Interconnection and the Multiple Roles Played by Pricing

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The Current Debate

- Much of the current regulatory debate focuses on constraining pricing
  - Nondiscrimination
  - Zero-price interconnection
  - Regulation of server side, but not end-user side
- Policymakers must understand the role of prices
Basic Roles of Simple Prices

- Allocate scarce demand
- Provide incentives for conservation
- Signal need/provide incentives for equilibration

- Current example: airline fuel prices
Role of Prices in Equilibration

P

S

D

P

Q

P

MC

AC

P

Q

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Yoo - Interconnection and Pricing
Role of Prices in Equilibration
Role of Prices in Equilibration

\[ P \quad S \quad D' \quad P' \quad P \quad MC \quad AC \quad Q \quad Q \]
Role of Prices in Equilibration

![Graph showing the role of prices in equilibration]

- **Profit**
- **S** (Supply)
- **D'** (Demand)
- **P** (Price)
- **P'**
- **Q** (Quantity)
- **MC** (Marginal Cost)
- **AC** (Average Cost)
Role of Prices in Equilibration

Diagram showing the role of prices in equilibration with supply (S'), demand (D'), profit (shaded area), marginal cost (MC), and average cost (AC).
Role of Prices in Equilibration

[Diagram showing supply (S') and demand (D') curves intersecting at a price (P) level.]

[Diagram showing marginal cost (MC) and average cost (AC) curves, with the intersection at the same price (P) level.]
Two-Sided Markets

- Special type of network economic effect
  - Network consists of two types of participants
  - Value is determined by number of other class
  - Classic examples: singles bars, credit cards, advertising

- Key insights
  - Pricing is determined by the elasticity of the other side
  - Increases in the profitability of one side lowers the price on the other side
  - Magnitude and direction of cash flow is arbitrary
Dynamic View of Pricing

- Multiple options exist ex ante/pricing is endogenous
  - Jet fuel: spot markets, futures markets, self-provisioning
  - Internet: multiple transit and peering paths, direct interconnection, CDNs

- There is no reason to prefer one pricing structure
  - “Paying twice” rhetoric is misleading
  - All value comes from consumers
  - Interconnection pricing may be fairer

- Full information not reflected in bilateral prices
Distinguishing Between Different Sources of Bargaining Power

- Good sources: investments, foresight, risk
- Bad sources: market power, terminating access
- Challenge: address only bad sources

Multiple sources of strategic behavior
- Last-mile provider
- Transit provider (e.g., consistent problems, Cogent’s prioritizing retail over wholesale)
- Edge provider
Comcast-Netflix Transit Relationships

Cogent

Tata

Level 3

Comcast
MIT Study on Comcast Congestion

Three transit links of Comcast in Bay Area over time

Cogent
TATA
Level3
Implications

- Pricing flexibility is key to any economic system
- Innovation depends on distinguishing between good and bad sources of bargaining power
- Pricing and topology are related choices/endogenous
- Simple bilateral pricing does not yield enough information
  - Market makers
  - Alternative institutional forms to align incentives