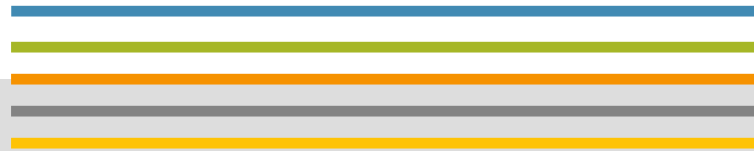


Hotelling's Model



Philosophy of Economics

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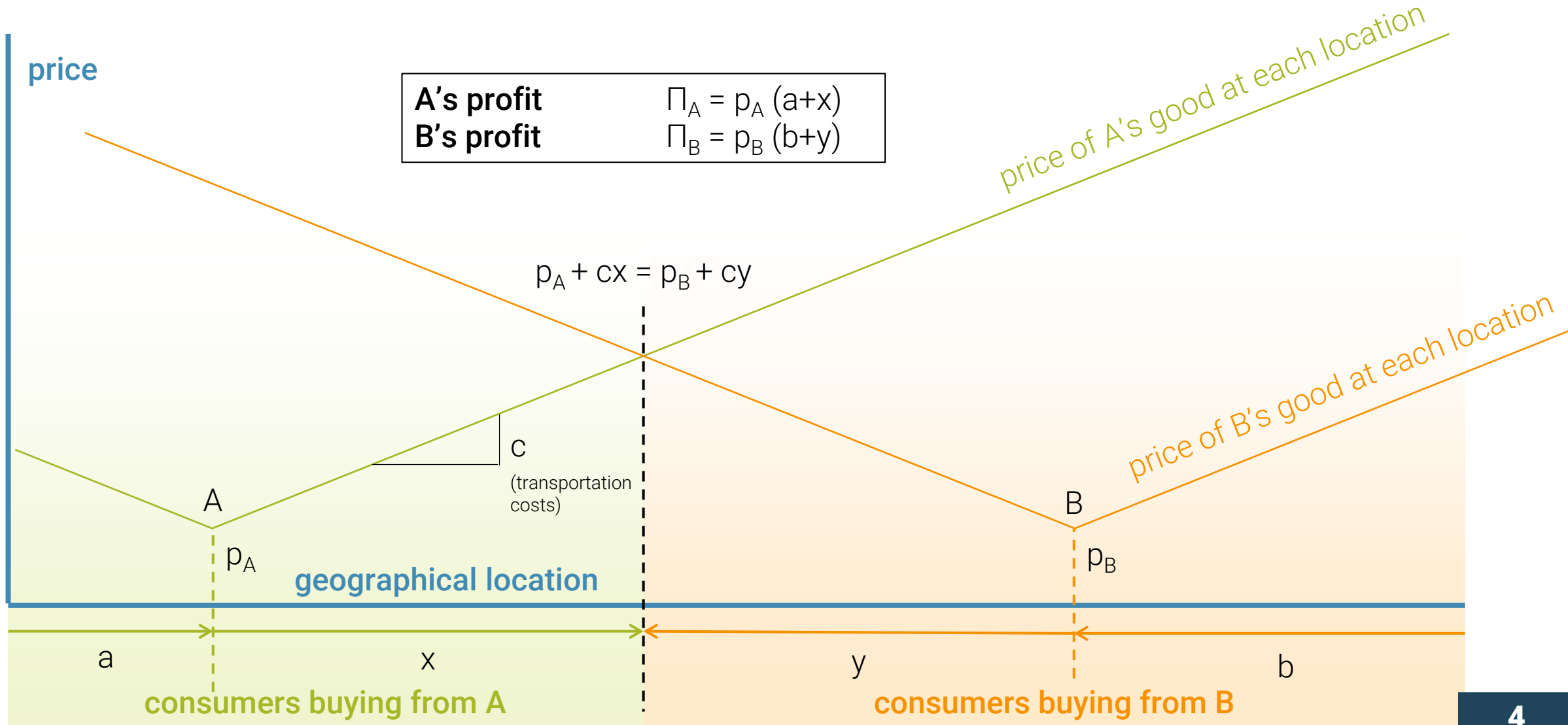
Aims for Today

- What is **Hotelling's Model**?
- What **assumptions** go into Hotelling's Model?
- What **results** does Hotelling argue for?
- What **method** does Hotelling use?
- What might be **problems** with this method?

