COMMERCIAL COOPERATION AND INNOVATION

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Toulouse School of Economics

INTRODUCTION (1/3)

- ***Commercial cooperation***
  - Joint ventures
  - Marketing alliances, co-branding
  - Patent pools, …
- ***Regulatory oversight***
  - Substitutes: cartels are undesirable
    - Short-term: too high prices / too little usage
    - Long-term: too little investment (*quiet life*)
  - Complements: cooperation is socially desirable
    - "Cournot effect:" avoiding double marginalization
    - Patents: royalty stacking
    - More generally, cooperation is called for: standards

INTRODUCTION (2/3)

- ***Issue: complements or substitutes?***
  - GrandMet/Guinness merger (portfolios of alcoholic beverages)

    Is vodka a complement or a substitute to whisky?
    - For a small party ("one bottle"): substitutes
    - For a larger party ("two bottles"): complements
  - Patent pools
    - Patents relating to alternative technologies
    - Patents relating to key ingredients of the same technology
    - Standard essential patents: *ex ante* vs. *ex post*
  - Moving target
    - Evolves over time
    - Endogenous: price level

INTRODUCTION (3/3)

- ***Industry oversight***
  - Sector-specific regulators
    - Detailed knowledge, on-going supervision
    - *Ex ante* intervention: regulations, data collection
  - Competition agencies
    - Across-the-board, mostly *ex post* intervention
    - Reluctance to let firms discuss prices
    - Few patent pools nowadays
    - Huge legal disputes: ("[F]RAND")
  - Calls for *information-free* screens
    - Rules on governance of Joint Marketing Alliances (JMAs)
    - Screening out bad JMAs, screening in good ones

SUBSTITUTES OR COMPLEMENTS? (1/2)

- ***Nested demand model*** for technology, in which Users
  - Pick which elements to select within technological class (substitutability)
  - Decide whether to adopt the technology at all (complementarity)
- ***Applies to technology & IP, but also more generally***
  - Online platforms
  - Content carried by cable operators
  - Payment systems used by merchants
  - Providers included in health insurance network (Katz 2011)
  - Music performance rights licensed by Pandora
  - Product portfolios (e.g., alcoholic beverages in *GrandMet*)

SUBSTITUTES OR COMPLEMENTS? (2/2)

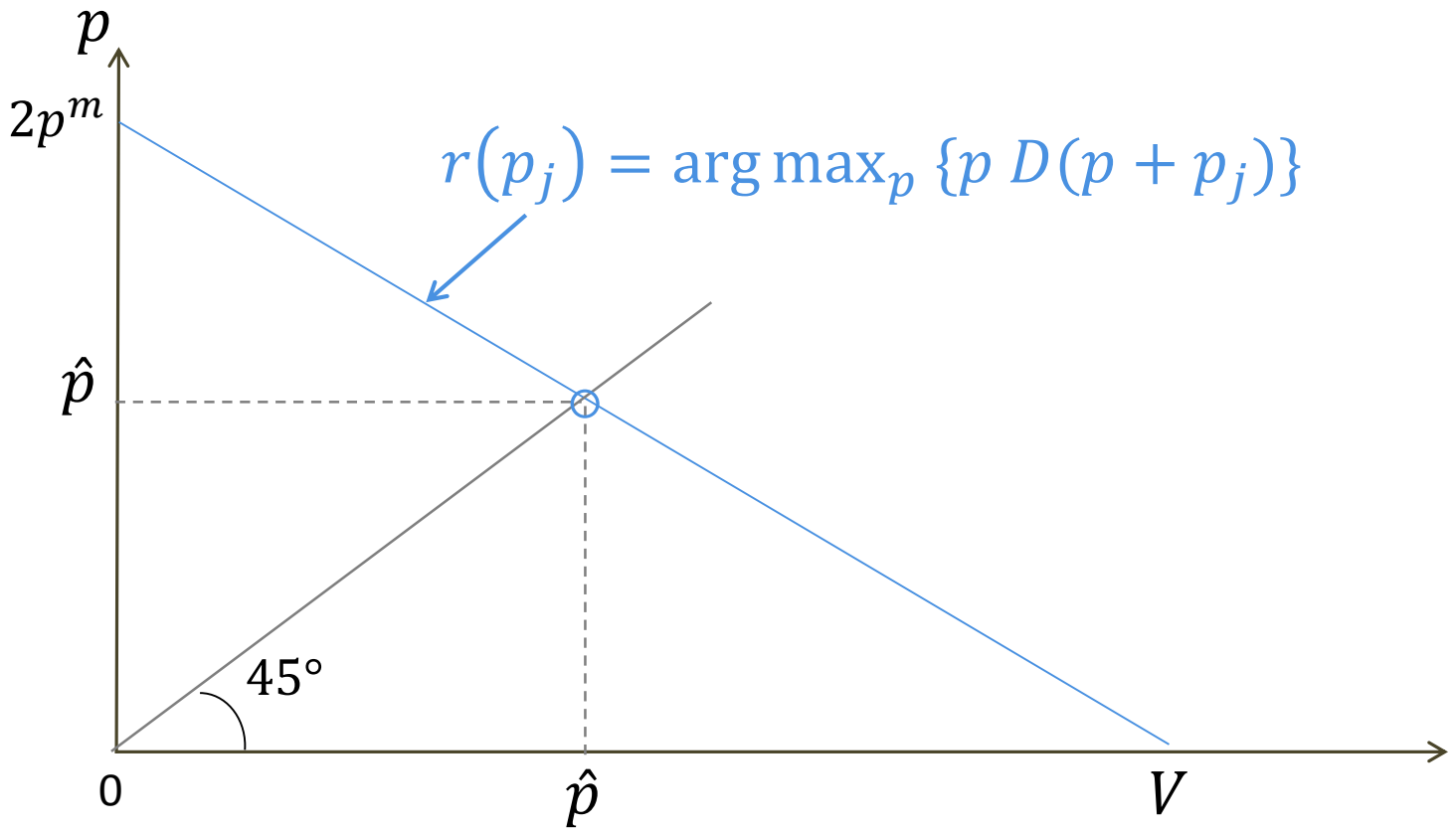
- Two symmetric firms 1 and 2, each one endowed with one patent

