



# Crowded Positions, Systemic Risk, and Central Clearing

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April 5, 2017

# Outline

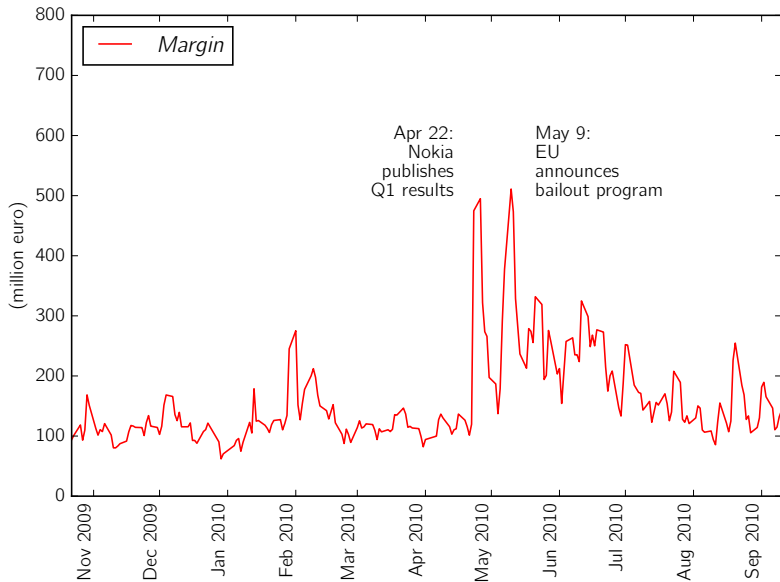
**Measure CCP exposure**

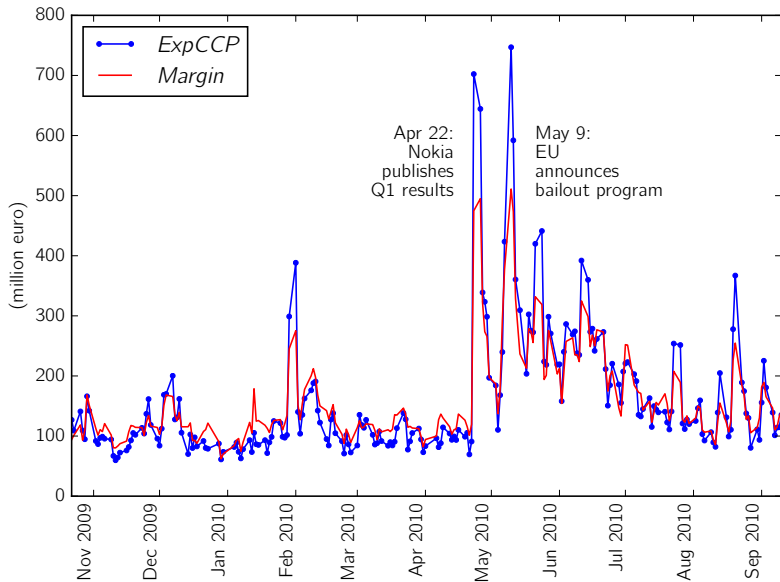
Track CCP exposure in realtime

CCP exposure and collateral

# Measure CCP exposure (Menkveld, 2017)

$$ExpCCP = VaR(\sum_j L_j)$$





## Decompose CCP exposure

Brunnermeier and Oehmke (2013, pp. 62-63) characterize a good allocation rule as follows:

*Ideally, the allocation should be such that (i) **the sum** of all risk contributions equals the total systemic risk and (ii) each risk contribution incentivizes financial institutions to **(marginally)** take on the appropriate amount of systemic risk. However, capturing both total and marginal risk contributions in one measure is a challenging task, because the relationship between the two may be non-linear. In fact, the marginal contribution of one institution may depend on the risks taken by other institutions.*

# Decompose CCP exposure

$$ExpCCP = \sum_{j=1}^J \sigma_j \underbrace{\left( \frac{\partial}{\partial \sigma_j} ExpCCP \right)}_{ExpCCP_j}$$

