

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 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 mass I 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 $\delta=0.99$
 - ▶ 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.

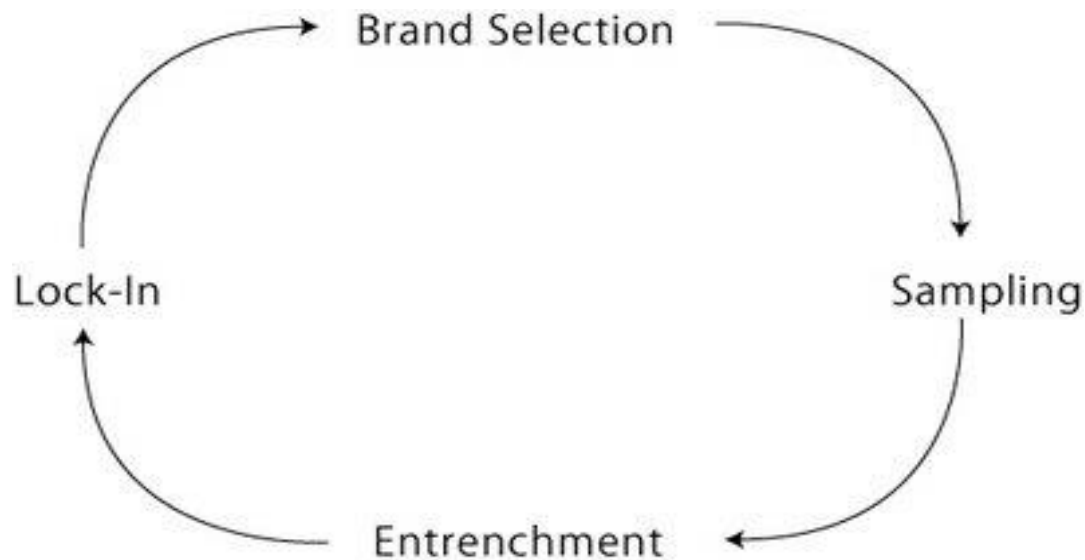


Figure : The Lock-In Cycle

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

Pricing 1: Competitive Markets

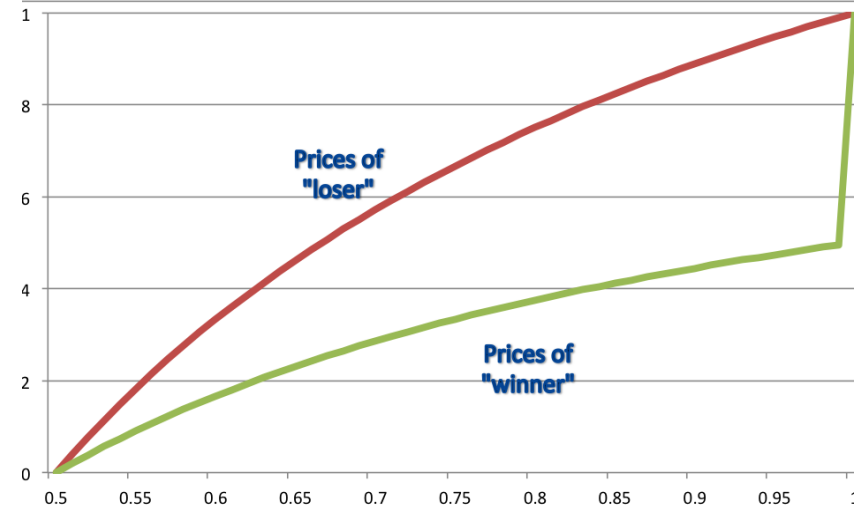
- ▶ May have to fight hard for “free” customers.
- ▶ Consider model from earlier
 - ▶ Competitive market with marginal cost c .
 - ▶ Mass I of free customers at $t=0$. Switching costs k at $t=1$
 - ▶ If win customers $\pi_w=k$; if lose $\pi_l=0$.
- ▶ What is the equilibrium price in period 0?
 - ▶ Each firm will price $p_0=c-k$ and make profits $\pi_0=0$.
 - ▶ Called the “rent dissipation postulate”
- ▶ Examples:
 - ▶ Fewer ads at starts of movie
 - ▶ Student discounts for computers
 - ▶ Low profits on bottom line cars.

Pricing 2: Oligopoly Markets

- ▶ **Switching costs can also soften price competition.**
 - ▶ Limited number of firms
 - ▶ Assume firms cannot discriminate between “new” and “old”
- ▶ **Two-period model**
 - ▶ In $t=1$, mass 1 of “old” customers enter.
 - ▶ They become “loyal” to whoever they purchase from
 - ▶ At $t=2$, mass 1 of “new” customers enter.
 - ▶ All customers have value v .
- ▶ **Two firms, cost zero, homogeneous good**
 - ▶ Call winner in $t=1$ firm ‘W’, and the other firm ‘L’.

Analyzing competition

- ▶ In period 2, look for mixed strategy equilibrium
 - ▶ Winner: $\pi_W = p + p[1 - F_L(p)]$, where $F_L(\cdot)$ is price dist of L
 - ▶ Loser: $\pi_L = p[1 - F_H(p)]$, where $F_H(\cdot)$ 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 $\Rightarrow F_W(p) = (p - 1/2v)/p$
- ▶ In period $t=1$
 - ▶ Compete for difference in π
 - ▶ Both price $p = -v/2$
- ▶ Both earn $\pi_0 = v/2$



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....

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

Calculating Klout

- ▶ Virgin America used Klout to identify influential customers and gave them free flight on new routes.

