The Economics of E-commerce and Technology

Switching Costs and Lock-in

Switching costs

▸ **Switching costs are ubiquitous**
  - ▸ Between brands (e.g. banks)
  - ▸ Between technologies (e.g. operating systems)

▸ **Large markets** (e.g. one firm sells to many buyers)
  - ▸ Customers and cell phone providers
  - ▸ Students and UCLA
  - ▸ Car workers and GM

▸ **Bilateral bargaining**
  - ▸ Marvel and Robert Downey Jr.
  - ▸ Bell Atlantic and AT&T
  - ▸ Coal mines and electricity plants

Large Consumer Markets

On switching costs

- Switching costs are two-sided
  - Customer switching costs: searching for new firm, learning new system, losing complementary investments etc.
  - Firm switching costs: setting up new account, hiring personnel
  - Total switching cost matters.
- Switching costs can be endogenous
  - Depend on compatibility decisions (e.g. number portability).
  - Can impose costs on departing customers (e.g. disruption)
  - Depends on users actions (e.g. queue in Netflix).
- Switching costs vs differentiation?
  - With s.c., goods may be similar ex ante, but different ex-post.

Why switching costs matter

- **The Valuation Principle:**
  - In homogenous good market, the discounted present value of a customer to firm = customers total switching costs.
- **Model**
  - Competitive market has price $p^m=c$
  - Firm A has mass 1 of customers with switching cost k
  - Customer willing to pay p=c+k, otherwise will quit.
  - This means profits equal $\pi=k$.
- **Hence switching costs tell you how much firm is worth**
  - Ignoring differentiation and costs differences.

Application: LTV and CAC

- Switching costs determine
    - The costs of acquiring a customer (CAC)
    - And the lifetime value of a customer (LTV)
- Verizon's LTV
    - Verizon makes profit $20/user/month.
    - Retain p=98% of customers per month. Discount rate δ=0.99
    - Lifetime Value (LTV) of customer is $20/(1-p\delta)$ = 671/user.
    - What about Sprint, where profit $15 and p=96%?
- Verizon CAC
    - Have to persuade person to move from AT&T to Verizon
    - Have to overcome their switching cost.

Lock-in cycle

- Four stages of lock-in
  - Important to anticipate entire lock-in cycle from the start
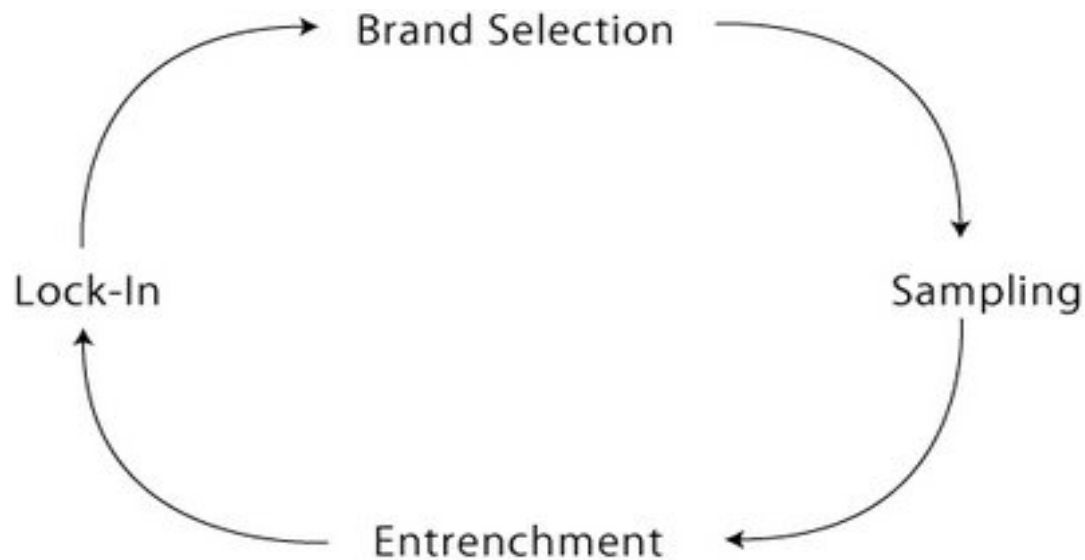 - Holds true for both buyers and sellers.

