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

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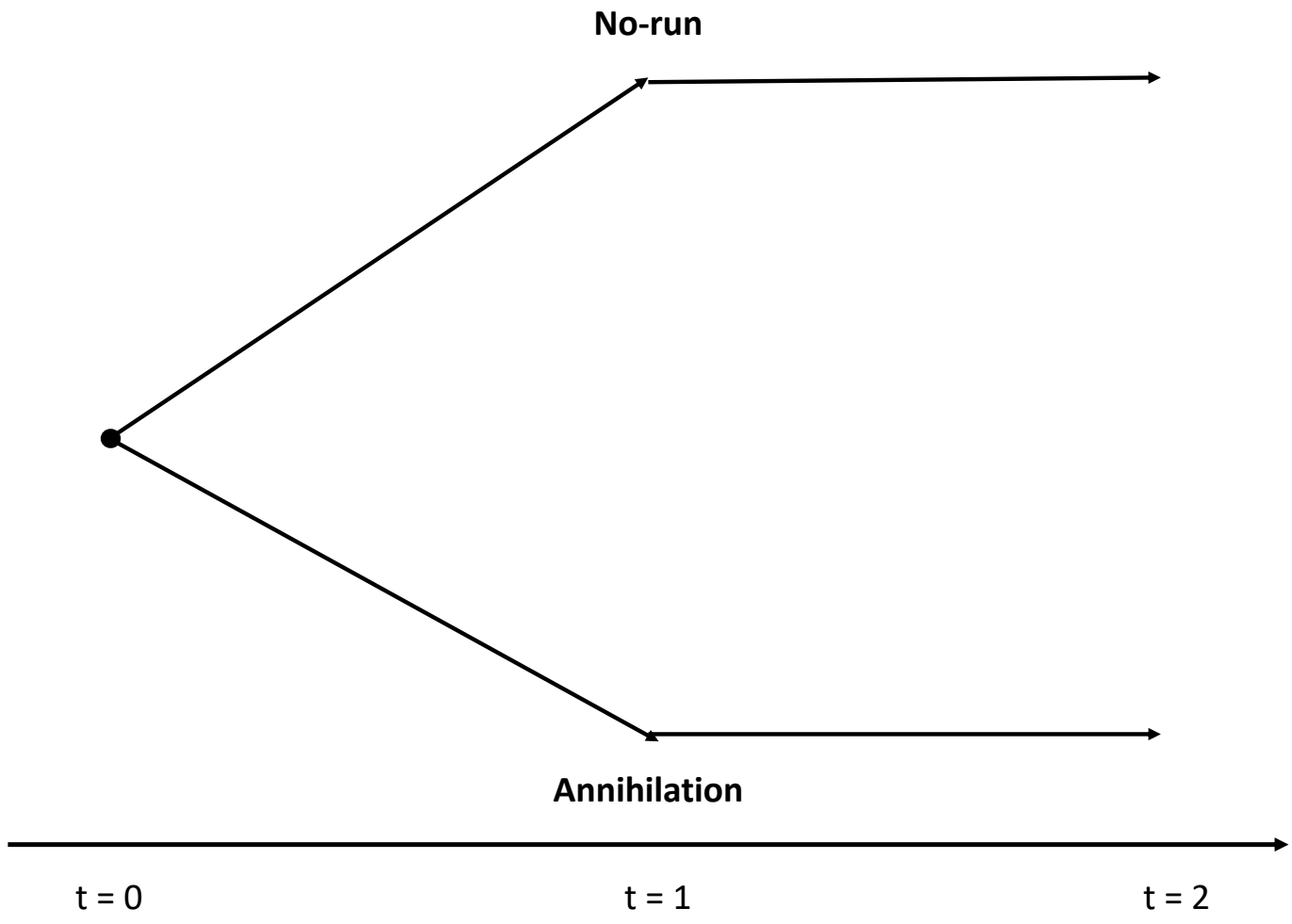
Background

