EIO (Ch.1–Ch.9): The Coherent Logic

Why the sequence is consistent: primitives → equilibrium → counterfactual equilibrium

The key line (the invariant)

The entire arc of Chapters 1–9 is a single inferential pipeline:

$$\underbrace{\text{Primitives}}_{\text{preferences, technology/costs, information, constraints}} + \underbrace{\text{Equilibrium behavior}}_{\text{demand, competition, entry, dynamics}}$$

$$\Longrightarrow \underbrace{\text{Observed outcomes}}_{\text{prices, quantities, shares, entry/exit, networks}} \Longrightarrow \underbrace{\text{Counterfactual outcomes}}_{\text{policy / merger / regulation / innovation}}.$$

The sequence is coherent because each chapter supplies (i) a missing primitive or (ii) a missing equilibrium restriction that makes those primitives identifiable from data, so that counterfactual equilibria become credible.

Chapters 1–9 as "missing pieces" of the same machine

1. **Chapter 1 (Big picture).** EIO is the strategy: use economic structure and data to recover primitives, then simulate counterfactuals. *Role:* defines the pipeline and the goal (policy-relevant prediction).
2. **Chapter 2 (Demand).** Recover **preferences** and **substitution patterns** from (p, x, s). *Role:* delivers demand derivatives (elasticities / Jacobians), which are the key inputs for markups and merger diversion.
3. **Chapter 3 (Production / Productivity).** Recover **technology** and **cost heterogeneity** (TFP) from (y, inputs), addressing simultaneity and selection. *Role:* supplies cost-side primitives that discipline marginal costs and firm heterogeneity.
4. **Chapter 4 (Competition / Conduct).** Combine **demand** with **equilibrium FOCs** to map outcomes into **markups** and **marginal costs**, and (with additional variation) infer **conduct**. *Role:* the core bridge: demand slopes + FOCs ⇒ markups ⇒ marginal costs.
5. **Chapter 5 (Entry).** Use entry/zero-profit inequalities to recover **fixed and entry costs** and the **competition effect** of additional rivals. *Role:* completes the cost structure (fixed + variable) and makes market structure an equilibrium outcome.
6. **Chapter 6 (Dynamics: foundations).** Introduce **states** and **continuation values**; show why static models misread behavior when actions shift future states (durables, inventories, investment, adjustment). *Role:* explains when equilibrium must be dynamic and provides the Bellman framework.
7. **Chapter 7 (Dynamic consumer demand).** Model intertemporal substitution (inventory / installed base) using household panels; use inclusive values and state reduction to make estimation feasible. *Role:* repairs demand identification when timing (stockpiling/waiting) is central.

8. **Chapter 8 (Dynamic games: methods).** Add strategic interaction to dynamics: MPE, CCPs, valuation, estimation (ML/MPEC vs two-step CCP vs NPL vs inequalities), heterogeneity, dimensionality, equilibrium selection. *Role:* supplies the machinery to estimate dynamic equilibria with many firms.
9. **Chapter 9 (Dynamic games: applications).** Apply the full pipeline to regulation, networks, and innovation: estimate primitives, solve equilibrium, and compute counterfactual equilibria and welfare. *Role:* demonstrates that the pipeline is operational and policy-relevant.

Why the coherence is high

Each chapter answers the same question at a higher level of realism:

What primitive is missing, and what equilibrium restriction lets us recover it from data so we can predict a new equilibrium under a counterfactual?

Ultra-concise summary

Empirical IO is the disciplined recovery of demand and cost primitives plus the equilibrium mapping, enabling credible counterfactual equilibria under mergers, regulation, entry changes, and innovation incentives.