Figure : The Lock-In Cycle

Classifying Switching Costs

Classifying switching costs I

1. ## Contractual commitments

   ▸ Cell-phone 2-year contracts and family plans.

   ▸ Employments contracts

   ▸ Anticipate switching costs after contract terminates

2. ## Complimentary Investments

   ▸ Durable purchases (e.g. Xbox, printers),

   ▸ Brand specific training (e.g. learning software, fixing airplane),

   ▸ Complimentary purchases (e.g. iPad and Mac)

   ▸ SC determined by: durability of assets/training, ease of resale, scale of investments, ease of leasing.

Classifying switching costs II

3. ## Transactions costs
   - Time and effort to make changes
   - Changing bank account or web browser.

4. ## Search Costs
   - Example: Yoga studios
   - Consumer search costs: time and effort to find good deal, evaluating product, risk of new seller (experience good)
   - Seller side: promotion, adverse selection

5. ## Loyalty Programs
   - Examples: Frequent flyer miles, supermarket cards, iDine
   - Loyalty benefits may increase (e.g. "gold" status)
   - Cooperate with other firms (e.g. win miles with credit card)

What type of switching costs?

- Google chrome
  - Change settings in computer (complimentary investment)
  - Unknown quality of other engines (search costs)
  - Learning how to search effectively (training)
- Facebook
  - List of friends (complimentary investment)
  - Learning the interface (training)
- Apple iPhone
  - Durable equipment (software)
  - Learning the interface (training)
  - Mac sales (complementary investment)

Seller's Strategy

3/27/2019

Pricing 1: Competitive Markets

- Model
  - Many firms, cost zero, homogeneous good
  - Mass 1 of customers have value v.
  - Free at t=1. Locked in at t=2
- At t=2, winner makes money from locked in consumers
  - If win customers π_W=v; if lose π_L=0.
- At t=1, fight hard for "free" customers
  - Each firm will price p_0=-v and make profits π_0=0.
  - Called the "rent dissipation postulate"
- Examples:
  - Fewer ads at starts of movie
  - Student discounts for computers
 - Low profits on bottom line cars.

3/27/2019

Pricing 2: Oligopoly Markets

- Switching costs can also soften price competition if
  - Limited number of firms
  - Firms cannot discriminate between "new" and "old"
- Model
  - Two firms, cost zero, homogeneous good
  - In t=1, mass 1 of "old" customers enter with value v
  - They become "loyal" to whoever they purchase from
  - In t=2, mass 1 of "new" customers enter with value v

Oligopoly Equilibrium

▸ ## At t=2, firms use mixed strategy equilibrium

  ▸ Winner: $\pi_W = p + p[1 - F_L(p)]$, where $F_L(.)$ is price dist of L

  ▸ Loser: $\pi_L = p[1 - FW(p)]$, where $F_W(.)$ is price dist of W

▸ ## If W loses in t=2 then $\pi_W = v$.

  ▸ Indifference $\Rightarrow F_L(p) = (2p-v)/p$ on $[v/2, v]$.

▸ ## Firm L gets $\pi_L = v/2$.