Klout Summary for Kanye West | Score Analysis |

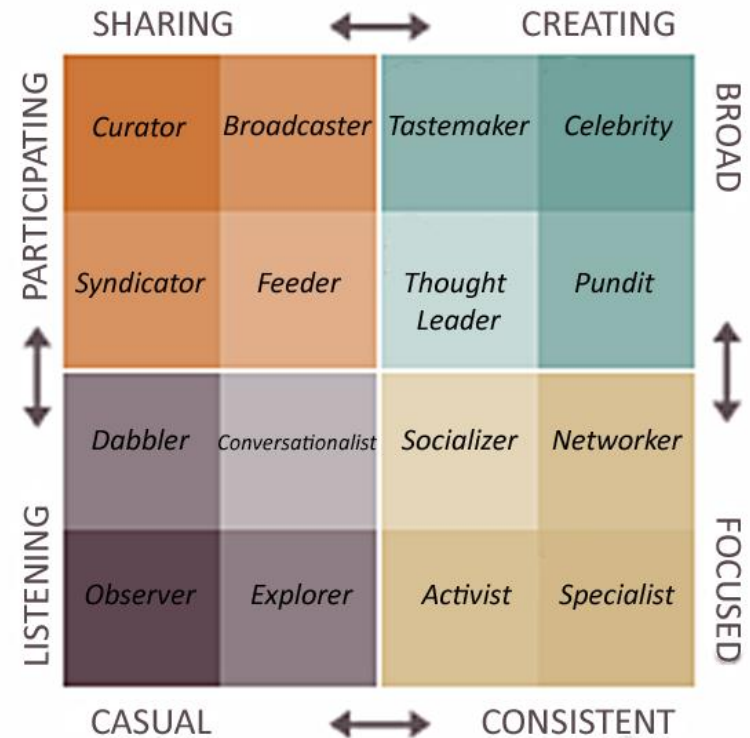
Kanye West
www.kanyewest.com
Def Jam | Follow

Klout Score | Measurement of your overall online influence [Learn more](#)

Score Summary
 { **87** klout score | **627K** true reach | **81** amplification | **91** network }

Achievements

- 1M MESSAGE REACH
- 250K TOTAL RETWEETS
- 100K UNIQUE RETWEETERS
- 5K UNIQUE MENTIONERS
- 5K UNIQUE MSGS RETWEETED
- 250 MESSAGE RETWEETED

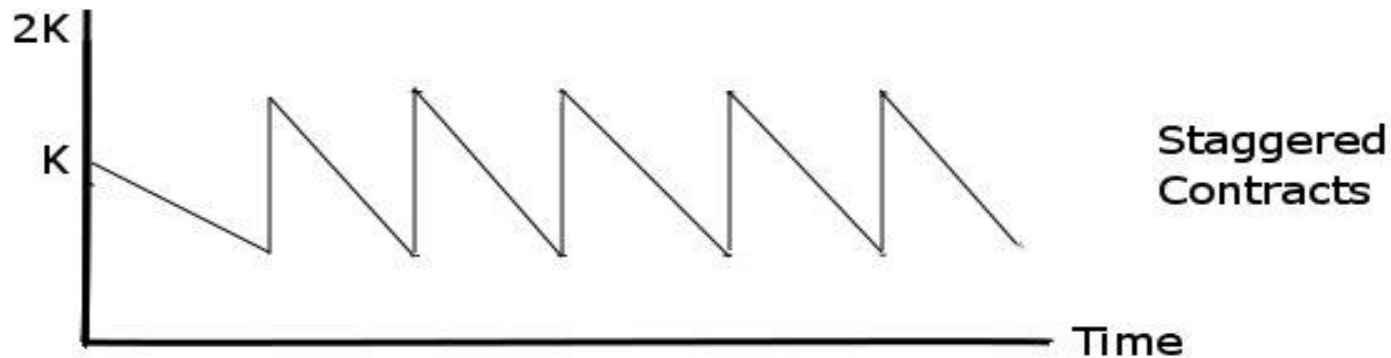
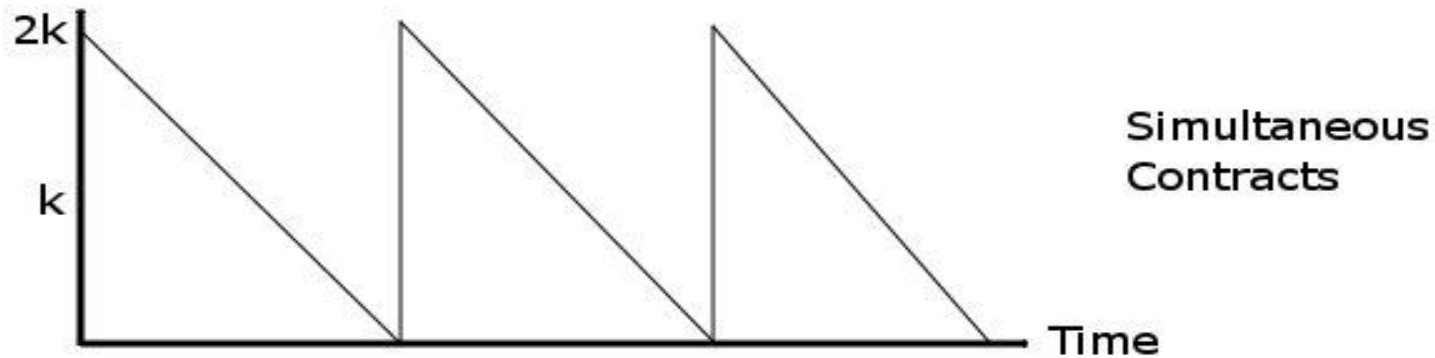


Encourage Entrenchment

- ▶ **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:



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?

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 $c(\cdot)$ 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.