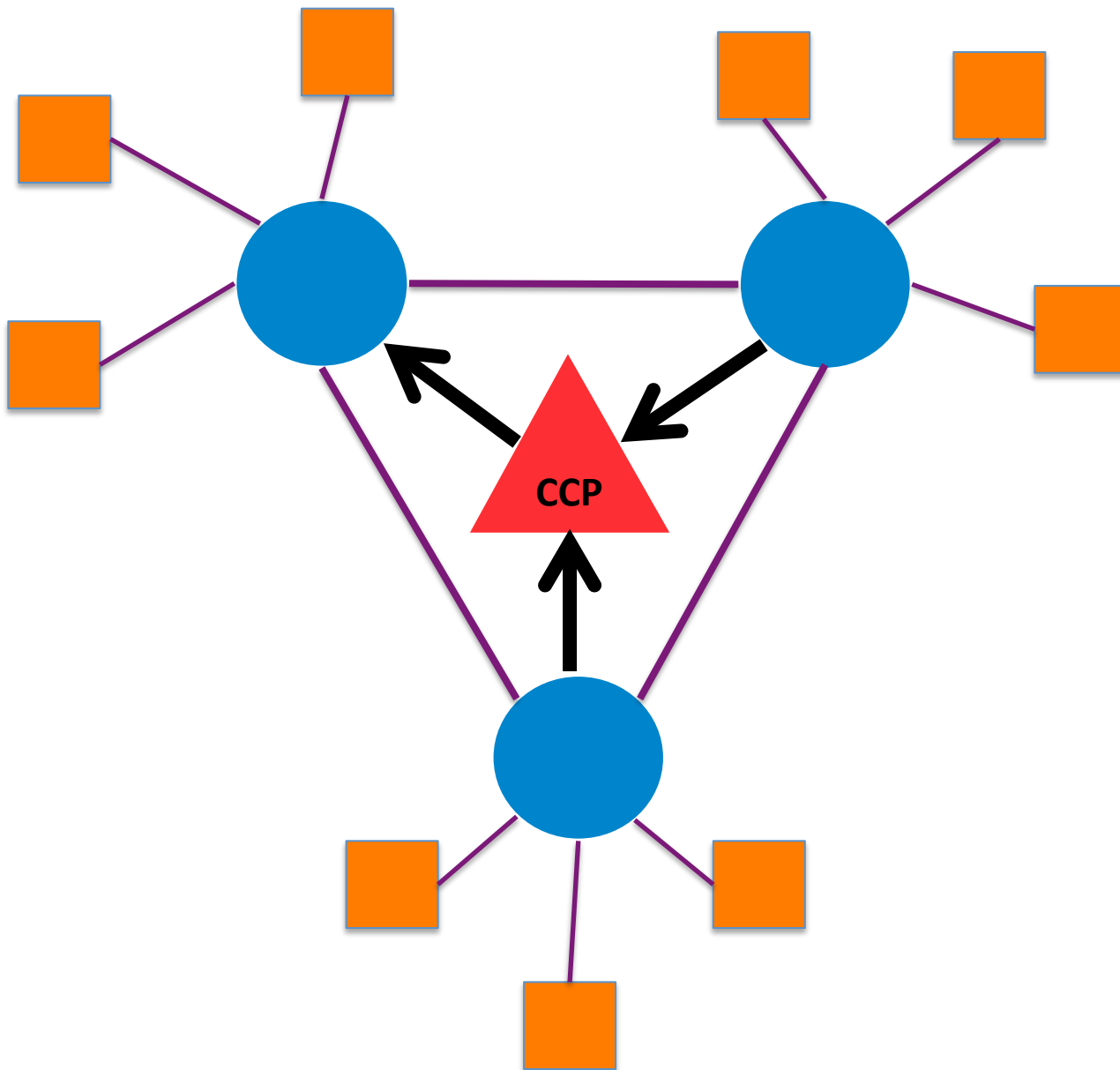
10-by-10-by-10 Systemic Risk Monitoring



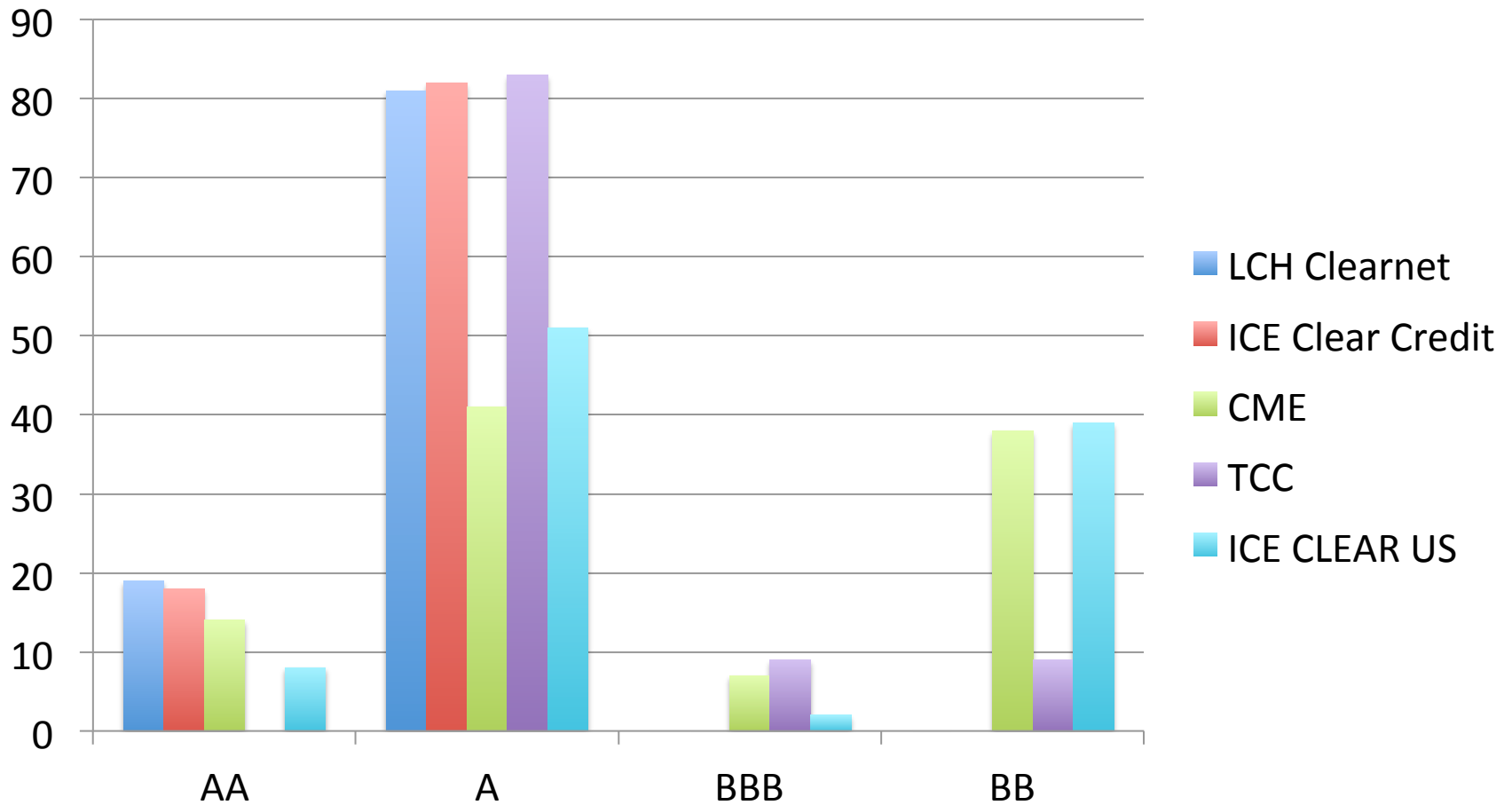
A 10-by-10-by-10 Submission

| | Stress 1 | ... | Stress j | ... | Stress 10 |
|--------------------|-------------|-----|-------------|-----|--------------|
| Self | | | | | |
| Counterparty 1 | | | | | |
| ⋮ | | | | | |
| Counterparty i | | | | | |
| ⋮ | | | | | |
| Counterparty 10 | | | | | |