- 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



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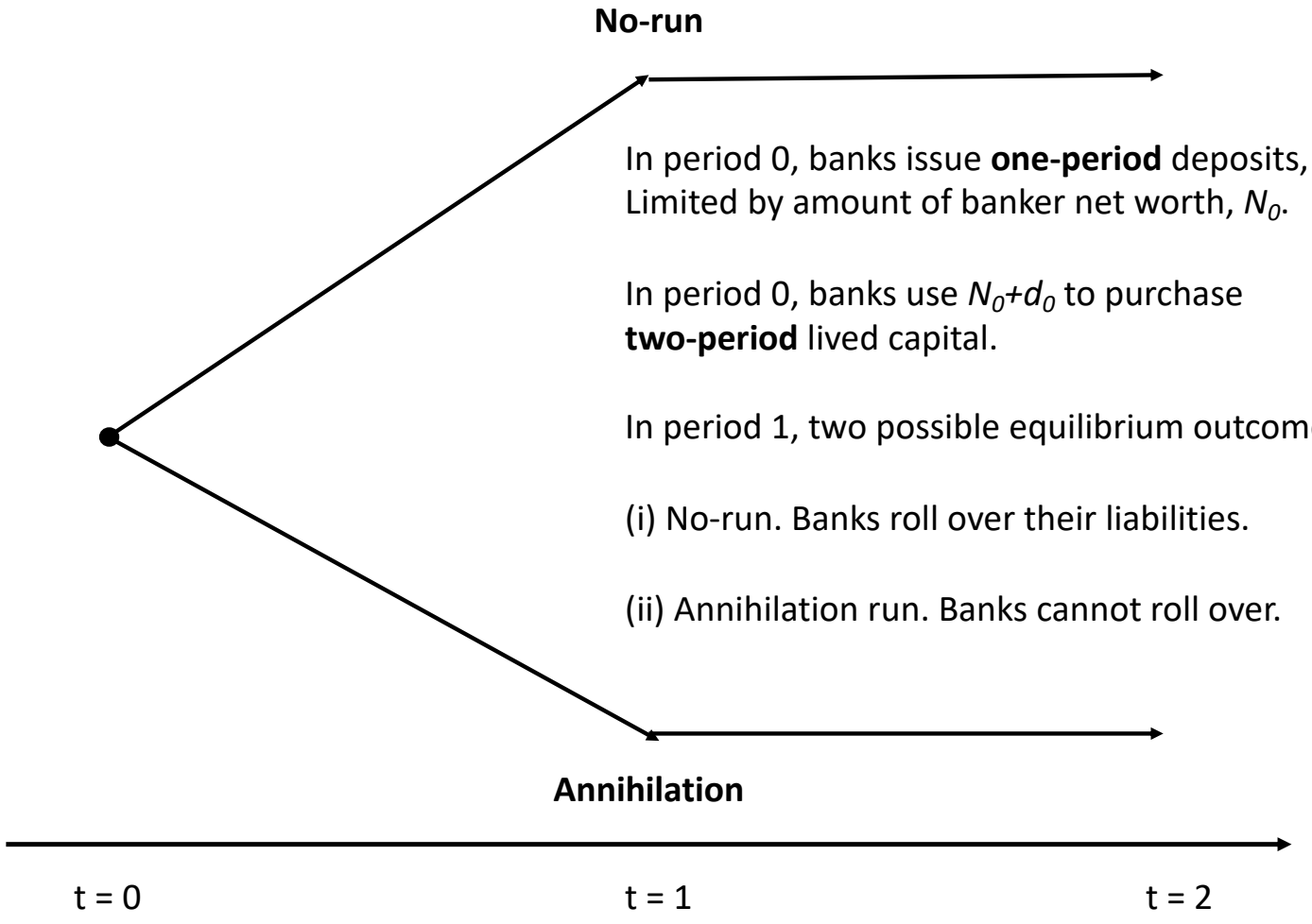


In period 0, banks issue **one-period** deposits, d_0. Limited by amount of banker net worth, N_0.