Contents

- 1. Hotelling's Model**
2. Assumptions in Hotelling's Model
3. Hotelling's Results
4. Hotelling's Method
5. Problems with Method

Hotelling's Model



Hotelling's Model



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Contents

1. Hotelling's Model
- 2. Assumptions in Hotelling's Model**
3. Hotelling's Results
4. Hotelling's Method
5. Problems with Method

Assumptions in Section I

- (1) The market is a finite (one-dimensional) line (p. 45)
 - (2) The “line” represents geographical distance (implicit in sec. I)
 - (3) There are two producers on the market (p. 45)
 - (4) There is only one, identical commodity sold on the market (p. 45)
 - (5) Consumers are uniformly distributed along the market (p. 45)
 - (6) Consumers buy the same amount of commodity, whatever the price (p. 45)
 - (7) Consumers only choose on the basis of price (p. 45)
 - (8) There are transportation costs, linear to distance (p. 45)
 - (9) Producers can adjust their prices freely (p. 45)
 - (10) Producers adjust prices so that they maximise profit (p. 46)
 - (11) The position of producers on the market is fixed (implicit throughout)
 - (12) There are no production costs (p. 45)
 - (13) All consumers and producers possess full information about prices, products, the distribution of consumers, and so on. (implicit throughout)
- (...There are likely more implicit and explicit assumptions...)

(Relaxed) Assumptions in Section II

- (1*) The market is multi-dimensional (p. 55)
- (2*) The “line” represents a general product space (p. 54)
- (3*) A third or more competitors enter the market (p. 53)
- (4) There is only one, identical commodity sold on the market (p. 45)
- (5*) Consumers are not uniformly distributed along the market (p. 55)
- (6*) Demand is elastic, reacting to price (p. 56)
- (7) Consumers only choose on the basis of price (p. 45)
- (8) There are transportation costs, linear to distance (p. 45)
- (9) Producers can adjust their prices freely (p. 45)
- (10) Producers adjust prices so that they maximise profit (p. 46)
- (11*) One or both competitors can change their position (p. 51-2)
- (12*) There are some production costs (p. 50-1)
- (13) All consumers and producers possess full information about prices, products, the distribution of consumers, and so on. (implicit throughout)

Contents

1. Hotelling's Model
2. Assumptions in Hotelling's Model
- 3. Hotelling's Results**
4. Hotelling's Method
5. Problems with Method

Law of Minimum Differentiation

- **Hotelling's Law** (or the **Law of Minimum Differentiation**): for two competitors competing in a one-dimensional space, the rational equilibrium is for both competitors to end up right next to each other
 - ❑ More cautious formulation: ... there is a tendency for both competitors to end up right next to each other
- What is the relevant **space**?
 - ❑ Geographical space (e.g., most bespoke tailors in London can be found in Savile Row)
 - ❑ Product similarity (e.g., the degree to which Burger King and McDonald's menus are similar)
 - ❑ Political ideology (e.g., the tendency for Republicans and Democrats to move towards the political centre)

Contents

1. Hotelling's Model
2. Assumptions in Hotelling's Model
3. Hotelling's Results
- 4. Hotelling's Method**
5. Problems with Method

Noticeable Features of Hotelling's Model

1. Highly **abstract** model: does not refer to anything concrete
2. Many **simplifying assumptions**, many of which are simply wrong
3. Central claims are **formulated mathematically**
4. (Implicit) **assumptions about rationality** and human behaviour
5. No experimental design, **no empirical testing**, no empirical data
6. Some **reference to empirical phenomena**, but very unsystematic
7. (Implicit) **moral judgments** (e.g., about what's in the public interest)
8. Result is **counterintuitive** (and interesting) despite simple assumptions
9. Result is **general but vague**: it only describes a tendency
10. Model **"feels" explanatory**, as if it describes some real-world mechanism

Contents

1. Hotelling's Model
2. Assumptions in Hotelling's Model
3. Hotelling's Results
4. Hotelling's Method
5. **Problems with Method**

Problems(?) with Model-Based Theorising

1. Vague Laws
2. Ceteris Paribus (“Hedged”) Laws
3. High Abstraction
4. Wrong Assumptions
5. Theorising often not directly driven by empirical data
6. Few or No (Controlled) Experiments
7. Lack of Predictive Success

1. Vague Laws

- Many economic laws predict that two variables hang together, but they merely suggest a tendency
- The law of differentiation: competitors **tend to** move towards each other in a product space

Problems

- How are vague laws helpful?

2. Ceteris Paribus (“Hedged”) Laws

- Economic laws are often implicitly restricted
- “Other things being equal, the ice cream vendors will converge on one spot”

Problems

- How can such laws be helpful if we don’t know whether “things are equal”?
- We often know things are not equal!

3. Abstraction in Models

- Economic models are highly abstract
 - consumers on a two-dimensional line
 - identical commodities, consumers, sellers, ...

Problems

- How can abstract models tell us something about concrete reality?

4. False Assumptions in Models

- Often, the assumptions in economic models are false
 - ❑ utility-maximising agents
 - ❑ perfect knowledge

Problems

- How can we gain knowledge from economic models given that some of their assumptions are clearly false?

5. Theorising not empirically driven

- Hotelling's theory seems neither inspired nor driven by empirical data
- It tries to explain some existing phenomena, but no systematic survey is done

Problems

- Shouldn't science usually be empirically driven?