The table is a 10x6 grid. The first row is the header with columns: (empty), Stress 1, ..., Stress j, ..., Stress 10. The first column contains: Self, Counterparty 1, ⋮, Counterparty i, ⋮, Counterparty 10. The intersection of the row 'Counterparty i' and the column 'Stress j' is highlighted with a blue dashed border and contains the text 'Ctpy ID & Exposure'. Dashed blue lines extend from this cell to the top and bottom of the 'Stress j' column and to the left and right of the 'Counterparty i' row.

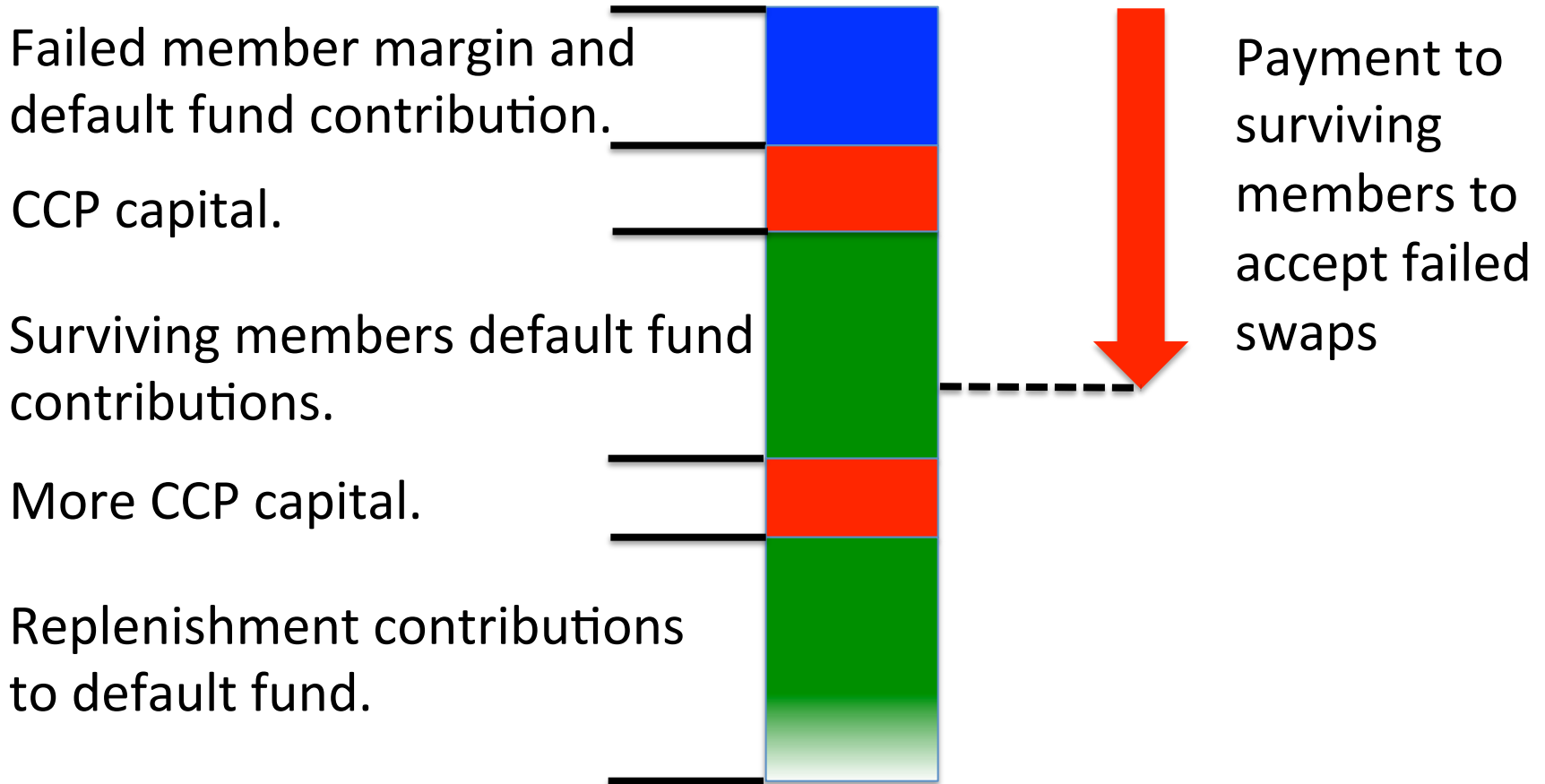


Distribution of clearing member ratings



Source: Standard & Poors, Armakola and Laurent (2015)

CCP default management waterfall



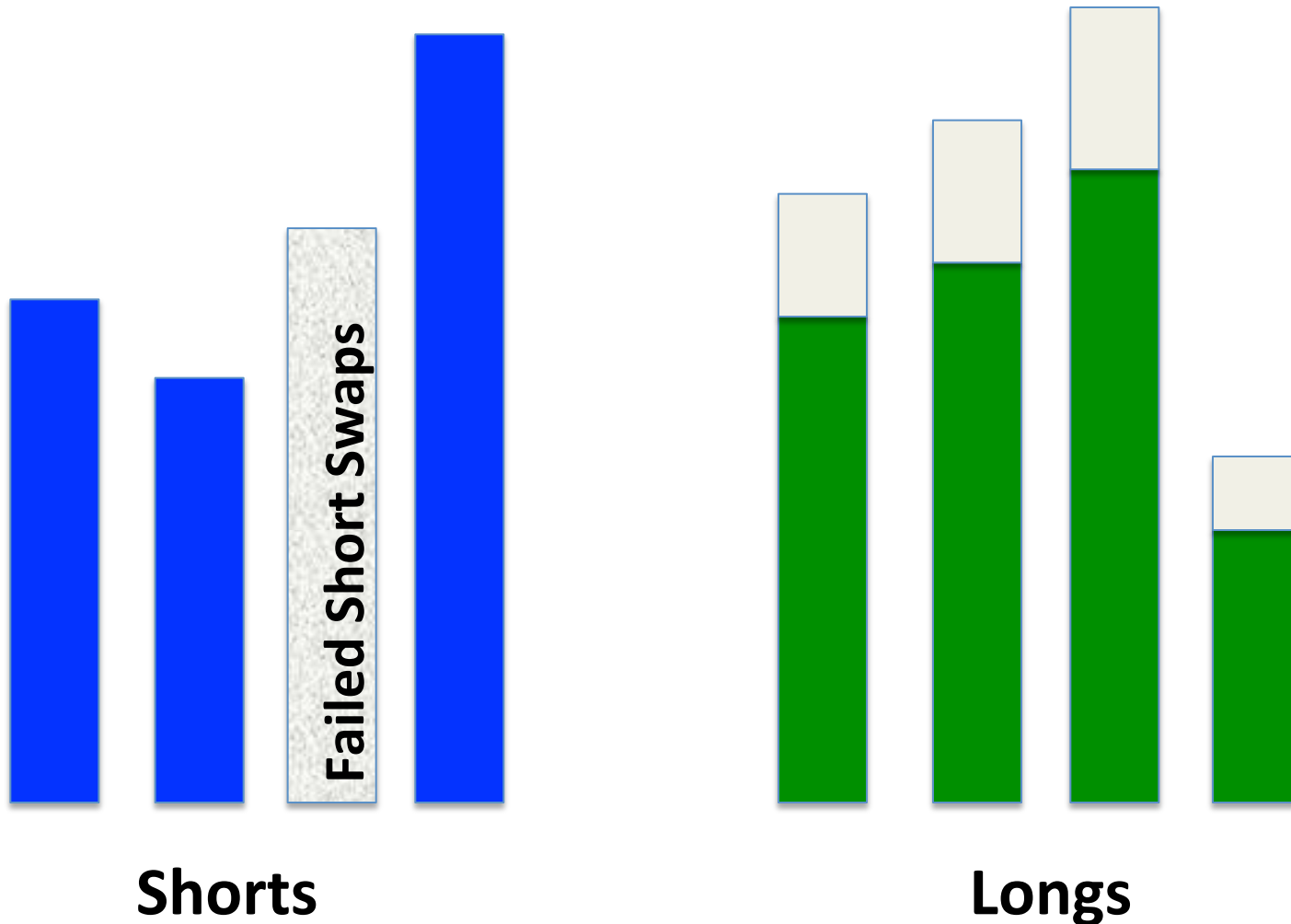
IRS CCP pre-funded waterfall resources (billions)

