Igami and Uetake

Mergers, Innovation, and Entry-Exit Dynamics: Consolidation of the Hard Disk Drive Industry, 1996-2016

- Abstract in the title...
- paper incorporates various modeling elements that we have been discussing. Also a good lead-in for discussing trends in concentration
- static merger policy versus dynamic considerations
- paper estimates effects of merger policy on innovation for an interesting application

- discussion in intro—mergers "strategic complements"

- 3 challenges "haunt"...high-tech context
  - small sample
  - nonstationary environment
  - multiple equilibria ("point identification difficult when a single vector of parameters predicts multiple strategies and outcomes")

- Cut the Gordian knot by writing down a model with a tractable model with a unique equilibrium...

Model

- $t \in \{0, 1, 2, ..., T\}$
- Incumbents $i = 1, 2, ..., n$, has productivity $\omega_{it} \in \left\{\omega^1, \omega^2, ...\right\}$,
- $\omega_t = \{\omega_{it}\}_{i=1}^{n}$ state of industry, $\pi_{it}(\omega_t)$ profit
- potential entrant $i = 0$ and state ω^0 exists in every period ,move when its turn, comes in at ω^1
  - costs of each action

$$\kappa^{enter} + \varepsilon_{it}^{enter}$$
$$\kappa^{out} + \varepsilon_{it}^{out}$$

- Incumbent that can move chooses between

$$a \in \left\{\text{exit,innovate, } \{proposemergertoj\}_{j\neq i}, \{innovate + propose\right.$$

sunk cost : $\kappa^a + \varepsilon(a_{it})$

- ε T1EV, with σ scale parameter (also policy functions later!!!)

- Transitions:
  - exits terminal
  - innovate $\omega_{i,t+1} = \omega_{it} + 1$
  - merger involves TIOLI (take-it-or-leave-it), $\omega_{i,t+1} = \max\left\{\omega_{it}, \omega_{jk}\right\} + \Delta_{i,t+1}$, where $\Delta_{i,t+1} \tilde{} Poisson(\lambda)$

- Antitrust policy: mergers to less than 3 firms are blocked

- Timing: arguments why deterministic rules about who gets to move.

- Getting messy, let's use the author's slides....