Exclusive contracts with costly rent extraction

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Conditional discounts

- Conditional (or loyalty) discounts:
  - Do not reference rivals
    - Quantity discounts (i.e. non-linear pricing)
    - Bundled discounts
  - Reference rivals
    - Exclusivity discounts
    - Market-share discounts

Conditional discounts

- The antitrust treatment of conditional discounts is one of the most controversial issues in competition policy
  - Many competing theories with different, sometimes opposite, policy implications
  - Limited empirical analyses
  - Difficult to translate theoretical findings into simple criteria that are practically applicable by antitrust authorities and the courts

Competition policy and Exclusive contracts

- Since *Hoffman-La Roche*, discounts that reference rivals' output are nearly *per se* illegal in Europe
  - The only possible defense is "objective justification" (burden of proof and proving efficiency effects, difficult!)
- In the US, policy is based on rule of reason
  - Exclusive contracts are more likely to be regarded as anticompetitive if
    - They are used only by the dominant firm
    - The duration of the contracts is long
    - The share of the market that is foreclosed is large

Exclusive contracts

- Excusive contracts
  - Firm i offers two different price schedules, $P_i^E(q_i)$ when $q_j = 0$, and $P_i^{NE}(q_i)$ when $q_j > 0$
    - The firm can enforce exclusive dealing by offering $P_i^{NE}(q_i) = \infty$
- Market-share discounts
  - Again two different price schedules, but now which one applies depends on whether the ratio $q_i/(q_i+q_j)$ exceeds a critical threshold chosen by the firm (e.g. 80%)
    - More generally, $P_i = P_i(q_i,q_j)$

Theories

1. Benchmark: Neutrality
   - Exclusive dealing is irrelevant
2. Pro-competitive theories
3. Anti-competitive theories

1. Neutrality theory

- Suppose some sellers deal with a buyer: "*If sellers can use non-linear pricing, exclusive or market share contracts are irrelevant/neutral*"
  - O'Brien and Shaffer (JEMS 1997); Bernheim and Whinston (JPE 1998)
  - In fact, two-part tariffs are already flexible enough for this
- Why? A firm can extract, by means of the fixed fee, all of the buyer's surplus in excess of what the buyer may get by trading exclusively with rivals
  - Hence, a firm will offer contracts that maximize that bilateral surplus:
  - The fixed fee allows to extract whatever bilateral surplus generated dealing with the buyer
  - Optimally set marginal price at marginal cost (bilateral efficiency)
- Overall efficiency follows
  - hence whenever exclusivity reduces surplus, it will not be observed in equilibrium and sellers will not want to implement it (in Pareto-undominated equilibria)
- A modern version of the Chicago critique

2. Pro-competitive theories

- Chicago School theories: exclusive contracts serve to protect some kind of relation-specific investment made by the firm (double-moral hazard)
  - Marvel, JLaw&Ec 1982; Segal and Whinston, RAND 2000
  - E.g. the firm invests in the buyer who is a retailer, offering sales and marketing skills. These could be used by the (common) retailer to the benefit of rival firms as well. To avoid this and have an incentive to invest, then impose exclusivity
  - Tend to imply that all active firms should enter into exclusive arrangements with their customers

3. Anti-competitive theories

- Entry deterrence models: a seller may sacrifice profits in the short run to deter or impede entry by a potential entrant
  - Aghion and Bolton (AER 1987)
  - Rasmusen, Ramseyer and Wiley (AER 1991)
  - Asker and Bar-Isaac (AER 2014)

- Hence, antitrust treatment of exclusive dealing should be here based on the premises of **predation or rising rivals' costs** (the two theories of harm currently used in antitrust for exclusive dealing)
  - In the US: need to provide evidence of possibility of recoupment
  - In Europe: show below-(marginal) cost pricing (EU Commission's approach in e.g. Intel, difficulty in determining contestable market)

- Problems: in many antitrust cases, facts do not square well with these theories

Common stylized facts

- Typical situation involves (e.g. *Intel vs. AMD*, but also others)
  - A **dominant firm**, that controls a substantial share of the market and has entered into some kind of **exclusive arrangement** with some of its customers (foreclosing some part of the market)
  - A **smaller competitor** (or group of competitors) that has been active in the industry for some time and apparently **has not used exclusive contracts** although could have used too

Adverse selection

- Suppose a buyer is privately informed about his demand
- Thanks to his private information, the buyer obtains an informational rent
- In the trade-off between (imperfect) rent extraction and maximizing surplus, sellers set **marginal prices that exceed marginal cost**
  - to appropriate some of the rent they cannot fully extract, even if this comes at the cost of distortions

Incentive to offer exclusive contracts

- Hence, firms that supply substitute products have a unilateral incentive to offer exclusive contracts
  - Start from the equilibrium without exclusive contracts
  - A firm may impose exclusive dealing at a (marginal) price ε-lower than the rival:
    - Buyer accepts this offer: alternative is now exclusivity with rival at ε- higher price
    - Firm obtains larger demand because of substitute products
    - Since initially prices are larger than marginal costs, this is a profitable deviation

The effects of exclusive offers

- Given the incentives to offer exclusive contracts, what is then the equilibrium outcome?
- General idea: Offering exclusive deals, firms move from **competition** at the **intensive margin** to competition at the **extensive margin**
  - Intensive: compete for each marginal unit
    - competition is mitigated by product differentiation
  - Extensive: compete in utility-space
    - the intensity of competition is independent of product differentiation

The effects of exclusive offers

- When sellers are symmetric (CD 2013) or similar
  - Competition in utility space is cut-throat: nobody wins
  - Prices and profits decrease (prisoners' dilemma)
  - CS and SW increase
  - Overall: PRO-COMPETITIVE
- When a seller has significant competitive advantage (better product or more efficient, CD 2015)
  - competition in utility space is now *less* intense than competition for marginal units
  - The dominant seller can leverage on the info rent it must leave to the buyer
  - Exclusive prices are higher than with competition on marginal units
  - Overall: ANTI-COMPETITITVE

Problems with this theory

- Asymmetry of information may not be pronounced in some industries in which exclusive contracts are used
- In the adverse selection model, equilibrium price schedules are very complex
  - In practice, simpler pricing schemes are often observed
- How robust is the theory?
  - Do results crucially depend on the adverse selection hypothesis?
  - Do results survive if firms, for some reasons, are restricted to simpler pricing strategies?