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

In period 1, two possible equilibrium outcomes:

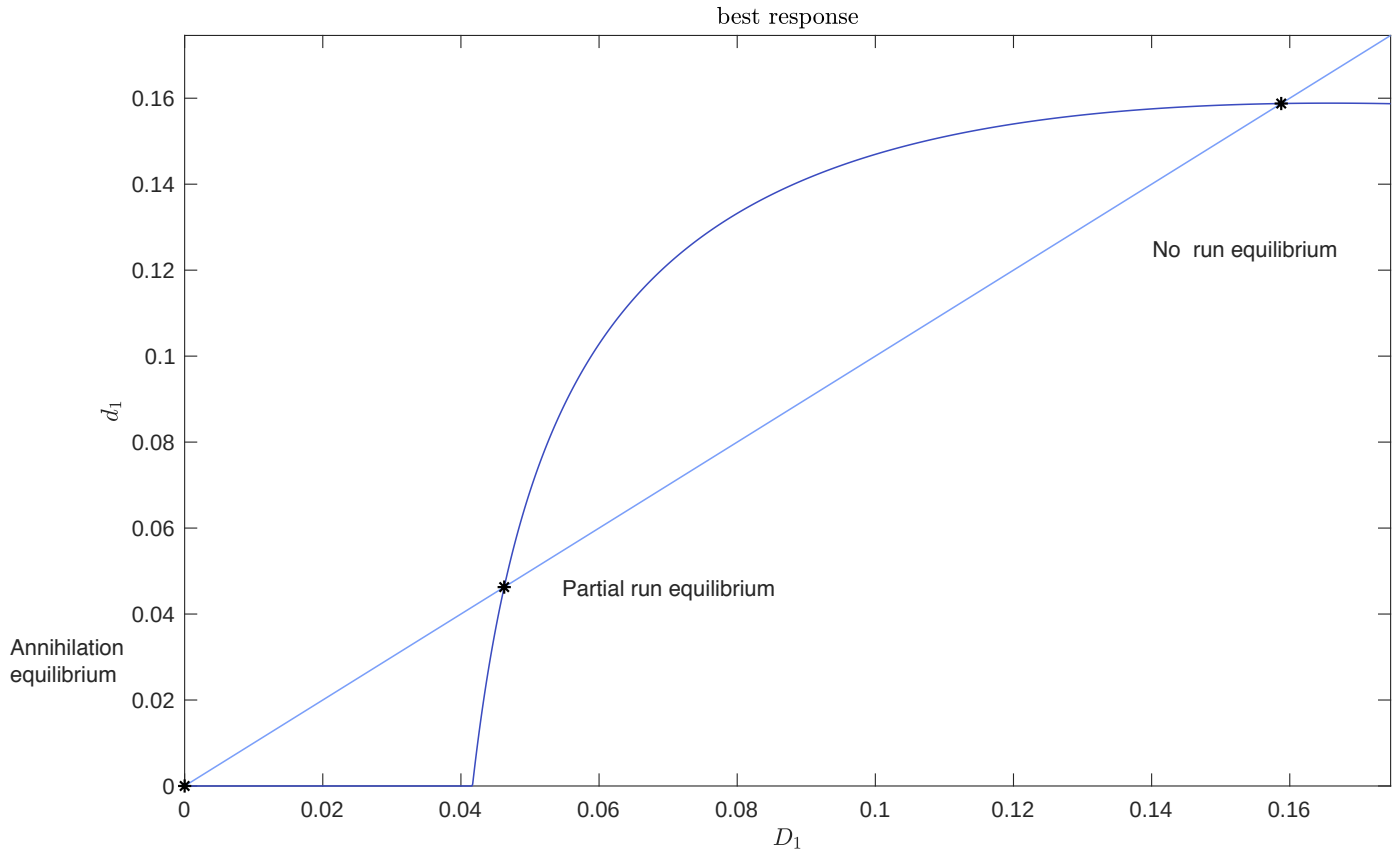
(i) No-run. Banks roll over their liabilities.

(ii) Annihilation run. Banks cannot roll over.