| | Initial Margin | CCP Capital | Default Fund |
|--------------------------|----------------|-------------|--------------|
| CME Clearing U.S. | 133 USD | 0.150 USD | 2.37 USD |
| LCH.Clearnet Ltd. | 89 EUR | 0.046 EUR | 3.62 EUR |

Source: Armakola and Laurent (2015)

A Partial Tear-Up

Partially Torn Up Long Swaps



In case of insufficient CCP funds

- Possible contractual haircut of variation margin payments.
- Possible contractual tear up of some or all swaps.

END OF CONTRACTUAL DEFAULT MANAGEMENT PROCESS

- Enter CCP failure resolution process.
- Stay contractual termination of swaps.
- Allocate losses.
- Liquidate or recapitalize the CCP.

Key CCP Failure Risks

- Clearing member CCP resignation runs.
- Uncapped DGF contributions, contagion.
- Disorderly unwind of CCPs, fire sales.
- Automatic stays of failed member swaps.
- Loss of continuity of clearing services.

Additional reading and sources

Additional selected sources

- Armakola, Angela, and Jean-Paul Laurent (2015) “CCP Resilience and Clearing Membership,” University of Paris I. April, 2015.
- Bank of England. 2014. “The Bank of England’s Sterling Monetary Framework,” Bank of England, November, <http://www.bankofengland.co.uk/markets/Documents/money/publications/redbook.pdf>.
- Blackrock. 2014. “Central Clearing Counterparties and Too Big to Fail,” BlackRock Viewpoint, April.
- Boissy, Charles, François Derrien, Evren Örs, and David Thesmar (2015) “Systemic Risk in Clearing Houses: Evidence from the European Repo Market,” April 2015.
- CDS Default Management Working Group. 2011. “Principles and Best Practices for Managing a Defaulting Clearing Member’s Remaining Portfolio and Shortfall in Available Funds,” January.
- The Clearinghouse. 2012. “Central Counterparties: Recommendations to Promote Financial Stability and Resilience,” December, <http://www.theclearinghouse.org/index.html?f=074643>
- Committee on Payment and Settlement Systems, Board of the International Organization of Securities Commissions. 2012a. “Principles For Financial Market Infrastructure,” Bank for International Settlements, April, <http://www.bis.org/cpmi/publ/d101a.pdf>.
- Committee on Payment and Settlement Systems, Board of the International Organization of Securities Commissions. 2012b. “Recovery and Resolution of Financial Market Infrastructures,” consultative report, July, <http://www.bis.org/publ/cpss103.pdf>; comments, <http://www.bis.org/publ/cpss103/comments.htm>.

