Cocos, Contagion and Systemic Risk

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What We Offer

- Conversion of cocos with a regulatory trigger **may increase the probability of bank runs** as it is informative about quality of returns
- A bank run triggered by a coco in one bank **may be contagious** because of asset correlation across banks
- **Properly-designed convert-to-equity cocos** may prevent moral hazard but principal writedown cocos never do

A Brief Introduction to Cocos

- Cocos are bank-issued debt that convert to equity or are written off upon the occurence of a trigger event
- Trigger events are either based on breaching a prespecified capital adequacy ratio or upon regulatory discretion
- Two major types: convert-to-equity and principal writedowns

Setup and Timeline

$t = 0$

- $\bar{n}$ depositors, $\bar{e} - \bar{n}$ coco holders and $1 - \bar{e}$ equity holders invest own endowment in bank, so that bank has a total of $\bar{n} + (\bar{e} - \bar{n}) + (1 - \bar{e}) = 1$ assct unit
- Of the depositors, $\lambda\bar{n}$ early consumers, $(1 - \lambda)\bar{n}$ late consumers
- Bank invests in asset with uncertain return
- $\tilde{R} = \begin{cases} R > 1 & \textbf{wp} \quad p(\theta) \\ R_L = R - \Delta & \textbf{wp} \quad 0 \\ 0 & \textbf{wp} \quad 1 - p(\theta) \end{cases}$
- θ is true state of the economy, $p(\cdot)$ increasing in θ
- Agents get varying signals about θ: $\theta_i \sim U[\theta - \varepsilon, \theta + \varepsilon]$ (agents know ε but not true θ)

$t = 1$

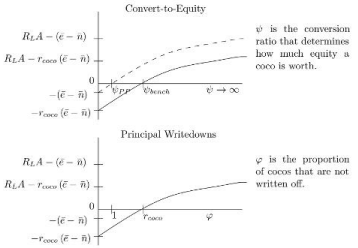
- Regulator discovers whether R or R_L will materialize and decides to convert cocos (or not)
- Early consumers are promised $r_1 > 1$ and withdraw accordingly
- Late consumers are promised $r_D = \frac{1-\lambda r_1}{1-\lambda} R$ but may or may not obtain it.

$t = 2$

If bank survives up to this point, $\tilde{R}$ materializes and all other agents get paid according to seniority.

Wealth Transfers

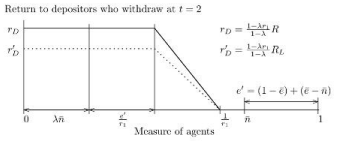
Benchmark: low returns but no conversion. Coco design parameters determine whether wealth transfers occur.



- $\psi < \psi_{bench}$ creates wealth transfers but $\psi > \psi_{bench}$ is sufficiently dilutive.
- Any $\varphi < r_{coco}$ creates wealth transfers. But this is all φ!

Mechanism: Global Games ala Goldstein and Pauzner (2005)

- Constraints: sequential service constraint + limited resources of bank + no liquidation costs + uncertain returns + no deposit insurance
- Promised payments only work if $t = 1$ depositors are sufficiently few: only up to $n = \lambda\bar{n} + \frac{e'}{r_1}$ runners can be paid r_1 at $t = 1$:



- For late consumers to wait, expected utility from waiting $\int_{n=\lambda\bar{n}+\frac{e'}{r_1}}^{\frac{1}{r_1}} \left[p(\theta) u\left(\frac{1-n r_1}{1-(\lambda\bar{n}+\frac{e'}{r_1}) r_1} r_D \right) \right] dn$ should be greater than expected utility from running $\int_{n=\lambda\bar{n}+\frac{e'}{r_1}}^{\frac{1}{r_1}} u(r_1) dn + \int_{n=\frac{1}{r_1}}^{\bar{n}} \frac{1}{n r_1} u(r_1) dn$.
- There exists a θ^* that equates these two. Because $\theta_i \sim U[\theta - \varepsilon, \theta + \varepsilon]$, θ^* proportion of agents get $\theta_i < \theta^*$, so θ^* can be interpreted as probability of a run.
- **Coco conversion is bad news** because it turns out that $\frac{\partial \theta^*}{\partial R} < 0$. Conversion can only mean that the regulator thinks that R_L will be realized rather than R.
- **Type of coco doesn't matter** for probability of runs as long as depositor seniority is strictly upheld by the coco design. But **trigger level** matters because it contains information about R.
- **Coco-induced bank runs are contagious** because if assets are correlated, $\frac{\partial \theta_1^*}{\partial R_1} = \frac{\partial \theta_2^*}{\partial R_2} \times \frac{\partial R_2}{\partial R_1} < 0$ and is extendable for $n \to \infty$ banks.

Policy Implications

- Regulatory action is informative. As such, forbearance is likely, so original purpose of cocos may be thwarted.
- Contagious runs reduce financial stability
- Principal writedown cocos always lead to wealth transfers to equity holders and so should not be allowed.
- Conversion prices should be regulated so as to be sufficiently dilutive to deter ex ante moral hazard from equity holders.