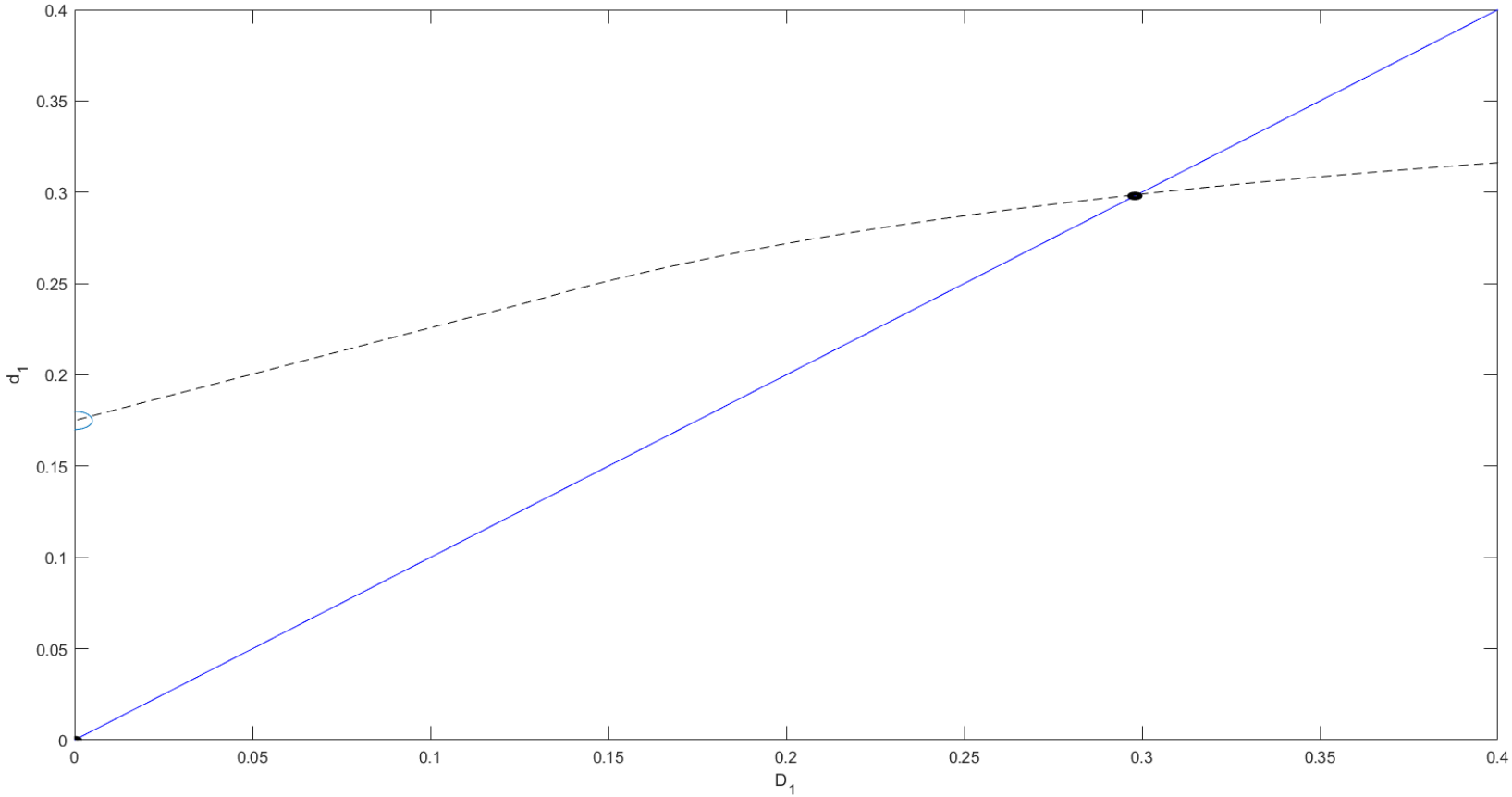
Two Equilibrium Outcomes in Period 1

- 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

