Discussion

How I Learned to Stop Worrying and Love Fire Sales

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Summary

- Foundational question in Normative Macro-Finance
  - Efficiency of price fluctuations/investment

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- Main result
  - Constrained planner wants *higher* investment ex-ante $\Rightarrow$ Underinvestment ex-ante in decentralized equilibrium

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- Main result
  - Constrained planner wants *higher* investment ex-ante $\Rightarrow$ Underinvestment ex-ante in decentralized equilibrium
  - Broader message: microfoundations are important

Discussion

1. Canonical model
2. Asymmetric information model
3. General thoughts

Canonical Model: Households and experts

- Lorenzoni 08
- Simplifying assumptions
  1. No financial markets
  2. No uncertainty
  3. Ex-ante transfers
- Easy to relax
  - Caveat: paper can't study financing decisions

Canonical Model: Households and experts

- Planner's problem:

$$W(k) = \underbrace{V(q,k) - k}_{\text{entrepreneurs}} + \underbrace{F\left(k^H\right) - qk^H}_{\text{households}} + \ldots$$

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- Household's continuation value

$$V(q,k) = c_1^E + c_2^E$$

$$c_1^E = q\overbrace{\left(k - k^E\right)}^{s \text{ (sale)}} - zk$$

$$c_2^E = Ak^E$$

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- Lagrangian form

$$V(q,k) = c_1^E + Ak^E - \lambda_1^E\left(c_1^E + zk - q\left(k - k^E\right)\right) + \eta_1 c_1^E$$

$$\left.\frac{dV}{dk}\right|_{planner} = \underbrace{\lambda_1^E}_{=\frac{A}{q}}(q - z) + \lambda_1^E\left(k - k^E\right)\frac{dq}{dk}$$

Planner's problem

- Solution:

$$\left.\frac{dW}{dk}\right|_{planner}^{CE} = \underbrace{\lambda_1^E (q-z) - 1}_{=0} + \underbrace{\left(F'\left(k^H\right) - q\right)\frac{dk^H}{dk}}_{=0} + \lambda_1^E \left(k - k^E\right)\frac{dq}{dk} - \frac{dq}{dk}k^H$$

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- Planner wants to reduce k
- Distributive externality (three terms)
  1. Difference in MRS $\left(\frac{\lambda_1^E}{\lambda_0^E} - \frac{\lambda_1^H}{\lambda_0^H}\right)$
  2. Net trades (buying/selling) $k^H = k - k^E$
  3. Price-sensitivity to state-variable $\frac{dq}{dK} < 0$ *[fire sale]* (big-K, lil-k)

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- Davila and Korinek (2018)
  - Distributive externalities vs Collateral/frictional externalities (prices show up somewhere else, e.g. constraints)
  - How to distinguish them: Distributive externalities are zero-sum in each node/period (set $\lambda_1^E = 1$)

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- Comment: Why this trading protocol/equilibrium?
- Suggestion: Why not concave technology? Not nested models

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- Comment: Why this trading protocol/equilibrium?
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- Two effects of increasing k on the equilibrium, $\frac{dq}{dK} \gtreqless 0$
  - $\uparrow k$ increases the amount sold of *good* assets (better pool) $\Rightarrow$ prices go up
  - $\uparrow k$ increases the amount sold of assets (marginal buyer has less expertise) $\Rightarrow$ prices go down *[fire sale]*

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- Households indirect utility

$$V^H(q,k) = \int V^H(q,k;\theta)\, d\theta,$$

where

$$V^H(q,k;\theta) = \max \underbrace{c_1^H + \frac{s}{s+\lambda(1-\theta)} A\delta}_{c_2^H} - \lambda_1^H \left(c_1^H + q\delta - e_1(\theta)\right) + \eta c_1^H.$$

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- Threshold solution with $\delta(\theta) = \frac{e_1(\theta)}{q}$ if $\theta > \theta^*$
- Note that

$$\frac{dV^H}{dk} = \frac{d\left(\frac{s}{s+\lambda(1-\theta)}\right)}{dk} A \frac{e_1(\theta)}{q} - \lambda_1^H \frac{dq}{dk}\delta$$