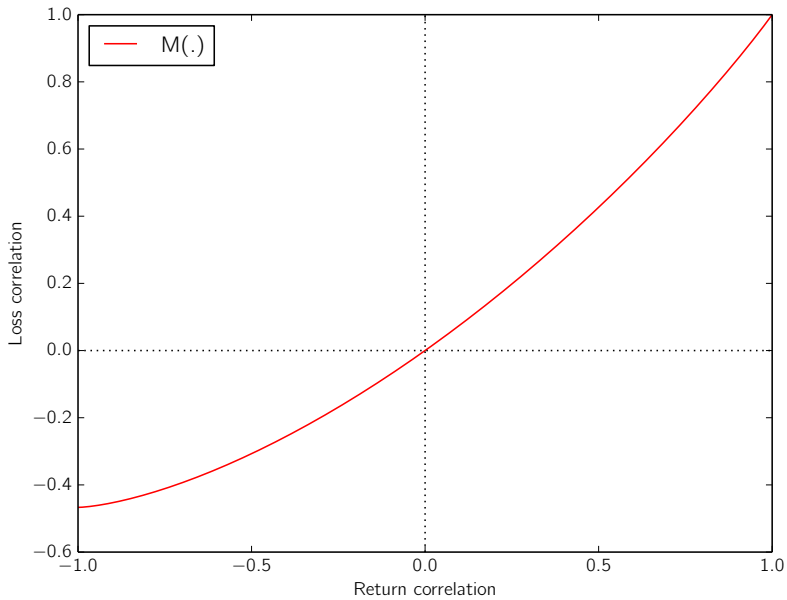


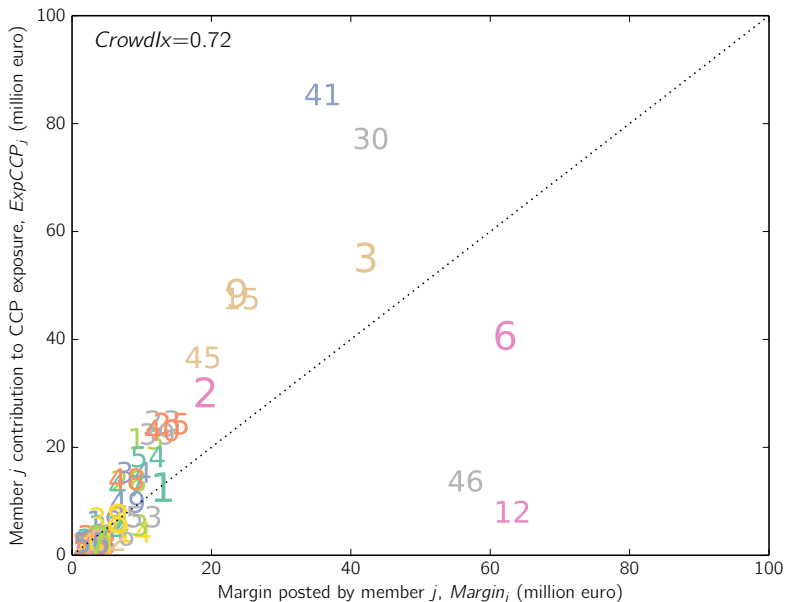
# Decompose CCP exposure

$$\text{ExpCCP}_j = \underbrace{\frac{c_1}{\sigma_A} \sigma_j^2}_{\text{Member-only part}} + \underbrace{\frac{c_2}{\sigma_A} \sum_{j \neq i} \sigma_i \sigma_j M(\rho_{ij})}_{\text{Crowded-risk part}}$$

# Decompose CCP exposure

$$M(\rho) = \frac{[\frac{1}{2}\pi + \arcsin(\rho)]\rho + \sqrt{1-\rho^2} - 1}{\pi - 1}$$





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# Track CCP exposure realtime

(Huang and Menkveld, 2016)