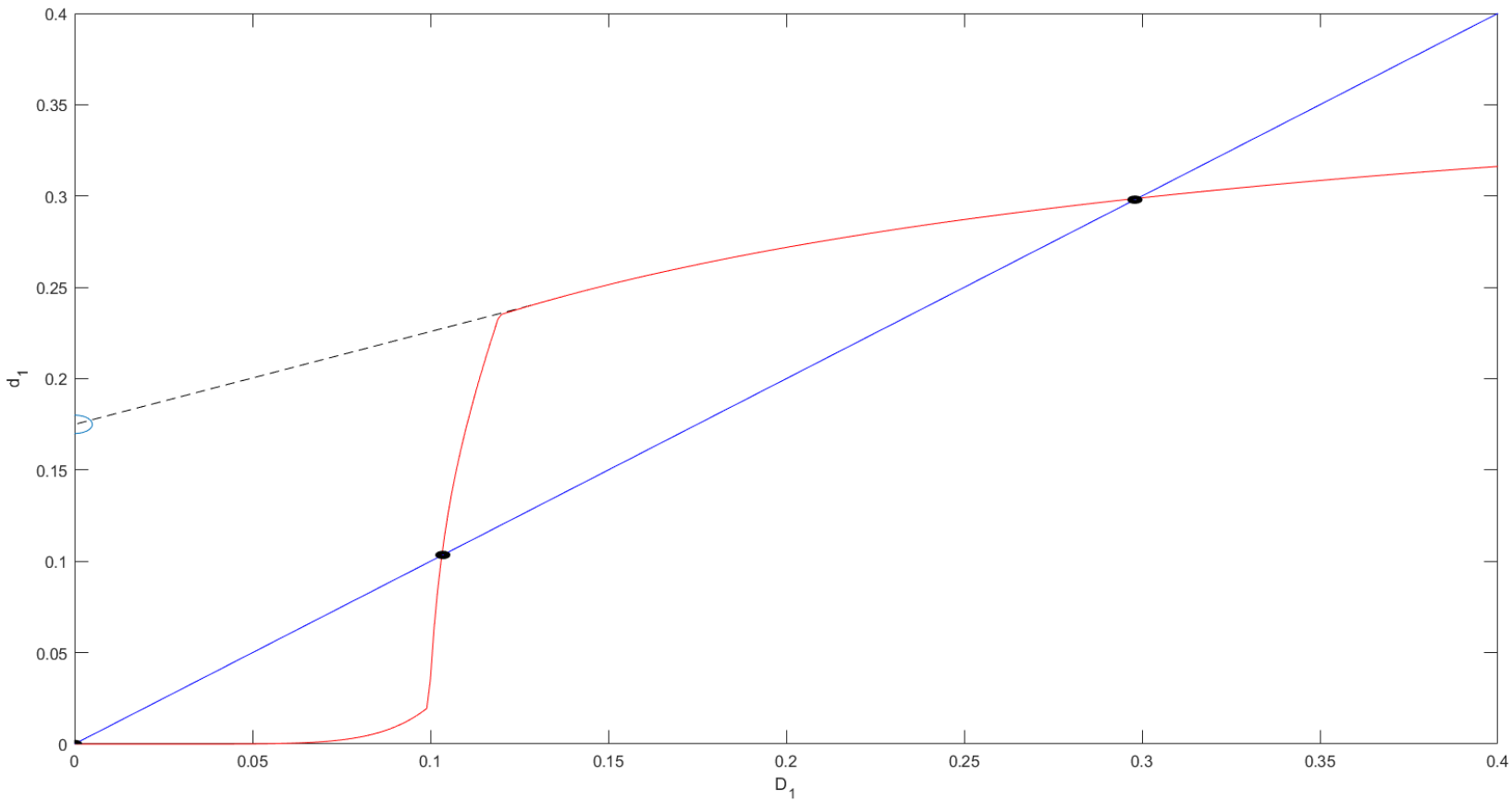


Aggregate Best Response Function, GKP/GK Model



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.

