Window Shopping

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Definitions and motivation

Definition

The terms window shopping and showrooming refer to the activity in which potential buyers visit a brick-and-mortar store to examine a product but end up either not buying it or buying the product from an online retailer.

Remark: Window shoppers also includes recreational shoppers (not analyzed in this paper) who simply spend time in shopping malls browsing and visiting stores.

Motivation for this research

- Explain how window shopping and online shopping can coexist
- Compute equilibrium prices
- Analyze welfare implications: Is window shopping excessive?

Observations

Consumer Reports, December 2012 survey of 10,000 readers:

1. 18% bought electronic products online after they had examined the products in a brick-and-mortar store
2. More than half of this group eventually bought from Amazon.com

- Online shopping in the United States accounted for 7% of all retail sales in 2011 and 2012
- U.S. e-retail will represent 9% of all consumer purchases by 2016
- online shoppers in the U.S. will spend $327 billion in 2016, up 45% from $226 billion in 2012 and up 62 percent from $202 billion in 2011
- a compound annual growth rate of 10.1% over the five-year forecast period

Literature

The paper draws heavily from Shin (*Marketing Science*, 2007):

- Consumers who are uncertain whether the product suits their needs
- buyers benefit from an in-store expert advice (inspecting the product)
- the retailer that does not provide pre-sale service may be able to free ride on a pre-sale service provided by the rival vendor.

But, the papers differ in:

- In Shin's model, the 2 retailers are identical. One chooses to provide service to differentiate itself from the rival
- Consequently, under equal prices, all buyers can patronize only one store
- Not the case in the present paper.

Literature (Con'd)

Theoretical papers:

- Carbajo, De Meza, and Seidmann (*J. Ind. Econ.*, 1990) and Horn and Shy (*IER*, 1996) show that bundling service with sales eliminates price competition
- Friberg, Ganslandt, and Sandstrom (2001) model price competition between online and walk-in retailers in the absence of window shopping

Empirical papers:

- Forman, Ghose, and Goldfarb (*Mgt. Sci.*, 2009), Farag et. al (2006–7), Forman, Ghose, and Goldfarb (2009), Cao (2012), and Cao, Xu, and Douma (2012) investigate the effect of online shopping and online search on traditional shopping
- Brynjolfsson and Smith (2000) find that online prices are 9–16% lower than prices in conventional retail outlets, depending on shipping and taxes

The Model: Potential buyers

$2N$ *potential* buyers ("potential" means that some will not buy)

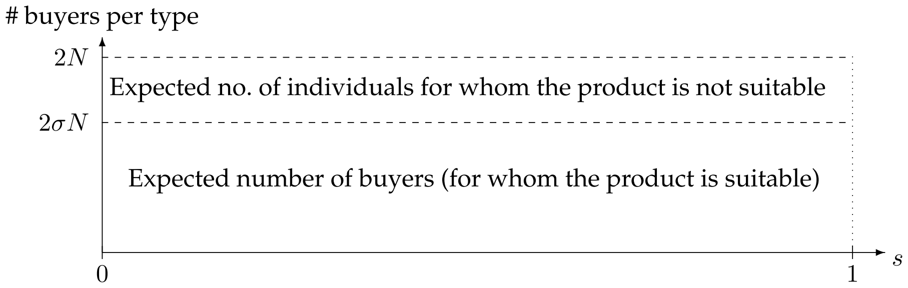
Ex-ante heterogeneity: 2 dimensions

1. N consumers bear $t = \tau > 0$ cost of traveling to the walk-in store
   N consumers do not bear this cost ($t = 0$)
2. $s =$ value buyers attach to *after*-sale service (installation, easy return, answering questions), where $s \in (0, 1)$.