- The present paper: we show that the models with incomplete information (CD 2013, 2015) in fact contain **the elements of a new general theory of harm**
  - incomplete information and complex contracts are not really needed

This paper

- We develop a model that contains the key ingredients of such general theory:
  1. **Sellers actively competing in the market**
  2. **Prices higher than marginal costs**

- In the literature, to our knowledge, there are only 3 such cases:
  - Our papers with incomplete information
  - An example in Bernheim and Whinston (JPE 1998) with risk-averse buyers
  - Mathewson and Winter (AER 1987), where sellers are restricted to linear pricing
- In fact, a unifying principle relates all these models

Bernheim & Whinston

- Bernheim and Whinston (1998, Sect. V) focus on two special cases:
  - Perfect substitutes with symmetric costs
    - In this case, sellers' profits vanish but exclusive dealing must prevail in equilibrium
    - Common representation would impede the supply of insurance
      - which requires marginal price to exceed marginal cost so as to make room for a negative fixed fee, which stabilises the buyer's payoff
  - Independent products
    - In this case, if exclusive contracts are permitted then in equilibrium common representation prevails
    - However, if exclusive contracts are banned there is no pure strategy equilibrium

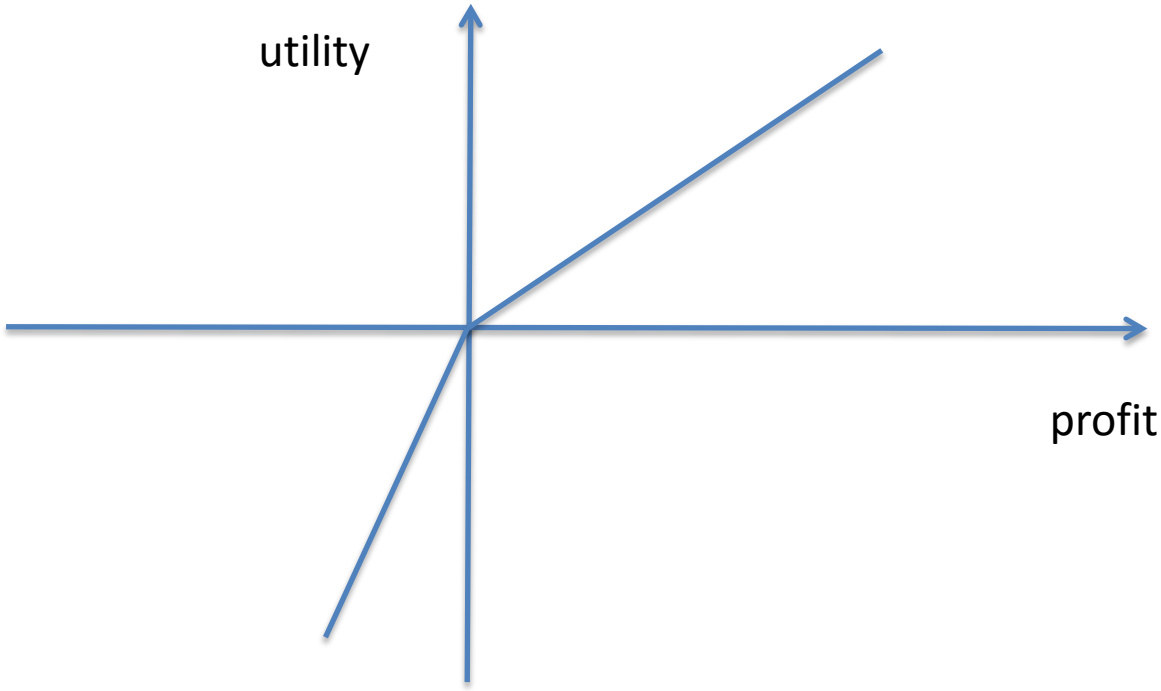
Risk aversion

- The CARA assumption implies that buyers benefit from income stabilisation even if losses are already prevented
  - The provision of insurance is then similar to the provision of other services
    - This had already been analysed by pro-competitive theories
  - The fact that the buyer likes income stabilisation even beyond the point where losses are avoided creates the effects which are responsible for the paradoxical results mentioned above

Piecewise lineat utility

- We assume that the buyer's VNM utility function is piecewise linear, with a kink at the
  - This specification of the risk aversion assumption implies that the use of the fixed fee is costly only to the extent that it creates the possibility of losses
  - As long as losses are avoided, the buyer does not care about the variability of profits
- This specification allows us to make progress towards a fuller characterisation of equilibria

Loss aversion



Model

- Two differentiated goods A and B
- Good A is of better quality or less costly to produce
  - Unit cost of producing B is c, and 0 for A
- Good A is produced by seller A, good B either by a Competitive Fringe (model I) or by a rival duopolist B (model II)
- We assume sellers can only offer (possibly menus of) simple two-part tariffs

$$P_i = p_i q_i + F_i$$

- The (single) buyer obtains a (gross) profit $\Pi(q_A, q_B, \theta)$ associated with uncertain and multiplicative demand

$$\theta q_i(p_i, p_j)$$

[as in BW 1998] where the shock is θ with density $f(\theta)$

Notice: with nil fixed-fees, then non-negative profit Π

Uniform-quadratic case

- Although many results can be generalised, for simplicity the presentation focuses on the uniform-quadratic model in which the buyer's profit function is

$$\Pi = (q_A + q_B) - \frac{1}{2\theta}({q_A}^2 + {q_B}^2) - \frac{1}{\theta}\gamma q_A q_B$$

where θ, which measures the level of demand, is uniformly distributed over $(0,1]$

- Demand functions are

$$q_i = \theta \frac{1-\gamma-p_i+\gamma p_j}{1-\gamma^2}$$

- γ, ranging from 0 to 1, measures the degree of product differentiation
  - $\gamma = 1$ perfect substitutes
  - $\gamma = 0$ independent products

Timing

- Sellers simultaneously and independently offer contracts
- Buyer chooses which contract(s) to sign
- Uncertainty is realised
- Buyer makes purchases and payoffs are realised

Loss aversion

- Buyer's net payoff is

$$\pi = \Pi - p_A q_A - p_B q_B - \text{fixed fees}$$

- *Ex ante* (at the contracting stage), the buyer assesses the possible outcomes according to the expected utility function

$$(1+\lambda) \int_{\pi(\theta)<0} \pi(\theta) f(\theta) d\theta \quad + \int_{\pi(\theta)>0} \pi(\theta) f(\theta) d\theta$$

- Reservation payoff normalised to 0
- With $F = 0$, the region of losses (i.e. the first integral) is empty
- With $F > 0$, the buyer makes losses if demand is sufficiently low

Loss aversion

- Here, as long as losses are avoided, the buyer here does not care about the variability of payoffs
  - And losses can be avoided by simply setting fixed fees to nil
  - This avoids the "spurious" effects of insurance services of the risk-aversion model also when $F_i=0$
- Still, if a seller wants to extract rent from the buyer with $F_i>0$, he imposes a cost to the buyer (the buyer may end up in the losses region)
- As with the Reduced Form model, **rent extraction is costly**
- Differently from it, here the cost of using the fixed fee is not exogenous, endogenously determined by the level of prices, fixed fees and shock realization
- Differently from the Risk-Aversion model, this model is simpler to analyze and can be fully characterized

Rewriting sellers' payoffs

- In both the Loss-Aversion model and Reduced-form model, substituting the fixed fee from the buyer's binding participation constraint (no extra rent is left)

$$\Pi\text{-}p_A q_A\text{-}F_A\text{-}payments\_to\_B=\Pi_{\text{-}A}$$

  firm A's objective is to maximize

$$p_{\mathrm{A}} q_A \frac{\lambda}{1+\lambda}+\left(\Pi-payments\_to\_B\right)\frac{1}{1+\lambda}$$

  a weighted average of its variable profits and (bilateral) surplus with weights depending on λ

Limit cases

$$p_A q_A \frac{\lambda}{1+\lambda} + (\Pi - payments\_to\_B)\frac{1}{1+\lambda}$$

