Cash Calls and the Stability of Cleared Derivatives Markets: Implications for CCP Recovery and Resolution

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Overview

- Cash calls are a critical component of the recovery plan of a clearinghouse.
- Little is known about their effectiveness – clearinghouse distress is rare.
- I build a model of strategic cash call defaults motivated by a 2013 event at KRX CCP.
- I study how the likelihood and the reliability of a cash call interact with each other and with the optimal contract size in a stylized CCP.

Motivation: the default at KRX CCP

- The 2013 default of HanMag Capital caused losses $>$ \$45 million at KRX CCP (Korea Exchange)
- To replenish the default fund, KRX deployed a cash call to participants.
- Member banks did not initially honor the call.
  - Default fund replenished only at the end of March 2014.
- Prolonged recovery in the absence of market stress.
  - What about during crisis?

Literature

- Conceptual considerations for recovery and resolution
  - Duffie (2014a), (2014b); Singh (2015);
- Literature on clearinghouses and how they fit in the post-2008 financial landscape:
  - Biais et al. (2016); Santos and Scheinkman (2001); Koeppl (2013); Koeppl and Monnet (2012).
- Literature on CCP risk management:
  - Menkveld (2014); Huang and Menkveld (2016); Eliott (2013); Nahai-Williamson,Ota, Vital and Wetherilt (2013); Heath, Gerard and Manning (2014); Haene and Sturm (2009).
- Literature on the financial crisis (broadly interpreted)
  - Brunermeier and Pedersen (2009);
- Regulation:
  - CPMI-IOSCO (2012), (2014);

Approach

I investigate **two principal channels** of reaction to the potential future exposure created by a cash call:

- The **optimal contract size channel**: The participant changes the contract size traded to reduce exposure to the cash call.
- The **strategic default risk channel**: The participant increases its default risk on the cash call.

I deliberately consider only *strategic* cash call defaults:

- Definition. A default is *strategic* if the marginal utility benefit of default is bigger than the marginal utility cost of honoring the defaulted obligation.
- This amplifies the model's predictions for times of financial stress.

Results

Important findings for CCP recovery and resolution:

(1) The strategic default risk channel dominates;

(2) The optimal contract size is unaffected;

(3) The likelihood of strategic default increases with the likelihood of a cash call;

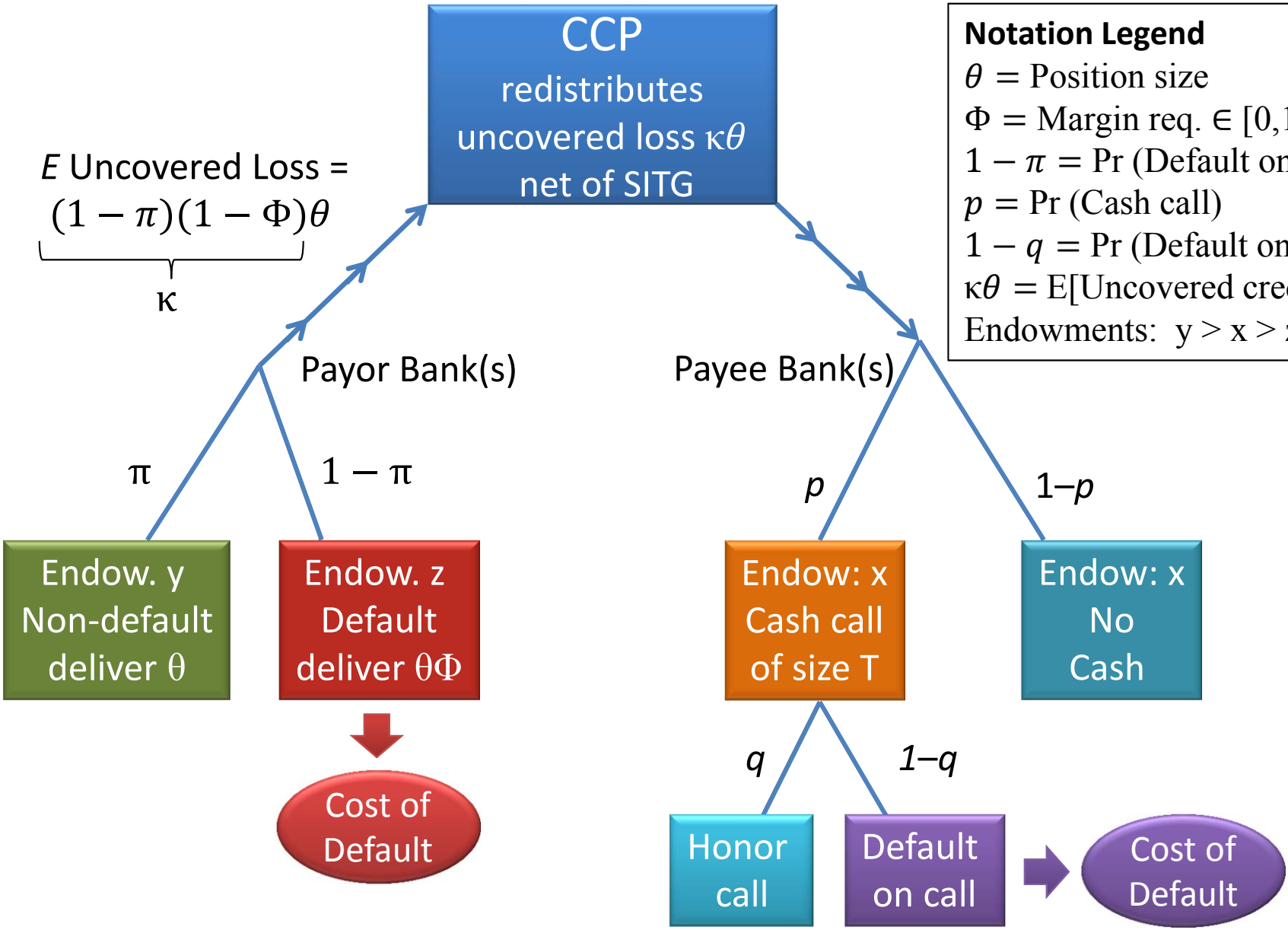
(4) There is a "hard stop" to the expected amount that can be collected with cash calls;

