Collective Risk Management in a Flight to Quality Episode
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Contribution

- To build a model where Knightian uncertainty generates a "Flight to Quality" and a role for central bank intervention
  - Novel mechanism that looks like flight to quality episodes
  - A central bank without informational advantage can help

Model: No Knightian uncertainty

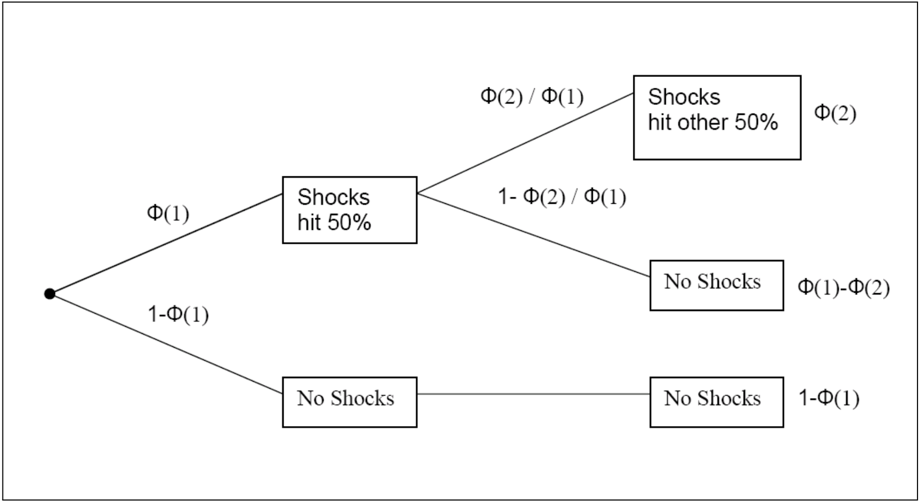
Continuum of ex-ante identical agents, 3 periods
Endowed with Z, storable at no cost
Complete financial markets,

Maximize

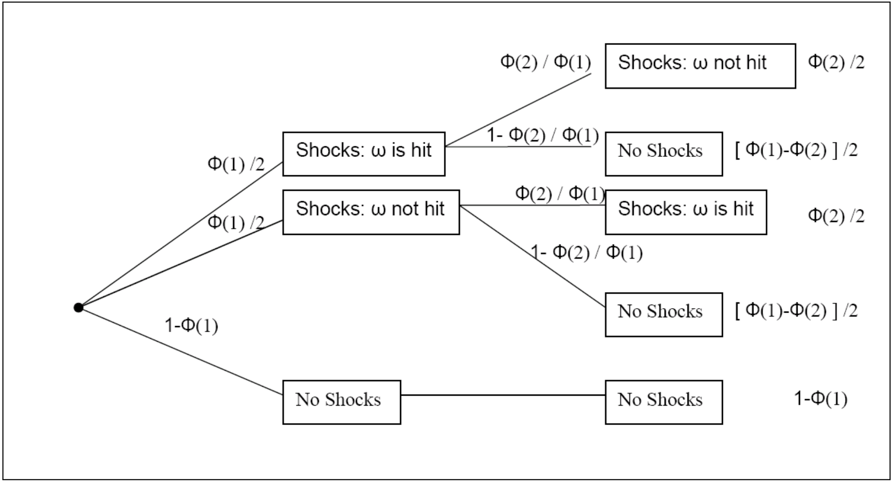
$$E_0 \left[\alpha_1 u\left(c_1\right) + \alpha_2 u\left(c_2\right) + \beta c_T\right]$$

with $\alpha_j \in (0, 1)$.

Event Tree: Aggregate



Event Tree: Individual Agent



Social planner's problem

$$\frac{\phi(1)}{2}u\left(c_1\right)+\frac{\phi(2)}{2}u\left(c_2\right)+$$

$$\beta\left\{\frac{\phi(1)-\phi(2)}{2}\left(c_T^{1,1}+c_T^{1,no}\right)+\frac{\phi(2)}{2}\left(c_T^{2,1}+c_T^{2,2}\right)+\left(1-\phi\left(1\right)\right)c_T^{0,no}\right\}$$

subject to

$$\begin{aligned} c_T^{0,no} &= Z \\ \frac{1}{2}\left(c_1+c_T^{1,1}+c_T^{1,no}\right) &= Z \\ \frac{1}{2}\left(c_1+c_2+c_T^{2,1}+c_T^{2,2}\right) &= Z \end{aligned}$$

and non-negativity constraints

- $c_T^{0,no} = Z$
- Interesting case is when $u'(Z) > \beta \Longrightarrow c_T^{2,1} = c_T^{2,2} = 0$
- $\frac{1}{2}\left(c_T^{1,1} + c_T^{1,no}\right) = Z - \frac{1}{2}c_1$