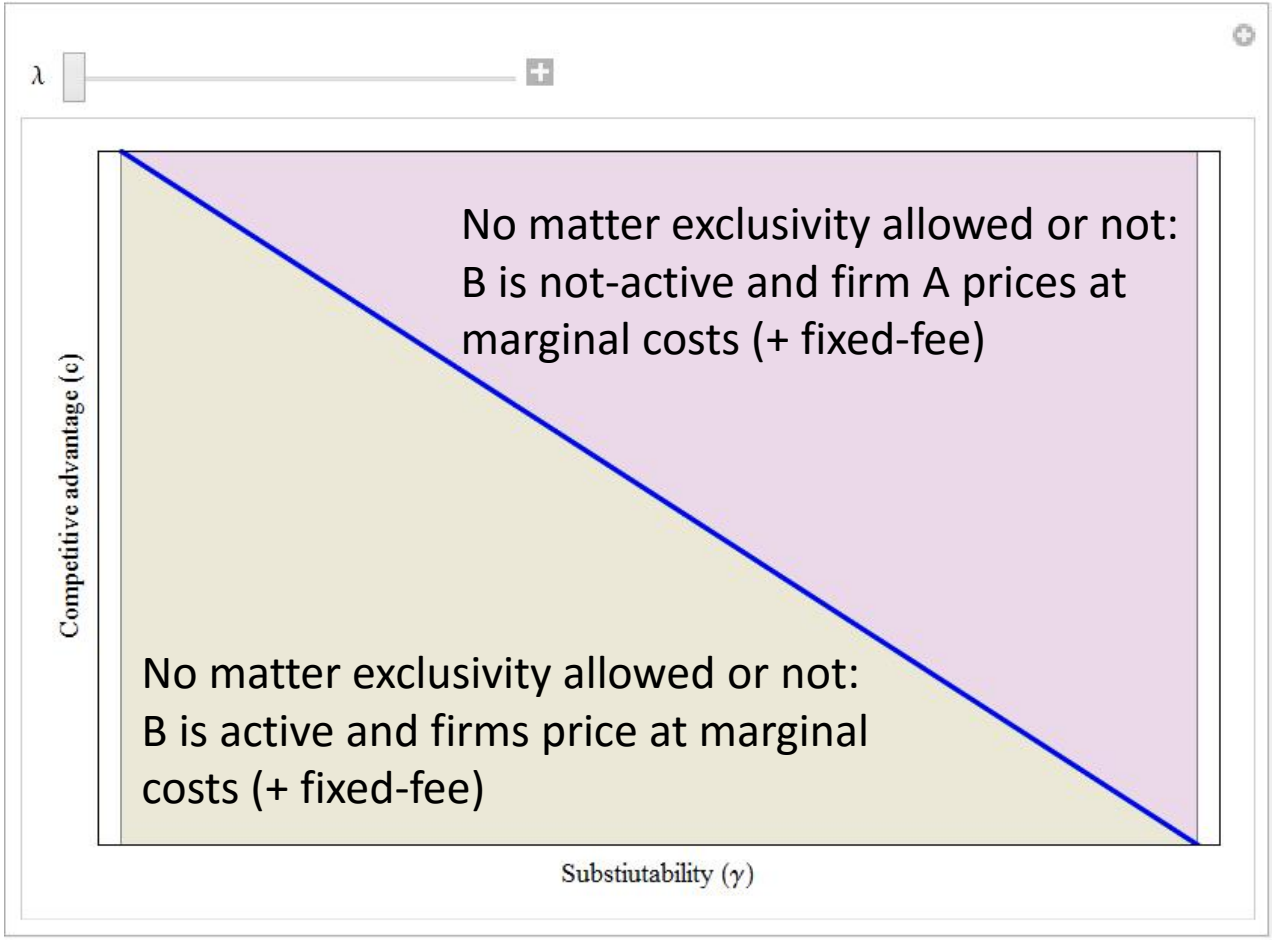
- In both the Loss aversion model and the Reduced for model:
  - **As $\lambda \to 0$**: fixed fees have no cost and thus they are used at a point in which prices become equal to marginal cost: **Neutrality result** (Bernheim and Whinston, JPE 1998)
  - **As $\lambda \to \infty$**: fixed fees become so costly that they are set to zero, and the equilibrium converges to that it would obtain when firms are restricted to **linear prices** (Mathewson and Winter, AER 1987)

Many models and cases in this paper…

- Four different combinations:
  - Competitive fringe or Duopoly
  - Loss aversion or Reduced form
- Different values of the cost of using the fixed-fee λ

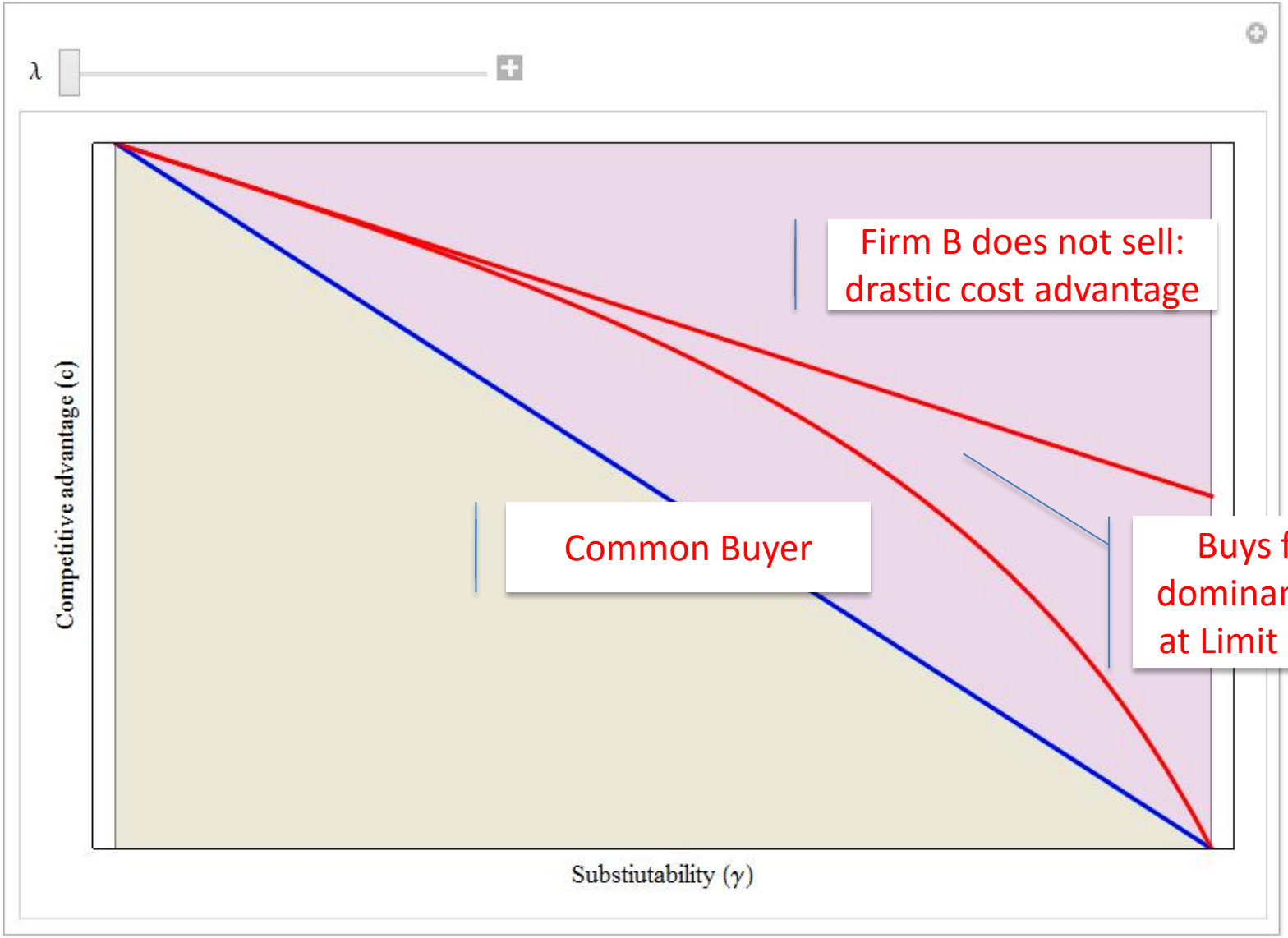
- Road map of the talk:
  - Two limiting cases: $\lambda=0$ (no-cost of fixed fee) and $\lambda=\infty$ (fixed fees so costly that not used, only linear-pricing) with Fringe & (Reduced-Form or Loss-Aversion)
  - Any $\lambda \neq 0$ with Reduced-Form & Fringe
  - $\lambda=\infty$ and Duopoly
- We will compare equilibria when sellers cannot offer exclusive contracts vs. when they can