(5) It may be optimal to resolve a CCP before all recovery options are used. Appropriate resolution powers, backed by the force of law, are needed.

Additional points:

- The paper also provides a natural operational boundary between recovery and resolution.
- All five results are consistent with the KRX experience.

Model: Graphical Description



Notation Legend

θ = Position size

Φ = Margin req. $\in [0,1]$

$1-\pi$ = Pr (Default on trade)

p = Pr (Cash call)

$1-q$ = Pr (Default on call)

$\kappa\theta$ = E[Uncovered credit loss]

Endowments: y > x > z.

Default is costly

- Since a credit default is a valid insolvency signal, defaulting on a larger trade is more damaging.
- The cost of default on a trade is $\lambda(1-\Phi)\theta$, proportional to contract size θ adjusted for collateral. (Diamond, 1984).
- By contrast, strategic cash call defaults are not a good insolvency signal.
  - Strategic default on a large call no more indicative of insolvency than a default on a small call (still have the money).
- The cash call default cost is λ_1 (invariant with respect to the size of the defaulted contract θ).

Model: Mathematical Description

Since the two groups of banks are symmetric, I solve the optimization of Bank 1:

$$U = \frac{1}{2}\Big[(1-p)\overbrace{u(x+\theta)}^{\text{No call}} + pq\overbrace{u(x+\theta-T)}^{\text{Honor call of T}} + p(1-q)\overbrace{[u(x+\theta)-\lambda_1]}^{\text{Not honor call}}\Big] +$$
$$+ \frac{\pi}{2}\underbrace{u(y-\theta)}_{\text{Deliver}} + \frac{1-\pi}{2}\Big[\underbrace{u(z-\theta\Phi)-\lambda(1-\Phi)\theta}_{\text{Default on trade}}\Big],$$

subject to

- A collateral constraint: $z \geq \theta\Phi$
  - CCP keeps the collateral $\theta\Phi$ even in the event of default.
- A budget constraint:

$$pqT = f(\theta, s),$$

  where f increases in the position θ, decreases in skin in the game s.
  - Subsumes the zero-profit condition $pqT = k\theta - s$ as a partial case.

Results

Definition

Equilibrium is a pair (θ^*, q^*) *consisting of a contract size* θ^* *and a cash call collection rate* q^* *chosen so that*

$$(\theta^*, q^*) = argmax_{(\theta,q)} \{U(\theta, q)\} \quad s.t.\ \theta\Phi \leq z \text{ and } pqT = f(\theta, s).$$

Proposition

(a) *In equilibrium, any increase in the cash call probability* p *is fully offset by a drop in the collection rate* q^**, so that the point elasticity is* $\epsilon_{q^*,p} = -1$.

(b) *The optimal contract size* θ^* *is insensitive with respect to the cash call probability* p*, so that the point elasticity is* $\epsilon_{\theta^*,p} = 0$.

Interpretation

Corollary 1. The probability pq^* that a cash call is assigned and honored remains constant, regardless of exogenous changes in the cash call likelihood p.

Corollary 2. The strategic default risk channel dominates in the banks' reaction to anticipated cash calls.

Corollary 3. Cash calls do not distort the size of the optimal contract ex ante.

Corollary 4. There is an upper limit $pq^* T(pq^*)$ of expected resources collectable by cash calls, which is not necessarily proportional to the size of the underlying credit loss.

Implications

- The PFMI requirement on full allocation of losses does not distort the optimal contract size.
- The inability to collect funds past a given expected amount $pq^* T(p, q^*)$ reveals a *contingent-resource constraint*.
- All else equal, CCPs clearing larger contracts may be at a higher risk in stabilizing with cash calls.
- Underscores the importance of comprehensive recovery plans that do not rely solely on cash calls.

Implications

- Resolution should be the preferred course of action when the contingent-resource constraint is about to be reached.
- CCP resolution authorities need adequate powers to initiate resolution even before it has become clear that the recovery phase has failed.
- The contingent-resource constraint can be used as a natural operational boundary between recovery and resolution
  - May help define criteria for entry into resolution.

Thank you!