Compute  $\Delta Exp_{CCP}$

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Decompose it into

- *RetVola*
- *RetCorr*
- *PrLevel*

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- *TrPosition*



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Compute  $\Delta ExpCCP$

Decompose it into

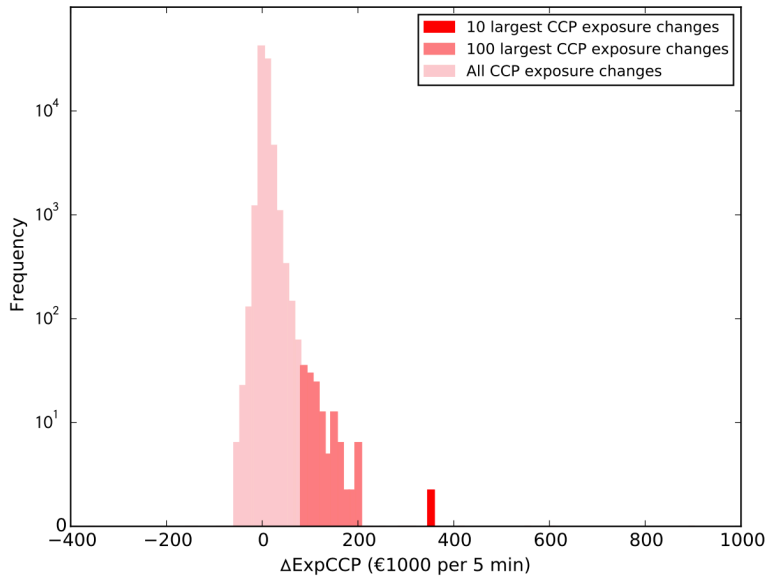
- *RetVola*
- *RetCorr*
- *PrLevel*
- *TrPosition*
  - *TrPositionCC*
  - *TrPositionHC*
  - *TrPositionHH*

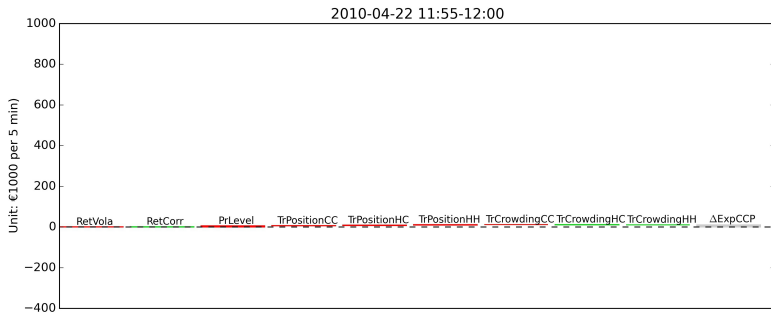
# Track CCP exposure realtime (Huang and Menkveld, 2016)

