The Economics of E-commerce and Technology

Switching Costs and Lock-in
Switching costs

- Switching costs are ubiquitous
  - Between brands (e.g. credit card companies)
  - Between technologies (e.g. operating systems)
- Example: Bell Atlantic and AT&T
  - In mid-1980s Bell invest in $3bn of AT&T switches
  - Proprietary technology, so needed AT&T for upgrades and fixes
  - Introducing ‘888’ numbers cost Bell $8m for software
  - Annual upgrades cost $100m/year plus peripheral sales
- Other examples
  - Changing cell phone providers
  - Changing server software
  - Changing email address, internet service provider, phone company…
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).

- Lock-in also faced by suppliers
  - Supplier lock-in: iPhone app maker and Apple.
  - Two-sided lock-in: coal mine and electricity plant
Why switching costs matter I

- **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 $N$ loyal customers with one-off switching cost $k$
  - Time $t \in \{1, 2, \ldots\}$ with discount rate $\delta$.
  - Customer willing to pay $p = c + k(1 - \delta)$, otherwise will quit.
  - This means profits equal $\pi = kN$.

- **Hence switching costs tell you how much firm is worth**
  - Ignoring differentiation and costs differences.
Why switching costs matter II

- How much should you invest in installed customer base?
  - Promotions to acquire customers
  - Bribing customers to join you (e.g. credit cards)

- Idea: Verizon is trying to lure a new customer
  - Verizon makes profit $20/user/month.
  - Retain p=98% of customers per month. Discount rate $\delta=0.99$
  - Lifetime Value (LTV) of customer is $20/(1-p\delta) = 671/user$.
  - Switching cost for customer is $300; cost to firm is $50, so total customer acquisition cost (CAC) is $350.
  - Can buy customer $400 iPhone and make profit.
  - What about Sprint, where profit $15 and p=96%?
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.
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.
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)
Buyers Strategy
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”
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 A: $V'(x_F) = c'(x_F)$, where $c(.)$ is cost of investment.
- Investment in B: $W'(x_U) = 0$

Negotiation: suppose firms A and 0 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 A: $\frac{1}{2} V'(x_F) = c'(x_F)$.
- Over invest in B: $\frac{1}{2} W'(x_U) = c'(x_U)$.
After Lock-in

- Dual sourcing
  - Use two companies to reduce hold-up (i.e. ex-post opportunism)
  - Toyota policy of two suppliers
  - AMD creation benefited both IBM and Intel.

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

- Acquire information to help ex-post bargaining
  - Seller’s suppliers.
  - Seller’s cost information.
  - Details of production process.

- Use bond to help ex-post bargaining
  - E.g. “getting the factory knocked up” when outsourcing.
Seller Strategy
May have to fight hard for “free” customers.

Consider model from earlier
- Competitive market with marginal cost $c$.
- $N$ free customers at time $t=0$. Switching costs $k$ after join firm.
- Discounted profits: if win customers $π_1 = kN$; if lose $π_1 = 0$.

What is the equilibrium price in period 0?
- Each firm will price $p_0 = c - δk$ and make profits $π_0 = 0$.
- Called “rent dissipation postulate”.
- Examples: fewer ads at starts of movie, student discounts for computers, low profits on bottom line cars.

Profits ultimately determined by
- Costs, differentiation and first-mover advantages.
Investing II: Sell to Influential Customers

- Gladwell’s classification of key customers:
  - Connector – people who have lots of “weak ties”
  - Maven – people who accumulate knowledge
  - Salesmen – people who can persuade others

- Selling to A may lead to sales from B
  - Network effects (e.g. selling to division A within firm)
  - A has reputation for being informed (e.g. Walmart)
  - A may provide industry contacts (e.g. importer into the US)

- Agency problems
  - Professor, publisher and students
  - Businessman, airline and employer
  - Doctors, pharma firms and insurance company
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.
  - Mixed: basic version is free; advanced version is not.
- Loyalty programs
- Stagger contracts/sales
  - Minimal lock-in: when most contracts/equipment near end
  - Stagger contracts to strengthen weak link.
  - Example: Pitch product B when A halfway through life.
  - 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:

  [Diagram showing two types of contracts: Simultaneous Contracts and Staggered Contracts.]

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Leveraging Installed Base I: Pricing

- Two firms (not competitive market, as before)
  - Some consumers locked-in, others are free.

- Lowering price...
  - reduces profits from loyal customers.
  - increases profits from free agents.
  - increases installed base and increases future profits.

- Expect switching costs to raise prices and profits
  - Fattening effect: If A lowers price, then B’s market share falls and B’s prices falls, increasing competition.
  - Skeptical consumer effect: if A lowers price expect A’s market share to rise and A’s future prices to rise, reducing elasticity.
Leveraging Installed Base II: General

- 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)

- Early contract renewal
  - Keep agent locked in (e.g. football contracts, phone contracts)

- 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)
Leveraging Installed Base III: Entry

- **Limit pricing**
  - Build up market share to avoid entry.

- **Creating switching costs**
  - Benefits incumbents but harms entrants.

- **Beware overestimating switching costs (and customer value)**
  - New entrants try to reduce SC
  - Example: MS Word mimicked WordPerfect controls.
  - Example: can honor other firms loyalty points.