

Unless otherwise noted, the content of this course material is licensed under a Creative Commons Attribution - Non-Commercial - Share Alike 3.0 License.

<http://creativecommons.org/licenses/by-nc-sa/3.0/>

Copyright 2008, Jeffrey K. MacKie-Mason

You assume all responsibility for use and potential liability associated with any use of the material. Material contains copyrighted content, used in accordance with U.S. law. Copyright holders of content included in this material should contact [open.michigan@umich.edu](mailto:open.michigan@umich.edu) with any questions, corrections, or clarifications regarding the use of content. The Regents of the University of Michigan do not license the use of third party content posted to this site unless such a license is specifically granted in connection with particular content objects. Users of content are responsible for their compliance with applicable law. Mention of specific products in this recording solely represents the opinion of the speaker and does not represent an endorsement by the University of Michigan.

# Hidden Characteristics II: Versioning

SI 680, ICD: Signaling and Contracting  
Prof. Jeff MacKie-Mason

April 2, 2008

## 1 Motivation

Willingness-to-pay is classic //hidden characteristic//: buyer knows how much a good is worth to her, seller doesn't know.

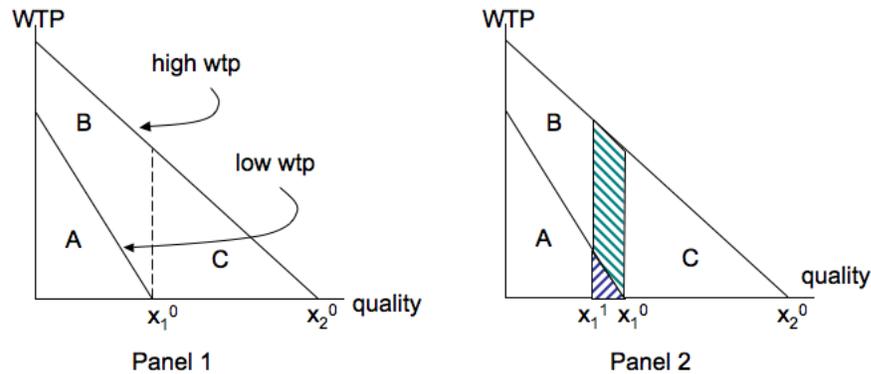
- If seller faces lots of competition, may not matter: competition forces  $P = MC$ , independent of WTP
- But what if  $\Pi = P \times Q - \text{Total Cost} = MC \times Q - \text{Total Cost} < 0$ ? For example, if  $MC = 0$ ?
- Then  $P > MC$ : now WTP does matter for  $P$  (can't set  $P > WTP$ )

If WTP heterogeneous, might want to (might //need// to if competition forces it) charge different users different amounts: get more from those with high WTP

- Differential pricing
- How to sort buyers into different WTP classes?
  - Perhaps WTP correlated with observable characteristic (seniors, students, business v. vacation travel, etc.) (“Partially observable” characteristics)
  - What about the unobservable part? Get buyers to reveal through self-selection (choose from a menu of contracts)
  - Self-selection on what dimensions?
    - \* quantity
    - \* bundle of features
    - \* quality
  - These last two are instances of *versioning*

## 2 Graphical analysis of versioning

- Single item
- Two types of buyers, low and high WTP for quality. (Draw two WTP for quality curves (how much WTP for each incremental unit of quality))
- If full information, firm would charge  $A$  to low types for quality  $x_1^0$ , and charge  $A+B+C$  to high types for  $x_2^0$
- But, if not full information, self-selection not incentive compatible!
  - Seller gets all surplus, buyers get 0
  - If high type pretends to be low type, takes  $x_1^0$  for price  $A$ , gets to keep surplus  $B > 0$ . See Figure (1).



The graphs show the willingness-to-pay for various qualities by two different consumer types: those with high WTP and those with low WTP

Figure 1:

- Suppose seller offers high quality for  $A+C$ 
  - \* high types get to keep surplus  $B$ , no incentive to lie
  - \* seller gets increase of  $C$  in revenues
- Seller can do better: degrade product for low type

- \* reduce quality to low type to  $x_1^1$
- \* lose blue shaded from low type, gain green from high type
- \* at starting point, marginal loss on low types is zero, gain on high types positive, so unambiguous increase by lowering low-type quality at least some
- How far to lower low-type quality?
  - \* if  $\{N_L, N_H\}$  of each type, go until  $N_L \Delta \text{blue} = N_H \Delta \text{green}$
  - \* Special case: if  $N_L = N_H$ , then go until the dividing line is bisected

**QUESTION:** What is the incentive compatibility constraint above?

$$u(q_2) - t_2 > B$$