Ex-post heterogeneity:

$0 < \sigma < 1$ fraction that will find the product *suitable* for their needs
Uncertainty can be resolved by: (i) buying the product or (ii) physically inspecting the product at the walk-in store

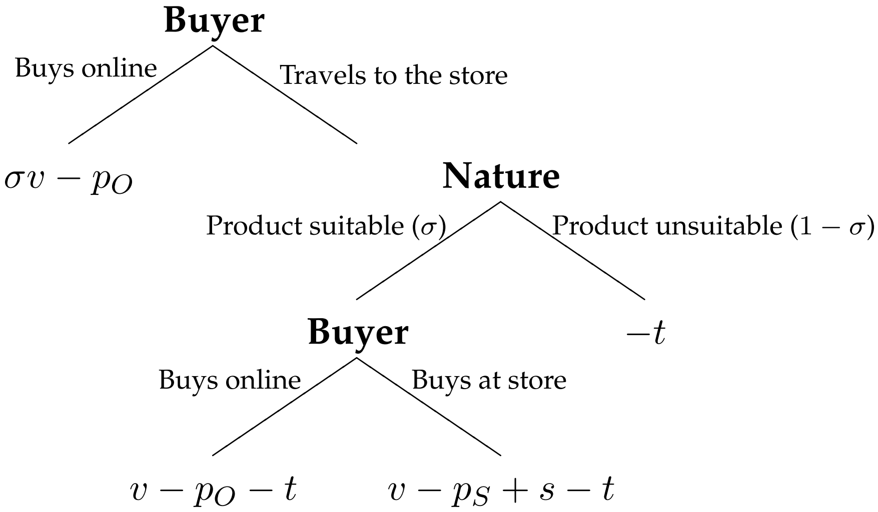
The Model: Potential buyers (con'd)



- v = basic value derived from consuming a *suitable* product.
- Expected utility of a buyer $s \in [0,1]$ with $t \in \{0, \tau\}$ is $u(s,t) =$

$$\begin{cases} \sigma v - p_O & \text{Buys directly online (without first going to the store)} \\ -t & \text{Travels to the store and finds the product unsuitable} \\ v - p_O - t & \text{Travels to the store, finds it suitable, but buys online} \\ v - p_S + s - t & \text{Travels to the store, finds it suitable, and buys at the stor} \end{cases}$$

The Model: Decision sequence and payoffs



Equilibrium: Decision while at the walk-in store

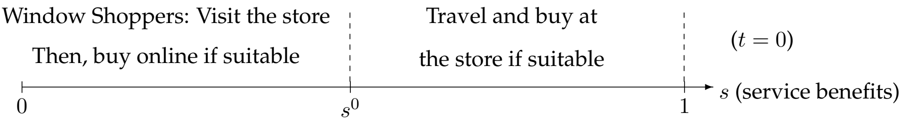
After a potential buyer visits a store, transportation cost t becomes sunk irrelevant for the purchase-no-purchase decision.

While at the store, potential buyers have 3 options:

(i) Find the product unsuitable (prob/frac σ). Do not buy (payoff $= -t$)

(ii) Buy at the walk-in store (payoff $= v + s - p_S - t$)

(iii) Leave the store, buy online (payoff $= v - p_O - t$)



- Service-oriented buyers $s \geq s_0$ buy at the store.
- Others, $s < s_0$, leave the store and buy online.

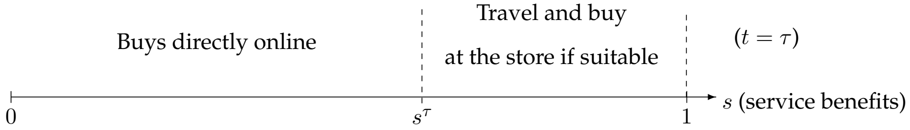
Note: All the N buyers with $t = 0$ (no cost) visit the walk-in store

Equilibrium: The decision to visit the store of the N consumers with $t = \tau > 0$

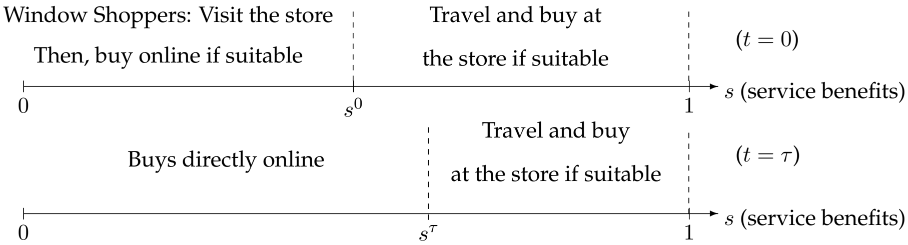
Expected benefit from visiting the store (high s consumers):

$$\underbrace{(1-\sigma)(-\tau)}_{\text{Not suitable}} + \underbrace{\sigma(v + s - p_S - \tau)}_{\text{product suitable}}$$