  ▸ Indifference $\Rightarrow F_W(p) = (p - \frac{1}{2}v)/p$

▸ ## At, t=1complete to be winner

  ▸ Both price p=-v/2

▸ ## Both earn $\pi_0 = v/2$

▸ ## Switching costs lead to profits!
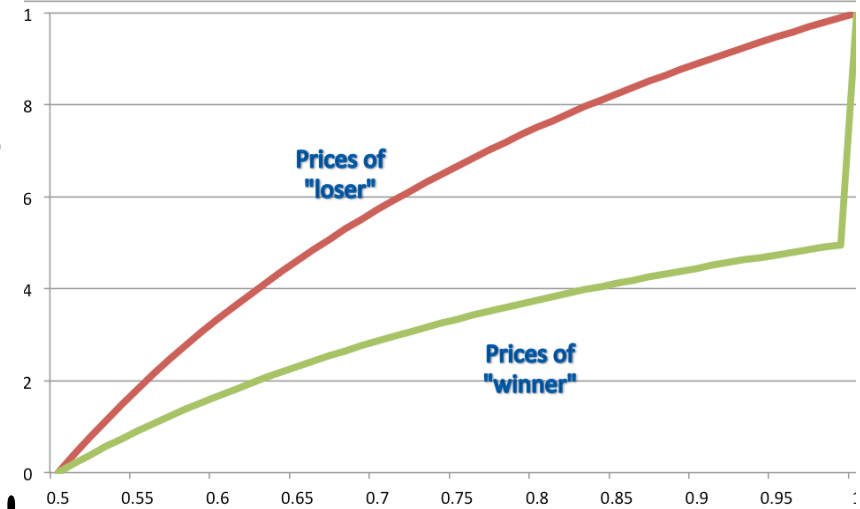
Economic Lessons

- Both firms make profits
  - Winner going after loyal customers, softens price competition
  - Loser makes money in second period
  - Softens competition in first period. Called "fattening effect".

- Can firm attract customers without bribing them?
  - First-mover advantage. Build up share before others enter.
  - Have complements that others lack.
  - Selling to influential customers….

3/27/2019

Selling to Influential Customers

- Classification of key customers
  - Maven – people who accumulate knowledge
  - Connector – people who have lots of "weak ties"
  - Salesmen – people who can persuade others
- Example: launching new headphones
  - First give to tech bloggers to vouch for quality
  - Then give to pop journalists to get word out
  - Then give to Justin Beiber to persuade his fans
- Agency problems
  - Professor, publisher and students
  - Businessman, airline and employer
  - Doctors, pharma firms and insurance company

3/27/2019

Calculating Klout

▸ Virgin America used Klout to identify influential customers and gave them free flight on new routes.
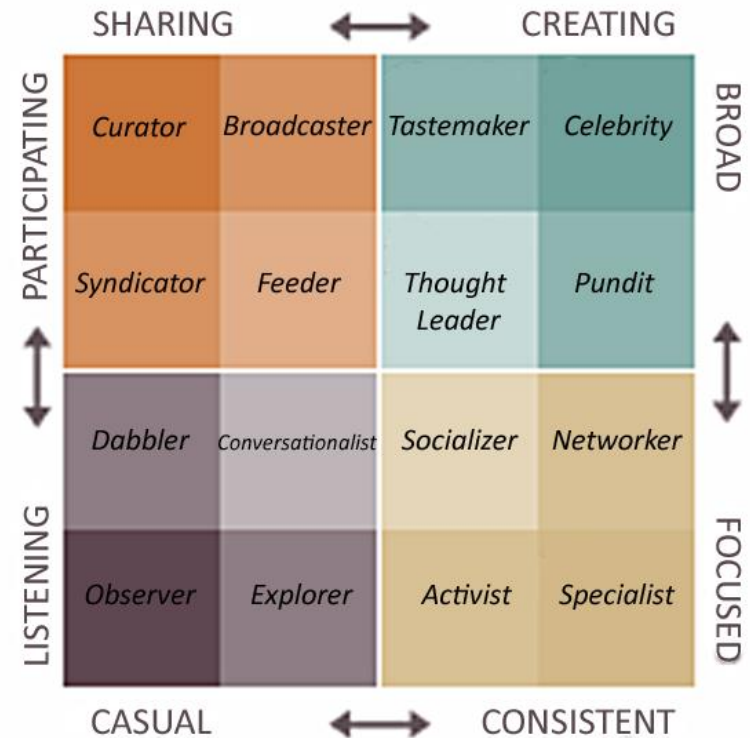
Encourage Entrenchment