$\lambda=0$ (no-cost of fixed fee) & Fringe



- The blue line is the "Positive Primary Output" line, i.e. loci of nil quantity of firm B in the efficient allocation
- The Neutrality result [same with duopoly]

$\lambda = \infty$ (linear-price) & Fringe: **No exclusive**

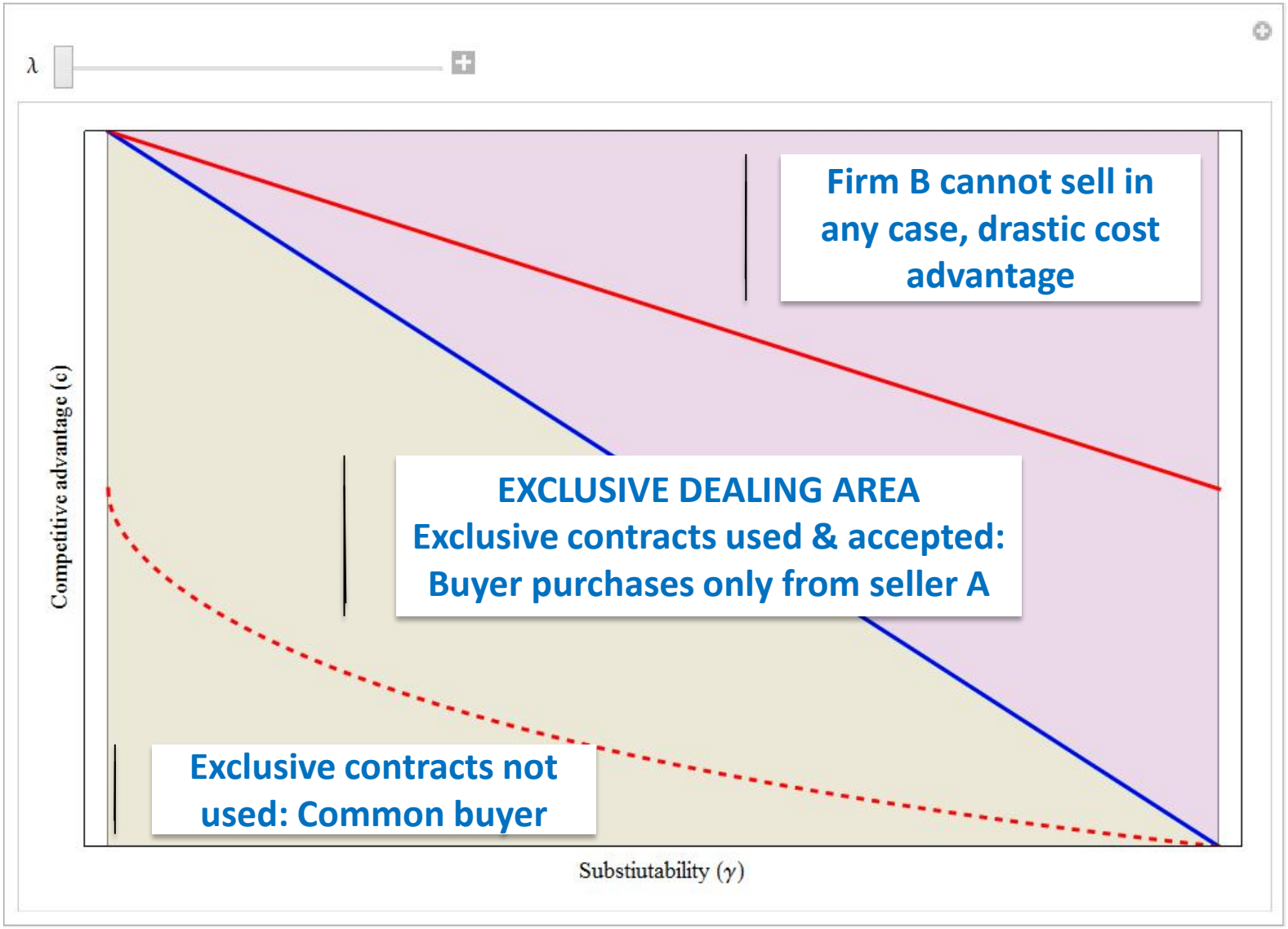


$\lambda = \infty$ (linear-price) & Fringe

- Exclusive contracts allowed: when offered?
  - When c is very large, B cannot sell in any case independently of exclusivity (drastic dis-advantage)
  - When c is intermediate (the Exclusive Dealing Area):
    - The dominant firm A is actually shielded from competition and can thus exploit its dominant position to its advantage and keep the price higher than with competition on marginal units
    - Buyer does not need to be compensated: the alternative of trading with the fringe gives a lower profit because the fringe is relatively inefficient
  - When c is small, to compete with the fringe for exclusivity the dominant firm would have to cut its price by too much for the move to be profitable, exclusive contract not offered

- In the Exclusive Dealing Area: Exclusive contracts are not neutral

$\lambda = \infty$ (linear-price) & Fringe: **Exclusive**



Are $\lambda=0$ and $\lambda=\infty$ extreme cases?