Expected benefit from buying directly (no prior inspection) online (low s consumers): $(1-\sigma) - p_O$



Equilibrium: Profits and market shares



$\pi_O = p_O \left[s^0 \sigma N + s^\tau N \right]$ (profit of the online retailer)

Observe the $\sigma s^0 N$ who are "window shoppers"

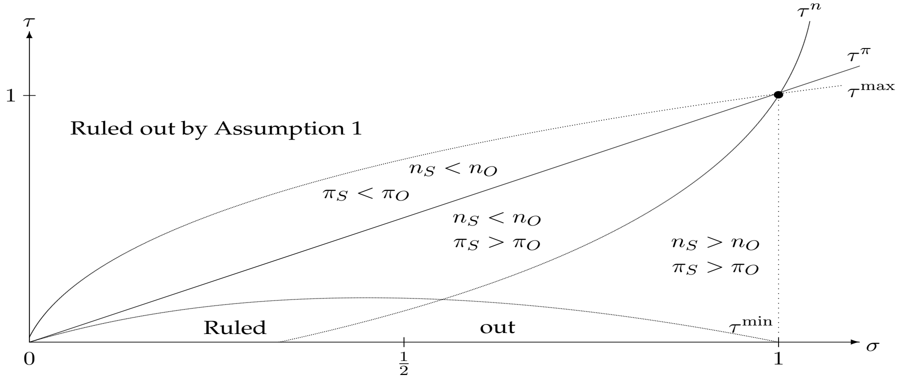
Observe the $s^\tau N$ who buy online without inspecting the product first

$\pi_S = p_S \left[(1 - s^0)\sigma N + (1 - s^\tau)\sigma N \right]$ (profit of the walk-in store)

Results: Profits and market shares

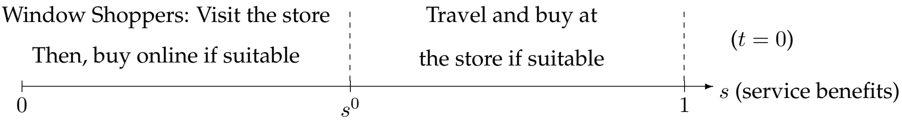
There exists a threshold transportation cost τ^n below which

1. the walk-in store's sales level exceeds that of the online retailer ($n_S \geq n_O$);
2. the walk-in stores' revenue level exceeds that of the online retailer ($\pi_S \geq \pi_O$).



Results: Welfare analysis

Setting prices to marginal cost: $0 = p_O = p_S$ yields $\hat{x}^0 = 0 < s^0$.



Hence, from a social welfare perspective, window shopping behavior is excessive.

That is, the equilibrium number of window shoppers exceeds the optimal number.

Results: Joint Ownership

- Suppose, the walk-in and the online retailers merge
- Joint ownership chooses p_O and p_S to maximize joint profit:

$$\max_{p_O, p_S} \pi_J = p_O n_O + p_S n_S$$

Research question: Will joint ownership eliminate excessive window shopping?

Answer: No! $s_J^0 > \hat{s}^0 = 0$

Why is that? Buyers are heterogeneous in 2 dimensions: t and s
So what? Two instruments, p_S and p_O are insufficient to correct for the widow shopping externality (common to many model with vertically-differentiated brands)

Results: Unequal marginal costs

So far we assumed $c_O = c_S = 0$. Now let $c_O \neq c_S$

$\pi_O = (p_O - c_O)\left[s^0\sigma N + s^\tau N\right]$ (profit of the online retailer)

$\pi_S = (p_S - c_S)\left[(1 - s^0)\sigma N + (1 - s^\tau)\sigma N\right]$ (profit of the walk-in store)

Optimal s^0 satisfies $\hat{s}^0 = c_S - c_O$, so the optimal number of window shoppers is proportional to the online retailer's cost advantage

$$\text{Also,} \qquad \frac{\partial(s^0 - \hat{s}^0)}{\partial c_S} < 0$$

Hence, the gap between the equilibrium number of window shoppers and the optimal number becomes smaller with an increase in the walk-in store's marginal cost, c_S

Remark: Introducing fixed costs, F_O and F_S, can be solved using a zero-profit equilibrium (marginal cost pricing yields a loss)