Last meeting

Last meeting we talked about:

- Cross-selling and its causes: persistent preferences, switching costs, informational asymmetries.
- Some points Phil raised:
  1. is asymmetric information plausible? It is plausible, credit bureaus do not share transaction data nor soft information. There are papers that show that using the information gathered from app use can improve predictions. From talks with a practitioner he told me they use around 600 variables.
  2. I mentioned Egan et al. (2025), Phil said that it was important to have that paper in mind. In their model there are no switching costs, persistence is due to consumer not reoptimizing.
  3. Is there prior literature on cross-selling? There are a couple of papers (e.g. Basten et al.) but they do not use IO tools and they do not focus on competition.

This meeting (1)

Topics to discuss:

- Present model of switching costs
- How to identify the model of switching costs?
  - Dube et al. (2009)?
- Discuss prospectus advising
- Next steps considering that I still have to apply for the data

Model: Setup

- Two periods $t = 1, 2$, two products (e.g., checking account and loan), J firms.
- Consumer utility:

$$u_{ijt} = \beta_j - \alpha p_{ijt} + \xi_{jt} + \mu_{ij} + \epsilon_{ijt}$$

  where μ_{ij} is a **persistent** consumer-firm match value.
- Consumers are myopic
- If consumer switches firms between periods, incurs cost s

Model: Demand with Persistent Heterogeneity

- First period demand:

$$D_{1j}(p_1) = \int_{\mu_i} \frac{\exp(\delta_{j1} + \mu_{ij})}{\sum_{j'} \exp(\delta_{j'1} + \mu_{ij'})} dF_{\mu_i}$$

- Second period demand, conditional on first period choice $j_1 = k$:

$$D_{2j}(k, p_2; p_1) = \int_{\mu_i} \frac{\exp(\delta_{j2k} + \mu_{ij} - \alpha s \cdot \mathbf{1}(j \neq k))}{\sum_{j'} \exp(\delta_{j'2k} + \mu_{ij'} - \alpha s \cdot \mathbf{1}(j' \neq k))} dF_{\mu_i | j_1 = k}$$

- Selection: Consumers who chose k in Period 1 have systematically higher μ_{ik}
- Period 2 profits from consumers who chose k in period 1:

$$\pi_{2j}(k; p_1) = \max_{p} D_{2j}(k, (p, p^*_{-j2}(k)); p_1)(p - c_2)$$

- Total profits are:

$$\Pi_j(p_1) = D_{1j}(p_1)(p_{j1} - c_1) + \sum_{k=1}^{J} D_{1k}(p_1) \cdot \pi_{2j}(k; p_1)$$

Model: Invest-Harvest Motive (Special Case: $\mu_{ij} = 0$)

- When $\mu_{ij} = 0$ (no persistent heterogeneity), there is no selection, so $\pi_{2j}(k; p_1) = \pi_{2j}(k)$.
- Firm j's problem in period 1:

$$\max_{p_{j1}} \underbrace{D_{1j}(p_1)\,(p_{j1} - c_1)}_{\text{Period 1 profit}} + \sum_{k=1}^{J} D_{1k} \cdot \pi_{2j}(k)$$

- The FOC is:

$$\mathrm{MR}_{1j} + \underbrace{\frac{\partial D_{1j}}{\partial p_{j1}}}_{(-)} \left[\pi_{2j}(j) - \sum_{k \neq j} \omega_{jk}\, \pi_{2j}(k)\right] = 0$$

  where ω_{jk} are diversion weights (fraction of lost customers going to k).
- Assuming that the poached consumers are less valuable to the firm (the term in brackets is positive), the initial price is lower than in the static case due to the invest-harvest motive

Definitions

Diversion weights ω_{jk}: Fraction of customers lost by firm j that go to firm k:

$$\omega_{jk} \equiv \frac{\frac{\partial D_{1k}}{\partial p_{j1}}}{-\frac{\partial D_{1j}}{\partial p_{j1}}}, \qquad k \neq j$$

- $\omega_{jk} \geq 0$ for substitutes (raising p_{j1} increases D_{1k})
- $\sum_{k \neq j} \omega_{jk} = 1$ (lost customers must go somewhere)