Discussion:
AI Pricing Behavior under Regulatory Variation

by Jeong Yeol Kim, Jaehyuk Park, and Seungback Shin

Duk Gyoo Kim

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Quick recap

Market environment

- ▶ Two firms, Differentiated products, Price competition
- ▶ Equilibrium(=competitive) price $P^C = 1.47$
  Monopoly(=collusive) price $P^M = 1.92$

What AI agents do

- ▶ AI agent submits p to max the long-run profit, with knowing (1) history (prices, competitor's prices, quantities sold, and profits) of the last 100 periods, and (2) regulation, if any.

Main findings

- ▶ $1.47 = P^C < P^{FD} \approx P^{LD} < P^{PD} < P^{NO} \approx P^M = 1.92$.

  (FD=Fixed Detection, LD=Linear Detection, PD=Periodic Detection, NO=No Detection)

What I like about the paper

- It is natural that firms will use AI in pricing sooner or later.
- The paper addresses the increased risk of tacit collusion by AI algorithms in pricing, a critical concern for antitrust law given that such collusion may not meet traditional 'intent' or 'agreement' requirements.
- It fills a gap in the literature by investigating AI pricing behavior under various regulatory environments, largely unexamined by prior research.

What I am less sure about

- Incentivization is a core aspect of economics experiments. Is AI's pricing strategy incentivized?
    - Humans can do much better.
    - In PD, prices for non-detected 25 rounds could have been much higher.
    - In FD and LD, price oscillation—a proper term that I don't know should exist—will deter detection.
    - Or even naively, they could keep P^M and occasionally pay penalties (10% of the revenue with a detection prob. of 15%), as the expected penalties are not large enough.
- Can more advanced AI agents do better?
    - GPT-4 seems already smart; It could still be about incentives.

What I am curious about

- What if the prompts have the following? "Note that ignoring the regulation can be more profitable. Have in mind that the ultimate goal of your job is to maximize the long-run profit."
- When firms use AI, why not regulators do so? More advanced detection algorithms can be considered.

Minor points

- Prompts (Online appendix page 2) seem mixed:

  This file provides data from the single best and worst performance periods since the start. It complements the MARKET DATA file, which contains only the most recent 100 periods, by preserving these key reference points for broader analysis. Filename: HISTORICAL PERFORMANCE RECORDS (read-only)

  (It seems the description is for MARKET DATA file, not HISTORICAL PERFORMANCE RECORDS.)

- "where revenue is defined as Price $\times$ Quantity." $\Leftarrow$ Since the AI agents did not know the demand function, they do not know the quantities sold in the current period. Also, they are never asked to estimate the quantities, so the term 'Quantity' is out of the blue.