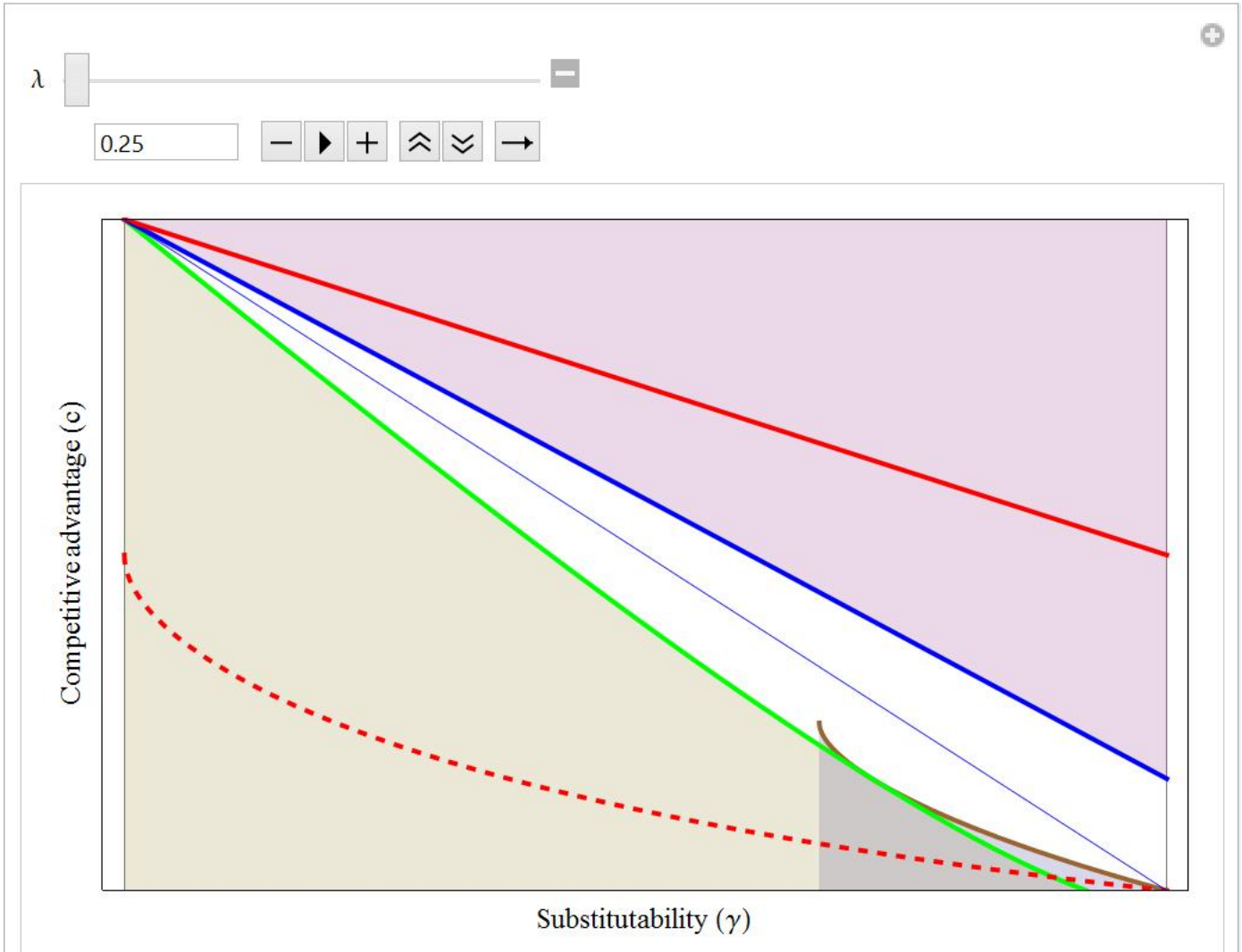
- We prove two general results

1. *For any $\lambda>0$, (i) there always exists an Exclusive Dealing Area (EDA) where the dominant seller offers an exclusive contract and the buyer accepts, (ii) this EDA is "around" the PPO line $c_{PPO}(\square)$.*

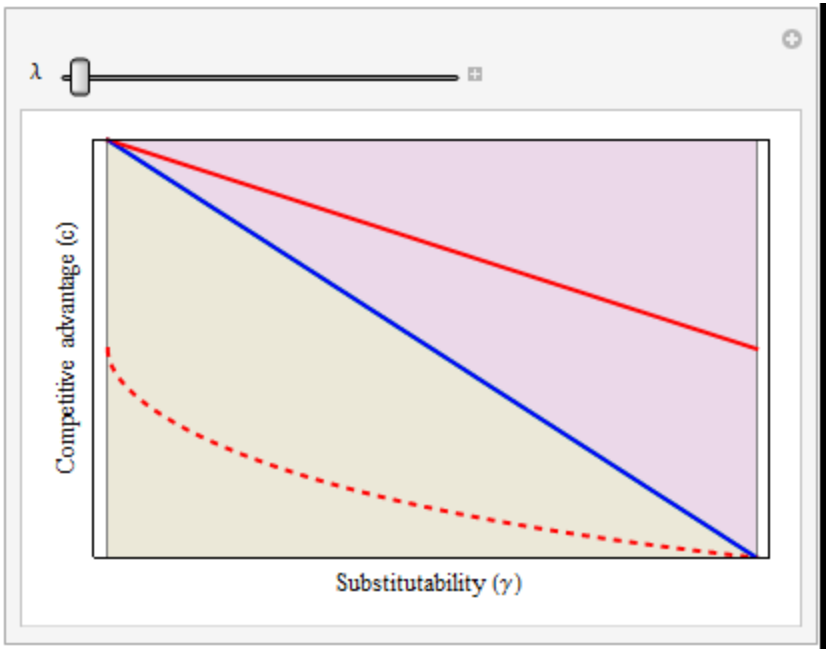
   The Exclusive Dealing Area is $[c(\square, \lambda), c_{drast}(\square, \lambda)]$, non-empty for any $\lambda>0$, and $c(\square, \lambda)<c_{PPO}(\square)<c_{drast}(\square, \lambda)$

2. *The model smoothly converges to the two extremes $\lambda=0$ and $\lambda=\infty$.*

The “Exclusive dealing area” appears for small λ and converges to that of linear pricing



Are $\lambda = 0$ and $\lambda = \infty$ extreme cases? Solving the model for any λ



Loss-aversion & Fringe

- Although the analysis is more complex and analytical results (even for the uniform-quadratic model) extremely cumbersome, qualitatively we have the same pattern as in the reduced form model
- As soon as $\lambda > 0$, there is a region (around the Positive Primary Output curve) where exclusive contracts become profitable