Blaug 1980, p. xxi

Articles published in the AER

	1972–6 (%)	1977–81 (%)
1. Mathematical models without any data	50.1	54.0
2. Theoretical models without mathematical formulation and without data	21.2	11.6
3. Statistical methodology	0.6	0.5
4. Empirical analysis based on data developed by the author	0.8	1.4
5. Empirical analysis using statistical inference on published data	21.4	22.7
6. Other types of empirical analysis	5.4	7.9
7. Empirical analysis based on artificial simulation and experiment	0.5	1.9

Source: Leontief (1982)

6. No or Few (Controlled) Experiments

- Historically, experiments are rare
- Especially in macroeconomics, we have no controlled experiments

Problems

- Aren't experiments central to science?

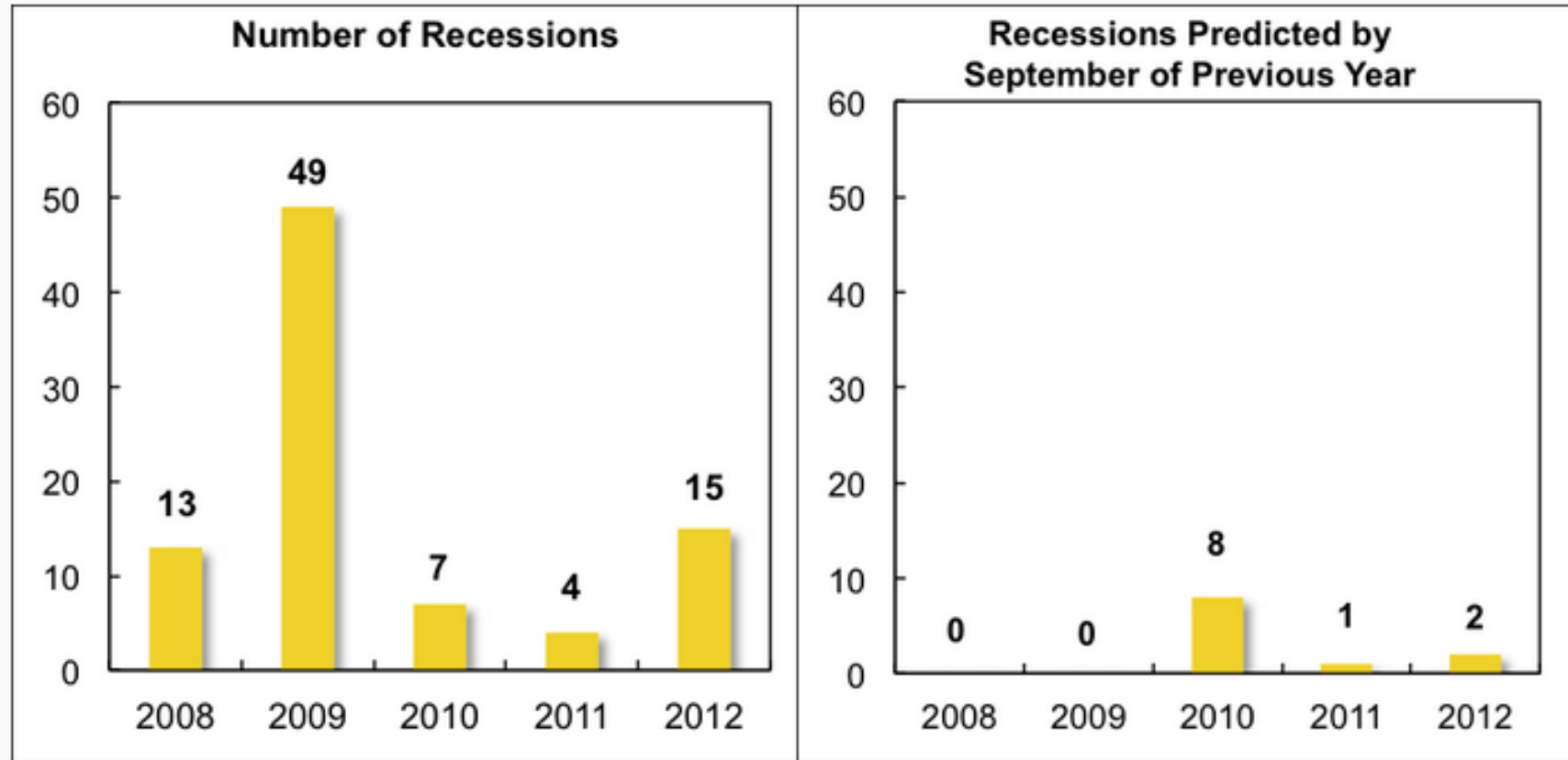
7. Questionable Predictive Success

- It's unclear whether there's been much predictive success in economics
- Economics forecasting beyond the immediate future seems to be highly unreliable

Problems

- Isn't predictive success one of the central features of a mature science?

Predicting Recessions



<http://www.voxeu.org/article/predicting-economic-turning-points>

Questions

- Where does this leave us?