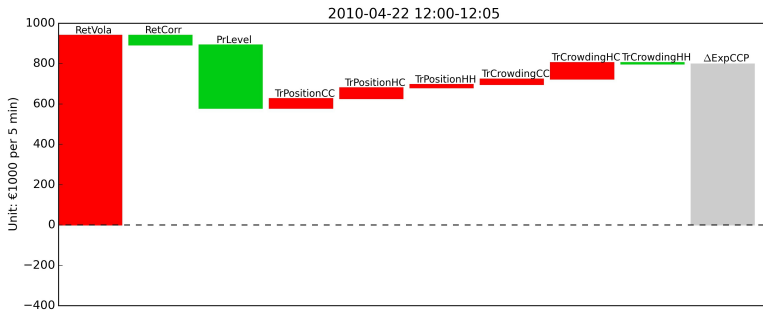
Compute  $\Delta ExpCCP$

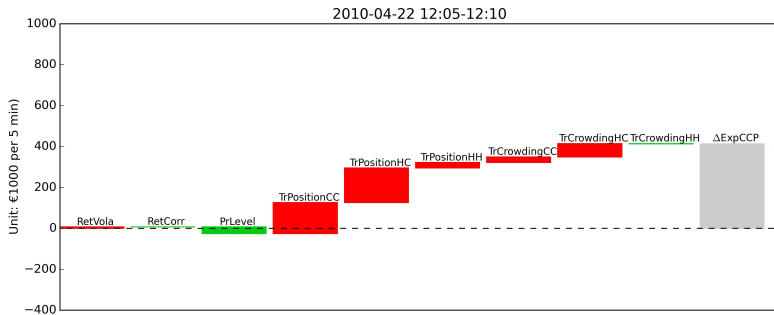
Decompose it into

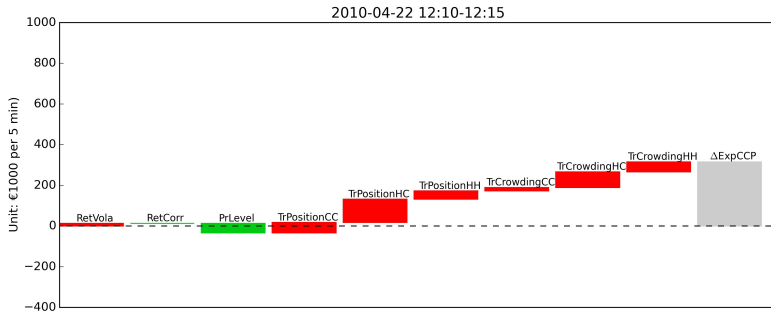
- *RetVola*
- *RetCorr*
- *PrLevel*
- *TrPosition*
  - *TrPositionCC*
  - *TrPositionHC*
  - *TrPositionHH*
- *TrCrowding*
  - *TrCrowdingCC*
  - *TrCrowdingHC*
  - *TrCrowdingHH*

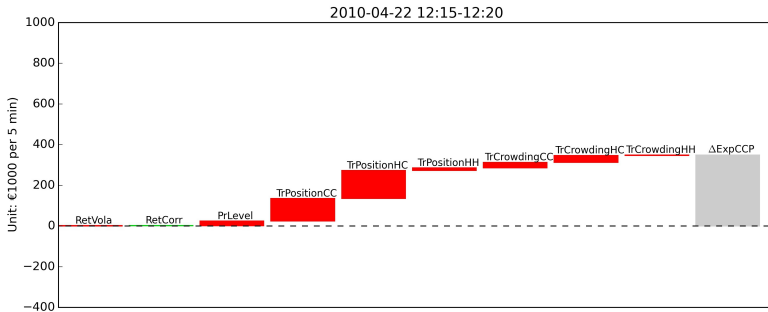














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Track CCP exposure in realtime

**CCP exposure and collateral**

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(Menkveld, 2016)

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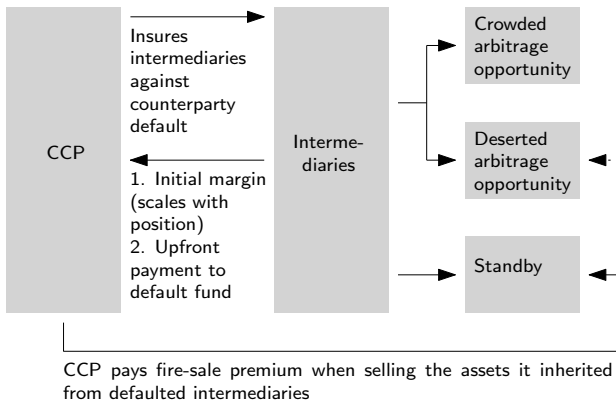
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2. Crowding concentrates capital (inadvertently), thus costly in terms of foregone opportunities



# CCP exposure and collateral



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- Brunnermeier, Markus K. and Martin Oehmke. 2013. “Bubbles, Financial Crises, and Systemic Risk.” In *Handbook of the Economics of Finance, Volume 2, Part B*, edited by George M. Constantinides, Milton Harris, and Rene M. Stulz. Amsterdam: Elsevier.
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- . 2017. “Crowded Positions: An Overlooked Systemic Risk for Central Clearing Counterparties.” *Review of Asset Pricing Studies (forthcoming)* .