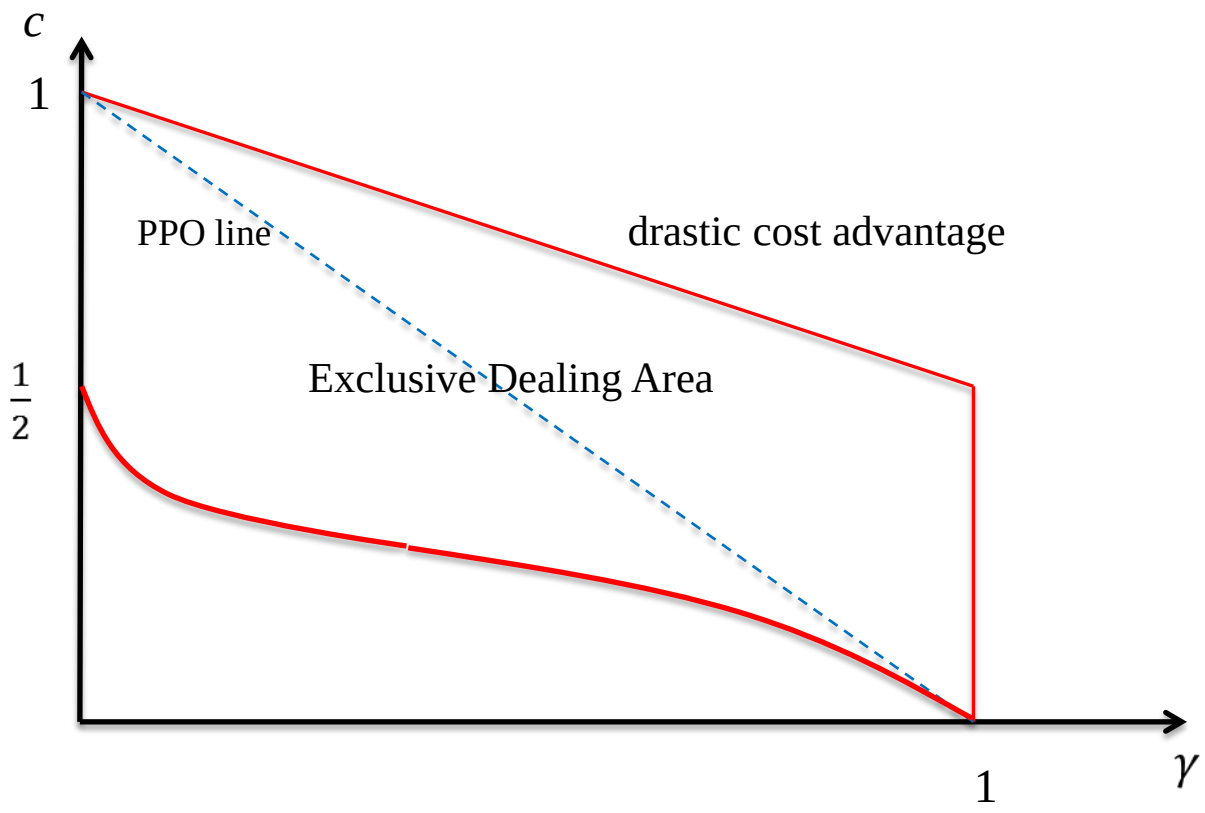
Limitations of the fringe model

- The competitive fringe model is simple but suffers from two main limitations
  - The **competitive fringe just breaks even** anyway (that is, both with and without exclusive contracts), which means that exclusive contracts cannot harm competitors by assumption
  - The **buyer's expected payoff is always driven to** what the buyer could get by trading exclusively with the fringe. But this does not depend on the dominant firm's strategy and the Fringe always prices at cost. Hence, exclusive contracts cannot harm the buyer either

Duopoly

- Things are different under duopoly, where exclusive contracts can harm both the buyer and the dominant firm's competitor
- As in the fringe model, both the loss aversion and the reduced form model's equilibria converge to the equilibrium with linear pricing as $\lambda \to \infty$
- We therefore focus on the duopoly equilibrium with linear pricing

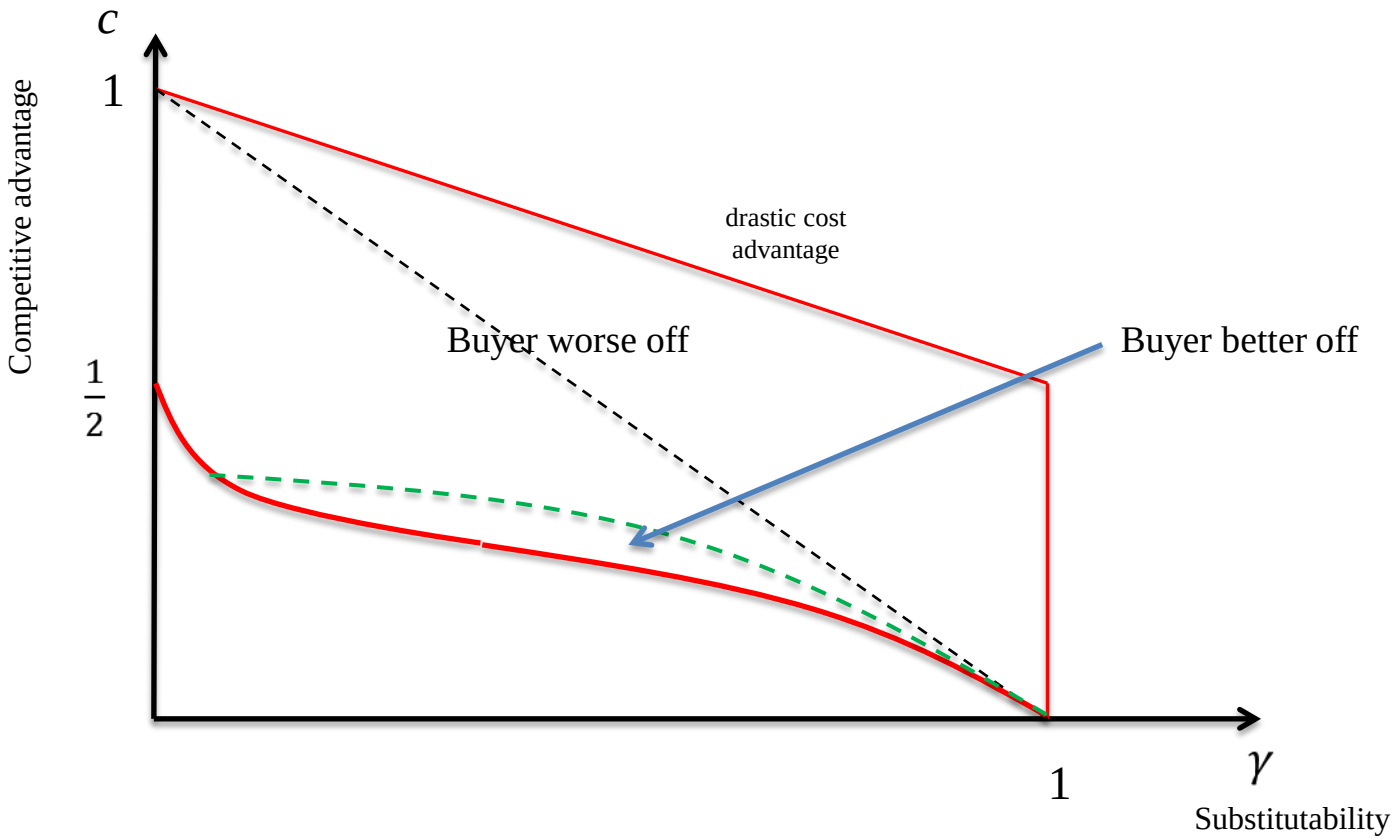
Duopoly & $\lambda = \infty$ (linear pricing)



Large competitive advantage

- Above the red curve, the equilibrium outcome is unique
  - Firm A undercuts firm B in the competition for exclusives pricing at $p^E = c$ or $p^E = \frac{1}{2}$ (whichever is lower)
  - Firm A gains, firm B loses,