Reduced social planner's problem

$$\frac{\phi(1)}{2} u(c_1) + \frac{\phi(2)}{2} u(c_2) + \beta \left\{ (\phi(1) - \phi(2)) \left(Z - \frac{1}{2} c_1 \right) \right\}$$

subject to

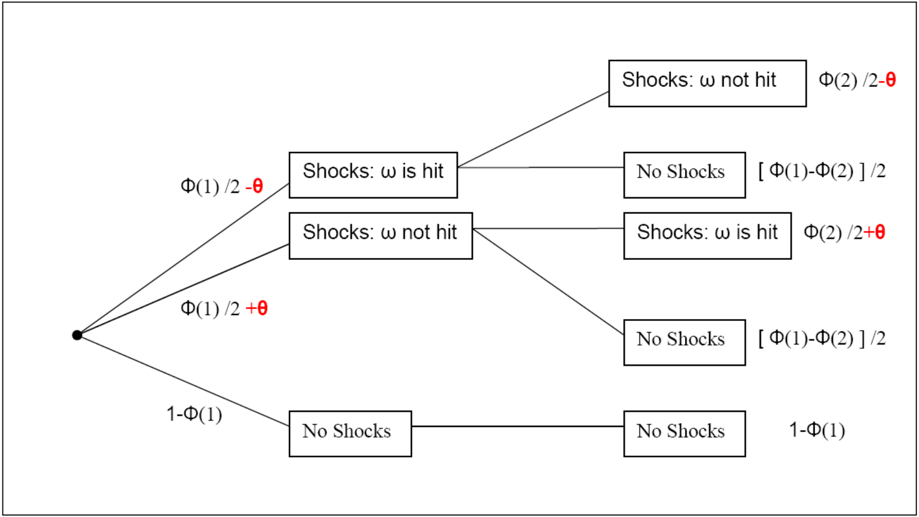
$$\frac{1}{2}(c_1 + c_2) = Z$$

first-order conditions imply

$$\frac{u'(c_2) - \beta}{u'(c_1) - \beta} = \frac{\phi(1)}{\phi(2)} ... > 1 \Longrightarrow c_1 > c_2$$

$$\Longrightarrow c_1 > Z > c_2$$

Event tree with Knightian uncertainty



Planner's problem with Knightian uncertainty

$$\max_{c_1, c_2} \min_{\theta} \left\{ \begin{array}{c} \left[\frac{\phi(1)}{2} - \theta\right] u(c_1) + \left[\frac{\phi(2)}{2} + \theta\right] u(c_2) \\ +\beta \left\{ (\phi(1) - \phi(2)) \left(Z - \frac{1}{2} c_1\right) \right\} \end{array} \right\}$$

subject to

$$\frac{1}{2}(c_1 + c_2) = Z$$

- With $c_1 > c_2$, θ will be at the highest possible value, $\theta \in [-K, K]$
- Thus

$$c_1^{\text{Knightian}} < c_1^{\text{No Knightian}} \text{ and, } c_2^{\text{Knightian}} > c_2^{\textit{No} \text{ Knightian}}$$

and for large K

$$c_1^{\text{Knightian}} = c_2^{\text{Knightian}} = Z$$

Role for policy intervention

Paper assumes central bank's objective uses different probabilities than agents:

$$V^{CB} = \frac{\phi(1)}{2} u(c_1) + \frac{\phi(2)}{2} u(c_2) + \beta \left\{ (\phi(1) - \phi(2)) \left(Z - \frac{1}{2} c_1 \right) \right\}$$

- Central Bank's Objective = Planner's objective without Knightian uncertainty!
- Reallocation of resources from c_2 to c_1 will improve welfare (defined this way)

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- Uncertainty about individual shocks or aggregate shocks?
- How robust is the main mechanism to changes in the model?

Model: 2 agents, stochastic endowments

Time 0 trade claims, time 1 get endowments and consume
Planner maximizes

$$
\begin{aligned}
V &= \frac{1}{2}\left(\frac{1}{1-\gamma} c_1^{1-\gamma}\right) + \frac{1}{2}\left(\frac{1}{1-\gamma} c_2^{1-\gamma}\right) \\
&\quad + \frac{1}{2}\left(\frac{1}{1-\gamma} c_1^{*1-\gamma}\right) + \frac{1}{2}\left(\frac{1}{1-\gamma} c_2^{*1-\gamma}\right)
\end{aligned}
$$

subject to

$$
\begin{aligned}
c_1 + c_1^* &= y_H + y_L = Y \\
c_2 + c_2^* &= y_L + y_H = Y
\end{aligned}
$$

Allocation: Full risk sharing

$$c_1 = c_1^* = Y/2 \text{ and } c_2 = c_2^* = Y/2$$

Fixed cost for financial contracting

If

$$V\,(\text{autarky}) > V\,(\text{full risk sharing}) - 2F$$

Allocation: no risk sharing (for γ small, F big)

Uncertainty aversion

Assume θ,$\theta^* \in [-K, K]$

$$\left(\tfrac{1}{2}-\theta\right)\left(\frac{1}{1-\gamma}y_H^{1-\gamma}\right)+\left(\tfrac{1}{2}+\theta\right)\left(\frac{1}{1-\gamma}y_L^{1-\gamma}\right)$$
$$+\left(\tfrac{1}{2}+\theta^*\right)\left(\frac{1}{1-\gamma}y_L^{1-\gamma}\right)+\left(\tfrac{1}{2}-\theta^*\right)\left(\frac{1}{1-\gamma}y_H^{1-\gamma}\right)$$

$$\text{vs} \qquad V\,(\text{full risk sharing}) - 2F$$

Allocation: For K big enough can get full risk sharing