Macro Prudential Analysis

- 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

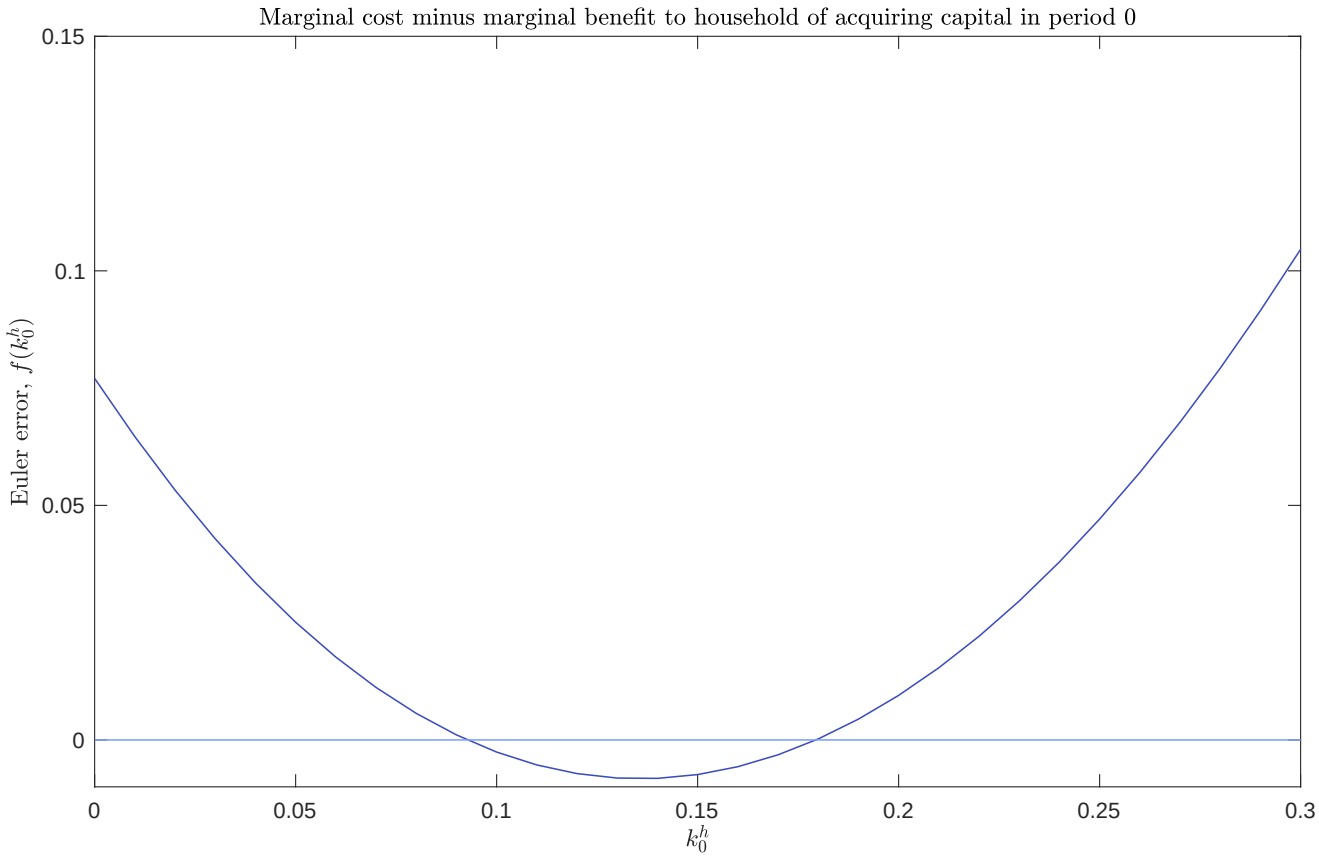
  $k_0^h \in [0,1] \sim t = 0$ capital chosen by non-banks (households).

- Given each $k_0^h \in [0,1]$, can solve for all other model variables using equilibrium conditions.
- Can evaluate period 0 household intertemporal Euler equation:

$$f\left(k_0^h\right) = \text{u'}(c_0)\text{-usual period 1 stuff.}$$

- Easy to verify numerically that the mapping from k_0^h to all other equilibrium variables is single-valued.

Euler Equation Error, $f\left(k_0^h\right)$



Three 'candidate equilibria'. But, only the two with $k_0^h > 0$ satisfy bank participation constraints.

The low k_0^h equilibrium is welfare superior to baseline and the high k_0^h equilibrium is worse than baseline.

Message of Macro Prudential Analysis

- 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