Duopoly & $\lambda = \infty$ (linear pricing) **the Buyer in the EDA**



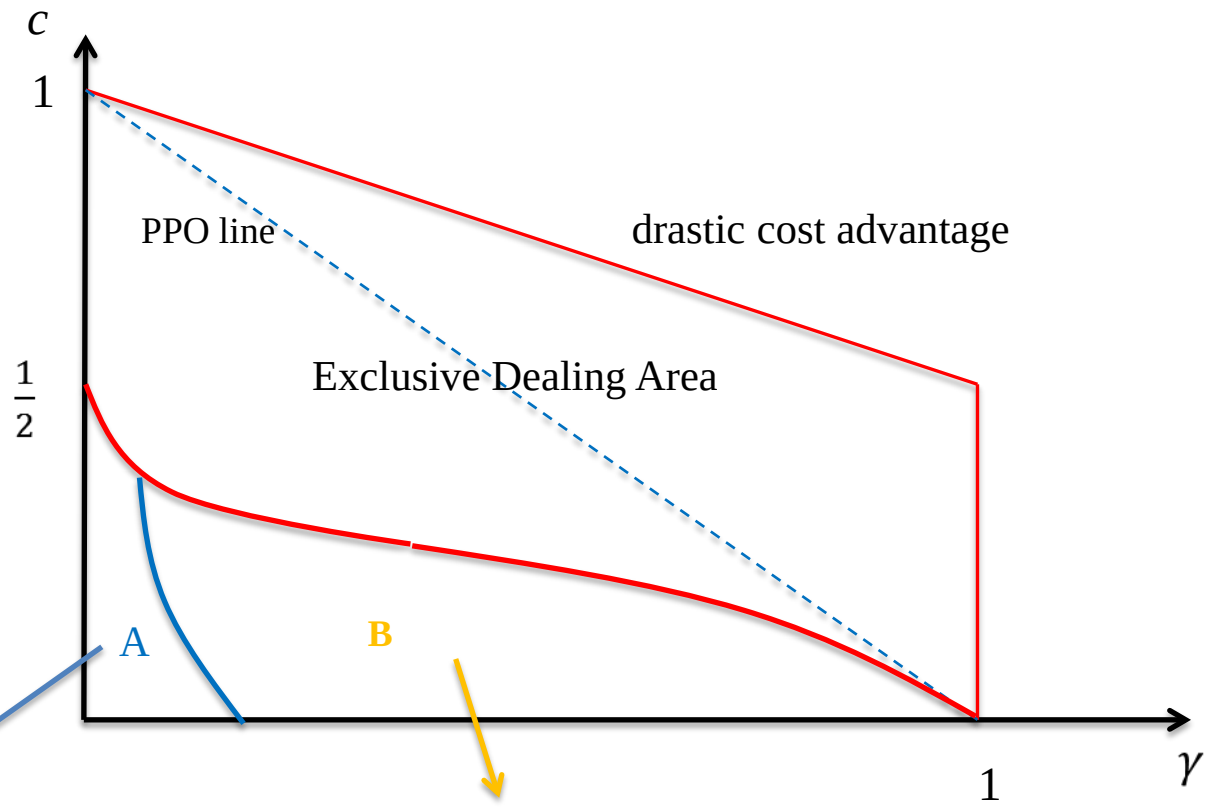
Intuition? Exclisive dealing with a more efficient firm rather than exclusive dealingwith the inefficient firm B, as long as not too inefficient

Small competitive advantage

- Below the red curve, there is always one equilibrium in which firm A undercuts firm B in the competition for exclusive pricing at p=c and the non-exclusive price is set so large that the buyer prefers the exclusive contract
  - However, firm A's profit is lower than in the common representation "Bertrand" equilibrium

- However, the equilibrium is not unique
  - Sellers can try to coordinate (increase) their exclusive prices so as to induce the buyer to opt for common representation by exploiting the buyer's preference for variety
  - These equilibria are Pareto-dominant for sellers: rich characterization

Duopoly, linear pricing



Neutrality [maximal coordination that neutralizes the pro-competitive effect]

Pro-competitive [some coordination on off-equilibrium exclusive price]

Region B

- Assume that firm A offers an exclusive contract at B's cost (minus a tiny discount to break indifference)
- However, both firms can price non-exclusive contracts so as to leave the buyer indifferent and obtain larger profits
  - gain extra profits by extracting the buyer's preference for variety