Planner's problem

$$\left.\frac{dW}{dk}\right|_{planner}^{CE} = \overbrace{\lambda_1^E\left(k-k^E\right)\frac{dq}{dk}}^{\text{entrepreneurs}} + \overbrace{\lambda\frac{dq}{dk}\int_0^1 \mu\left(i,k\right)di + \lambda q\left(k\right)\frac{d\int_0^1 \mu\left(i,k\right)di}{dk}}^{\text{fake entrepreneurs}}$$

$$+ \overbrace{\int_{\theta^*}^1 \left(\frac{d\left(\frac{s}{s+\lambda(1-\theta)}\right)}{dk}A\delta\left(\theta\right) - \lambda_1^H\frac{dq}{dk}\delta\left(\theta\right)\right)d\theta}^{\text{households}}$$

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$$= \underbrace{\left(\lambda_1^E\left(k-k^E\right) + \lambda\int_0^1 \mu\left(i,k\right)di - \int_{\theta^*}^1 \lambda_1^H\left(\theta\right)\delta\left(\theta\right)d\theta\right)\overbrace{\frac{dq}{dk}}^{\gtrless 0}}_{\text{distributive externality}}$$

$$+ \lambda q\left(k\right)\underbrace{\frac{d\left(\int_0^1 \mu\left(i,k\right)di\right)}{dk}}_{\substack{\text{thick-market}\\ \text{externality }>0}} + \int_{\theta^*}^1 \underbrace{\frac{d\left(\frac{s(k)}{s(k)+\lambda(1-\theta)}\right)}{dk}}_{\substack{\text{thick-market}\\ \text{externality }>0}}A\delta\left(\theta\right)d\theta$$

$$= A - 1 - z > 0$$

- Abstraction is helpful

Derivation Paper

$$\begin{aligned}
\frac{dW(k)}{dk} &= -1 + \frac{d}{dk}\left(\lambda\rho(k) + \int e_1(\theta)\max\left\{1, \frac{s(k)}{s(k)+\lambda(1-\theta)}\frac{A}{q(k)}\right\}d\theta\right) + \frac{dV(k,q(k))}{dk} \\
&= -1 + \frac{d}{dk}\left(\int_0^1 e_1(\theta)\,d\theta - s(k)\,q(k) + As(k)\right) + \frac{dV(k,q(k))}{dk} \\
&= A - 1 - z \qquad (45)
\end{aligned}$$

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- What is special about Walrasian model?
  1. Linear budget constraints
  2. Only payoff relevant interaction through prices
  - Walrasian trading

$$\max u_i(x_i) \text{ s.t. } \quad p(\{\boldsymbol{x}_i\})(x_i - e_i) \leq 0$$

  - Non-Walrasian trading

$$\max u_i(x_i) \text{ s.t. } \quad \underbrace{\mu(\{\boldsymbol{x}_i\})}_{\substack{\text{trading} \\ \text{protocol}}} p(\{\boldsymbol{x}_i\})(x_i - e_i) \leq 0$$

Comments/Thoughts

1. Relation to literature
   - Paper concludes: *"The main lesson from the above analysis is that the normative implications of fire sales are not robust across different possible microfoundations. One should therefore be cautious in extracting conclusive policy implications from the observation that investment booms lead to collapses in asset prices and tightening financial constraints, even if the empirical fact itself could be firmly established.*
   - Does the "canonical" model deliver over-investment?

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   - Does the "canonical" model deliver over-investment?
   - Prior: "Anything goes" even in Walrasian models with financial constraints

Sign of externalities. In the existing literature on pecuniary externalities, it has proven remarkably difficult to provide general results on the direction of inefficiency – except in tightly-defined special cases. The following corollary rationalizes why.

Corollary 1. (Sign of externalities and "anything goes") *The collateral externalities of sector-wide net worth are non-negative under Condition 1. All distributive externalities as well as the collateral externalities of sector-wide capital holdings can naturally take on either sign, so "anything goes."*

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2. Relation to adverse selection literature
   - Prior should be inefficiency: Arnott, Greenwald, Stiglitz 94
   - Also "anything goes"
   - Other results with imperfect information
     - Asriyan 16
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3. Investment in this paper (k) is only good/productive investment (extension with λ endogenous)
   - Reformulate main result: there is too little **good** investment
   - Alternative (better?) policy: prevent fake investments λ (!)
   - If $\lambda \to 0$, model converges to first best
   - **Tension**: if planner can tell λ from k, why not reveal that information?
   - Alternative benchmark (second-best problem):
     - Why not force the planner to treat good and bad investments (k and λ) equally ex-ante?
   - Anti-chicken model?

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4. Entire literature needs model driven empirical work