Discussion of Gertler-Kiyotaki-Prestipino
A Macroeconomic Model with Financial Panics

Lawrence J. Christiano,
in collaboration with Husnu Dalgic and Xiaoming Li

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Background

• This is very important work.

• Foundations for emerging (in part because of the authors) conventional narrative about origins of Great Recession.

• By 2008 there existed a massive Shadow Banking system, outside protective umbrella of Fed.
  – Vulnerable to a run (‘rollover crisis’).
  – Run triggered by a shock (perhaps correction in housing prices) that, absent the Shadow Banking system, could have been contained.
    • Gorton and later Bernanke associated with this narrative.

• Widespread failure to forecast the Great Recession reflected failure to notice the Shadow Banking system.
Two Issues

• A highly stylized three-period model that captures the maturity mismatch problem in the model.

• One issue: The number of possible types of equilibria.
  – In the paper, two types: no-run and annihilation run.
  – In general, would also expect a third type: partial run.

• Second issue: implications for policy?
  – Restrictions on bank leverage.
  – Implementation problem.
Benchmark Three Period Model

- No-run
- Annihilation

Time periods: $t = 0$, $t = 1$, $t = 2$
In period 0, banks issue **one-period** deposits, $d_0$. Limited by amount of banker net worth, $N_0$.

In period 0, banks use $N_0 + d_0$ to purchase **two-period** lived capital.

In period 1, two possible equilibrium outcomes:

(i) No-run. Banks roll over their liabilities.

(ii) Annihilation run. Banks cannot roll over.
Two Equilibrium Outcomes in Period 1

- Style of reasoning going back at least to D-D (1982).
- No-run:
  - Each bank believes all the other banks will issue enough new debt, $D_1 > 0$, so that they do not have to fire sale assets to pay off $d_0$.
  - With healthy net worth, $N_1$, bankers best respond with $d_1 = D_1$.
- Annihilation run:
  - Each bank believes all the other banks will set $D_1 = 0$ so that there will be a fire sale collapse in asset values.
  - With $N_1 = 0$, bankers best respond with $d_1 = D_1 = 0$.
- Which outcome occurs in period 1 is selected by a sunspot.
  - With probability $P$, annihilation run occurs.
  - GKP/GK assume $P$ is increasing in the losses creditors would experience if there were a run.
Best Response Analysis Reveals Three Possible Equilibrium Outcomes in Period 1
One interpretation of GKP/GK: aggregate best response function discontinuous at $D_1 = 0$. 
Aggregate Best Response Function, GKP/GK Model

Best response function in GK model if assume a very small fraction of newborns enter at low levels of $D_1$. This seems like a natural implication of the argument GK give for why newborns stay out of the market altogether during an annihilation run.
• Leverage restriction forces banks to internalize fact that higher aggregate leverage raises $P$.

• Let $\tilde{\phi}_0$ denote leverage in the baseline equilibrium ($= 5.95$).
  – Impose a restriction, $\phi_0 \leq \tilde{\phi}_0 \tau$.

• The best equilibrium is one associated with $\tau = 0.98$.
  – Want banker to internalize externalities, but don’t want to shut them down.
Finding Equilibria in Which Leverage Restriction is Binding

- Let
  \[ k^h_0 \in [0, 1] \sim t = 0 \] capital chosen by non-banks (households).
- Given each \( k^h_0 \in [0, 1] \), can solve for all other model variables using equilibrium conditions.
- Can evaluate period 0 household intertemporal Euler equation:
  \[ f \left( k^h_0 \right) = u'(c_0) \text{-usual period 1 stuff}. \]
- Easy to verify numerically that the mapping from \( k^h_0 \) to all other equilibrium variables is single-valued.
Three ‘candidate equilibria’. But, only the two with $k^h_0 > 0$ satisfy bank participation constraints. The low $k^h_0$ equilibrium is welfare superior to baseline and the high $k^h_0$ equilibrium is worse than baseline.
• Macro prudential policy can improve welfare in this environment.

• However, there is a non-trivial implementation problem:
  – Want policy to uniquely implement a good equilibrium.
  – Need to design policy to ensure that leverage restrictions don’t actually make things worse.
Conclusion

• Two findings that (I think!) will be robust.

• Macro prudential policy requires solving a non-trivial implementation problem.

• The analysis suggests that under reasonable assumptions there are at least three types of equilibria, not just two.
  – What kinds of runs we expect will have an impact on policy design.

• This work is enormously stimulating.
  – It cries out for a non-rational expectations approach.
  – Crises are observed only a few times a century, yet the equilibrium is heavily influenced by people’s views about what would happen if there were a crisis.
  – Related: how do we use evidence to do inference about the crisis probability function, \( P \)?
In Any Case, Whatever You Do, GKP Must Be Your First Stop