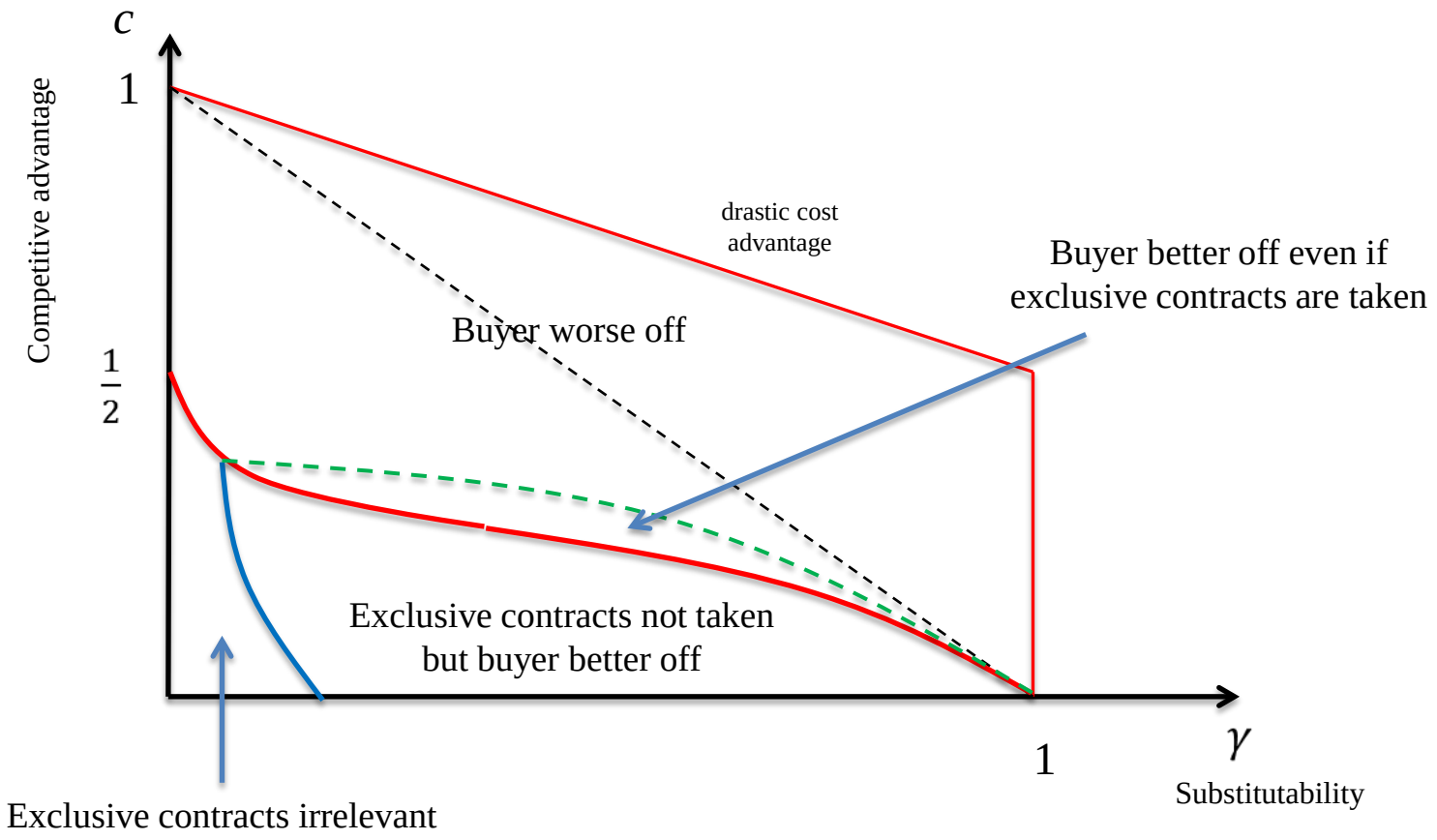
Region B

- In addition, firms can raise also the exclusive prices (as exclusive contracts are offered but are not accepted in equilibrium)
- Again, both firms price non-exclusive contracts so as to leave the buyer indifferent between exclusive dealing and common representation
  - and gain extra profits by extracting the buyer's preference for variety
- However, even allowing for the maximum possible level of coordination in a non-cooperative equilibrium, in region B the final outcome of allowing exclusive dealing is pro-competitive
  - The non-exclusive prices are lower than the Bertrand prices
  - The buyer is still better off
  - Both firms lose: dilemma

Region A

- In region A, the scope for coordination is so wide that firms manage to reproduce the Bertrand equilibrium
- In this region, exclusive contracts are neutral
  - If no exclusive contracts were offered, firms would have had a unilateral incentive to offer exclusive contracts
  - However, firms make barrage exclusive offers at prices which are sufficiently low that the deviation to exclusivity is unprofitable
  - These barrage bids allow the Bertrand equilibrium to be sustained

Duopoly, linear pricing
the Buyer



Main message I

- Independently of :
  - the specific type of competition (fringe or duopoly),
  - loss aversion, costly fixed fees (reduced for model)

  we have two effects…
  1. When the competitive advantage is large, equilibrium is unique and exclusive contracts are anti-competitive
  2. When the competitive advantage is small, either exclusive contracts are irrelevant or they are pro-competitive

Main message II

- These are the same qualitative results obtained in our Adverse Selection models
  - where full rent extraction is impossible
- In today models the buyer's rent was fully extracted (binding participation constraint) but this was costly
- Hence, we have a **new and general theory** of exclusive contracts and their 2 effects (previous slide)
- **What matters** for this theory is simply that:
  1. Prices are higher than marginal costs
  2. Extracting the rent from the buyer is costly

New policy perspective

- We show an important factor for antitrust evaluation: **difference between firms** determines if the dominant's rivals can **compete for exclusives effectively or not,** if not exclusivity anti-competitive
- Our theory shows that exclusive contracts **can be anti-competitive for reasons different** from those illustrated in existing theories and in situations to which previous theories would not apply
  - Rule of reason which focuses on competitors' ability to compete for exclusives effectively
- Important cases like Intel vs. AMD should be seen under a different perspective: probably Intel will be found guilty by the European Court of Justice but for the wrong reasons! (With large consequences in terms of damages too.)

Thank you!

Exclusive contracts
with costly rent extraction

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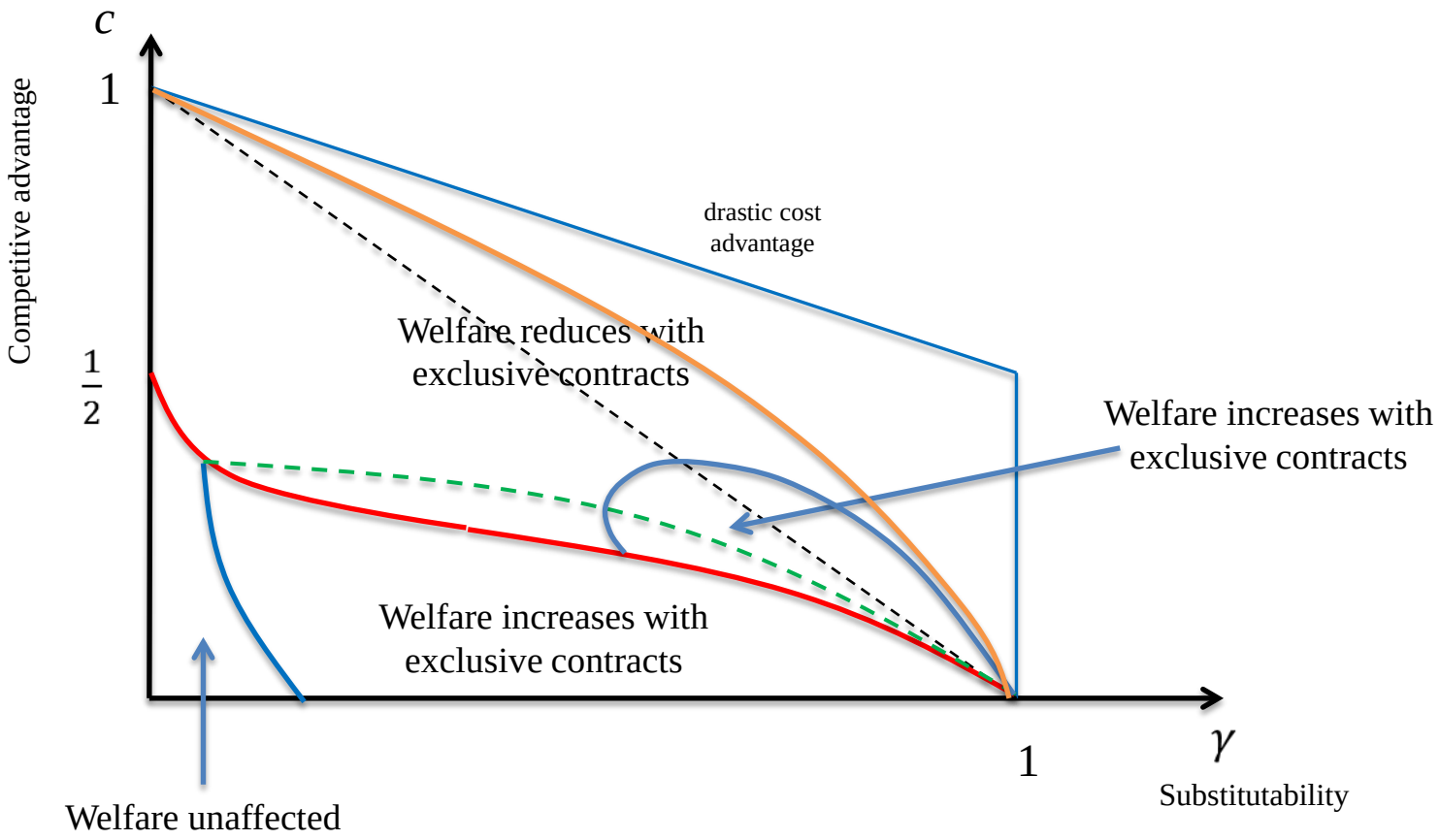
Duopoly, linear pricing
Welfare



Open questions: why below the PPO Exclusive dealing can increase welfare?

The boundary where exclusive dealing increases welfare is a complex one, not simple as with incomplete information