The Price Elasticity of AI Demand

Question

How elastic is consumer demand for AI subscriptions?

Setting

Chicago levies the Personal Property Lease Transaction Tax (PPLTT) on cloud software, including AI subscriptions. No other major US city does this. The rate increased twice:

Date	Rate	Change
Pre-2025	9%	—
January 2025	11%	+2pp
January 2026	15%	+4pp

Anthropic passes through the tax in full. OpenAI pass-through needs verification.

Identification

Difference-in-differences comparing AI subscription churn in Chicago versus surrounding suburbs.

Treatment: Chicago ZIP3s (606, 608)

Control: Suburban Cook County and collar counties (600–605, 607)

Unit: Individual cardholder × month

Outcome: Churn (no AI subscription transaction for k consecutive months after prior subscription)

Specification

$$\text{Churn}_{it} = \beta_1(\text{Chicago}_i \times \text{Post2025}_t) + \beta_2(\text{Chicago}_i \times \text{Post2026}_t) + \gamma_i + \delta_t + \epsilon_{it} \quad (1)$$

γ_i = cardholder fixed effects

δ_t = month fixed effects

β_1 identifies the effect of the 2pp increase; β_2 identifies the cumulative effect through the 4pp increase.

Data

Individual-level credit and debit card panel. Can isolate transactions to OpenAI, Anthropic, and related AI merchants. ZIP3 geography links cardholders to Chicago vs. suburbs.

Contribution

First causal estimate of the price elasticity of demand for AI tools.

What Could Kill This

1. **Sample size.** Fewer than 500 Chicago AI subscribers pre-2025 means too little power.
2. **No pass-through.** If OpenAI absorbs the tax, only Anthropic users are treated—smaller sample.
3. **Pre-trends.** If Chicago and suburban churn rates were already diverging before January 2025, the DiD is contaminated.
4. **Billing avoidance.** If Chicago users switch billing addresses to suburbs, true treatment effect is attenuated.

Extensions (If Core Works)

- Heterogeneity by income (proxy: total card spend)
- Heterogeneity by self-employment (proxy: business-related spending)
- Welfare calculation using external productivity estimates

These are gravy. The elasticity is the contribution.