- Design products to entrench
  - Open vs. closed system.
- Creeping locking
  - Freemium: basic version is free; advanced version is not.
- Loyalty programs
  - Nonlinear payments
- Stagger contracts/sales
  - Minimal lock-in: when most contracts/equipment near end
  - Stagger contracts to strengthen weak link.
  - Example: Offer new phone contract after 20 months.
- Forward sales
  - Sell customer stock of black toner (but not color)

Minimal lock-in

▸   With single contract switching cost falls from 'k' to 0.

▸ With two contracts:

Simultaneous Contracts

Staggered Contracts
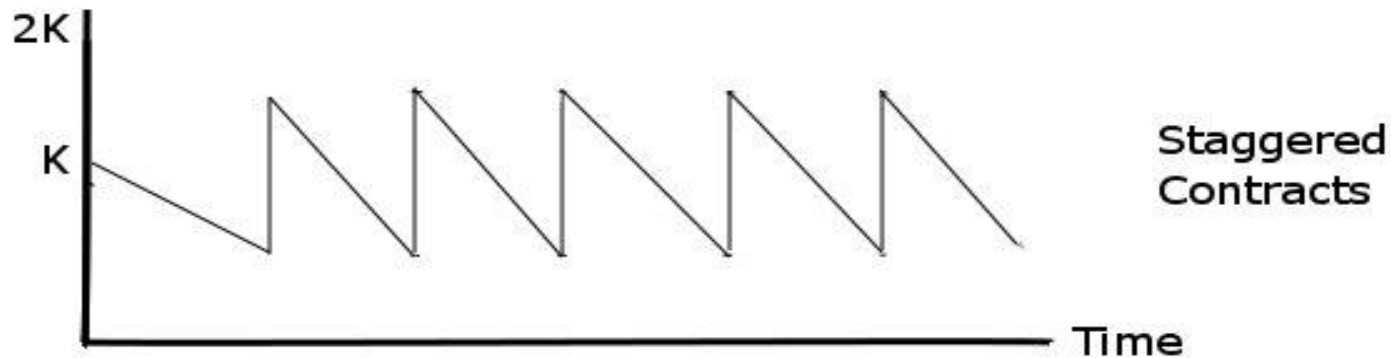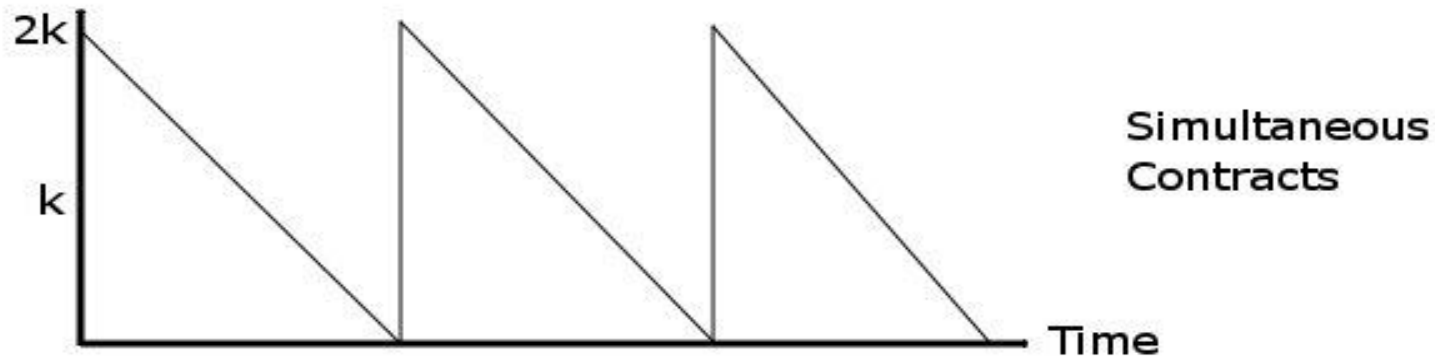
Leveraging Installed Base

