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.

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)
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”
A Little Bargaining Theory

- 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: $x_U = 0$
- 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 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.
Investing in Installed Base I

- 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 $\pi_1 = kN$; if lose $\pi_1 = 0$.
- What is the equilibrium price in period 0?
  - Each firm will price $p_0 = c - \delta k$ and make profits $\pi_0 = 0$.
  - 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:
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.