Selected sources, continued

- Committee on Payment and Settlement Systems, Board of the International Organization of Securities Commissions. 2014. “Recovery of Financial Market Infrastructures,” consultative report, October.
- Duffie, Darrell. 2014. “Financial Market Infrastructure: Too Important to Fail,” Darrell Duffie, in *The U.S. Financial System – Five Years After the Crisis*, edited by Martin Bailey and John Taylor, Hoover Institution and Brookings Institute, 2014. <http://darrellduffie.com/uploads/policy/DuffieTooImportantToFail2014.pdf>
- Duffie, Darrell. 2014. “Resolution of Failing Central Counterparties,” Working Paper, Graduate School of Business, Stanford University, December, 2014
- [Duffie, Darrell. 2014. “Systemic Risk Exposures: A 10-by-10-by-10 Approach,” in *Systemic Risk and Macro Modeling*, Markus K. Brunnermeier and Arvind Krishnamurthy, editors, University of Chicago Press.](#)
- Elliott, David. 2013. “Central Counterparty Loss-Allocation Rules.” Bank of England, Financial Stability Paper 20, April, http://www.bankofengland.co.uk/research/Documents/fspapers/fs_paper20.pdf

Selected sources, continued

- European Commission. 2012. “Consultation on a Possible Recovery and Resolution Framework for Financial Institutions other Than Banks,” Directorate General, Internal Markets and Services.
- European Securities and Markets Authority. 2012. “Draft Technical Standards under the Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC Derivatives, CCPs and Trade Repositories, Final Report,” September, http://www.esma.europa.eu/system/files/2012-600_0.pdf
- European Union. 2012. “Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC Derivatives, Central Counterparties and Trade Repositories,” Official Journal of the European Union, June 12, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:201:0001:0059:EN:PDF>
- European Union. 2014. “Directive 2014/59/EU of The European Parliament and of the Council of 15 May 2014, Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms,” Official Journal of the European Union, June 12, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.173.01.0190.01.ENG

Selected sources, continued

- Financial Stability Board. 2014. “Key Attributes of Effective Resolution Regimes for Financial Institutions,” Basel, October 15.
- H.M. Treasury. 2014. “Secondary Legislation for Non-Bank Resolution Regimes,” consultation outcome, June 9.
[https://www.gov.uk/government/consultations/secondary-legislation-for-non-bank-resolution-regimes/secondary-legislation-for-non-bank-resolution-regimes.](https://www.gov.uk/government/consultations/secondary-legislation-for-non-bank-resolution-regimes/secondary-legislation-for-non-bank-resolution-regimes)
- ISDA. 2013. “CCP Loss Allocation at the End of the Waterfall,” August.
- ISDA. 2014. “Resolution Stay Protocol,” November 4,
<http://assets.isda.org/media/f253b540-25/958e4aed.pdf/>

Selected Sources, continued

- “Application of the Key Attributes of Effective Resolution Regimes to Non-Bank Financial Institutions,” Consultative Document, Financial Stability Board, August 2013.
- Committee on Payment and Settlement Systems, Board of the International Organization of Securities Commissions, “Recovery of Financial Market Infrastructures,” Consultative Report, August, 2013.
- ISDA, David “CCP Loss Allocation at the End of the Waterfall,” August, 2013.
- Consultation on a possible recovery and resolution framework for financial institutions other than banks, EU Consultation Document, October 2012.
- DIRECTIVE 2014/59/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014, establishing a framework for the recovery and resolution of credit institutions and investment firms, Official Journal of the European Union, June 12, 2014.

Selected sources, continued

- Jackson, Thomas H. 2014. “Building on Bankruptcy: A Revised Chapter 14 Proposal for the Recapitalization, Reorganization, or Liquidation of Large Financial Institutions.”
- J.P. Morgan Chase & Company. 2014. “What is the Resolution Plan for CCPs?” Office of Regulatory Affairs, September.
- Singh, Manmohan. 2014. “Limiting Taxpayer 'Puts': An Example from Central Counterparties.” International Monetary Fund, Working Paper, October.
- McCauley, Robert N., Patrick McGuire, and Vladyslav Sushko, “Global dollar credit: links to US monetary policy and leverage”, BIS Working Papers No 483, Monetary and Economic Department. January 2015. <http://www.bis.org/publ/work483.pdf>
- DTCC (2015) “CCP Resiliency and Resources,” White Paper, June 2015.