- Have full range of products
  - Means consumers can stay within brand (e.g. car range)
- Sell complementary products
  - Increases lock-in (e.g. MS Office) and is money-spinner (e.g. ink)
- Sell access to installed base
  - Adverts (e.g. Google) or endorsement (e.g. AAA)
- Price discriminate between "free" and "loyal"
  - Lower price to free (e.g. magazines). Version to reduce arbitrage.
  - Higher price to free (e.g. software upgrades)
- Beware overestimating switching costs
  - New entrants and rivals try to reduce SC
  - Example: MS Word mimicked WordPerfect controls.

Bilateral Markets and Holdup

The Fundamental Transformation

▸ Consider a large buyer, e.g. Marvel
  ▸ Can choose from many actors
  ▸ Once chosen Robert Downey Jr., then locked into relationship.

▸ Lock-in may be two sided
  ▸ Robert Downey Jr. may find it harder to get other roles.
  ▸ Often seen in supply chains, e.g. Apple and FoxCon

▸ Marvel is then wary of holdup (i.e. ex-post opportunism)
  ▸ Refuses to be in latest Iron Man
  ▸ Refuses to do press and promote movie.

▸ What are the consequences for Marvel and Apple?

▸ What can they do to mitigate this problem?

3/27/2019

The Holdup Problem

▸ Zappos wants to do deal with Fedex

  ▸ Value of relationship: $V(x_F)$, where Z invests x_F in relationship

▸ Zappos has outside option to do deal with UPS

  ▸ Value of outside option: $W(x_U)$, where Z invests x_U in option

▸ Socially optimal investment, assuming $V>W$

  ▸ Investment in Fedex: $V'(x_F)=c'(x_F)$, where $c(.)$ is investment cost.

  ▸ Investment in UPS: $x_U=0$

  ▸ Can achieve this if write contract that gives gains to Zappos

▸ Negotiation: suppose Zappos and Fedex split gains 50:50

  ▸ Profits: $\pi_Z=\frac{1}{2}[V(x_F)-W(x_U)]+W(x_U)$, $\pi_F=\frac{1}{2}[V(x_F)-W(x_U)]$

  ▸ Under invest in Fedex: $\frac{1}{2}V'(x_F)=c'(x_F)$.

  ▸ Over invest in UPS: $\frac{1}{2}W'(x_U)=c'(x_U)$.

Bargain Before Being Locked In

▶ Look for introductory offers

 ▶ Sign-up bonus, extended warranties, support in switching over

▶ Increase ex-ante bargaining power

 ▶ "My current system is fine"

 ▶ "I'll make lots of follow-on purchases"

▶ Beware of being held-up after committing

 ▶ Have price and quality carefully specified

 ▶ Seek long-term protection: service guarantees, free upgrades, most favored customer treatment

 ▶ Beware of non-contractible elements

▶ Be wary of vague commitments to being "fair" and "open"

After Lock-in

▸ Dual sourcing
  ▸ Use two companies to reduce hold-up (e.g. Toyota policy)
  ▸ IBM forced Intel to cross-license to AMD.

▸ Beware of creeping lock-in from complementary purchases
  ▸ Try to avoid completely committing

▸ Acquire information to help ex-post bargaining
  ▸ Seller's suppliers, cost information and details of production

▸ Use bond to help ex-post bargaining
  ▸ E.g. "getting the factory knocked up" when outsourcing.

▸ Overlapping contracts
  ▸ Ensure supplier always under contract, so you have power.