  (extension to $n > 2$, asymmetry)

- The technology brings value
  - V if developed with both patents
  - $V - e$ if developed with one patent (either one)
- Users' adoption cost c distributed according to $F(c)$ on $[0, V]$
  - Demand for bundle $D(P) \equiv F(V - P)$
  - Demand for incomplete technology $D(p + e) = F(V - e - p)$
- Simple set-up
  - All users pick the same basket if they adopt the technology
  - Menus do not increase profit under joint marketing

IS COORDINATION GOOD OR BAD?

- Static Nash



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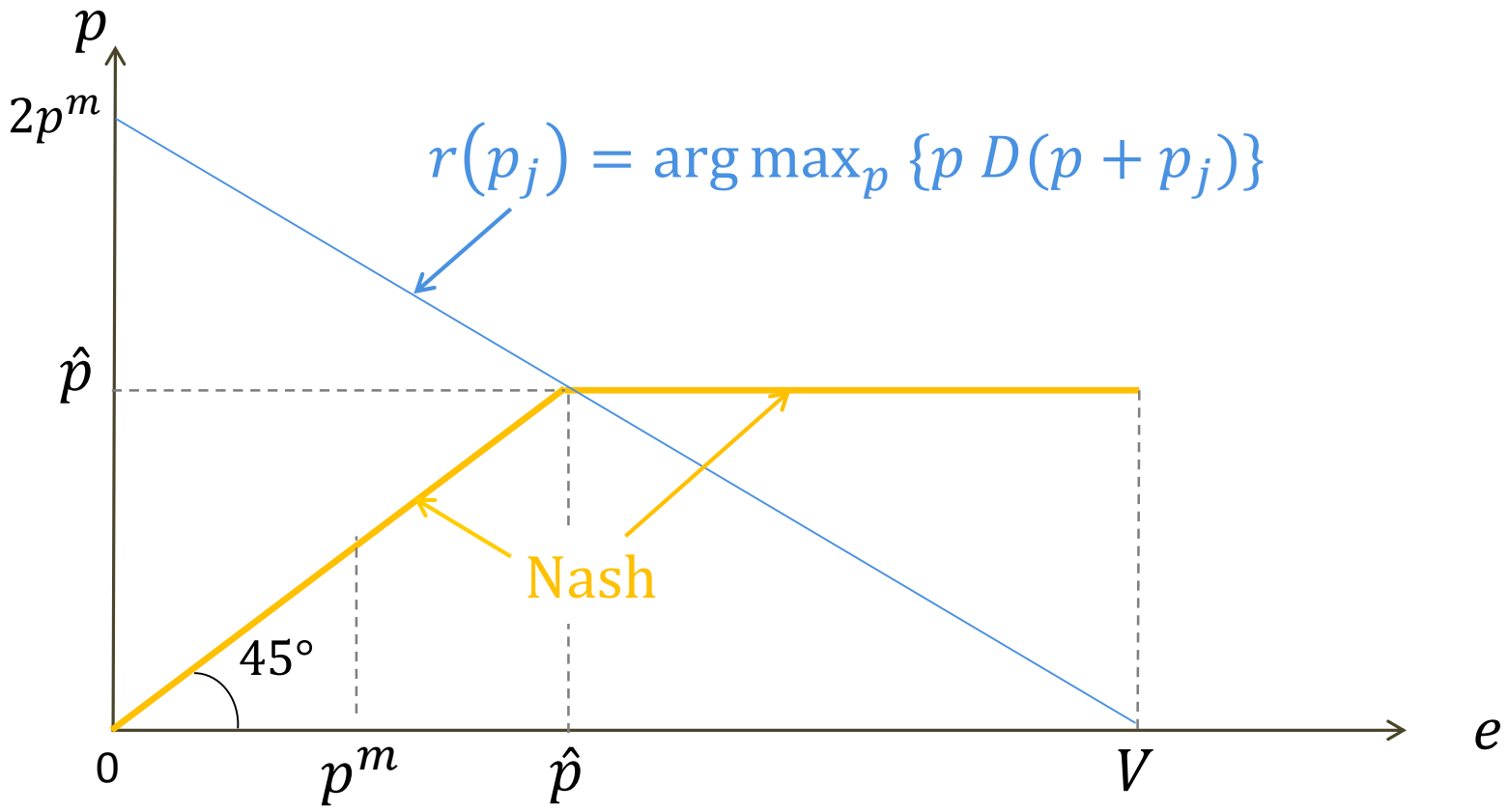

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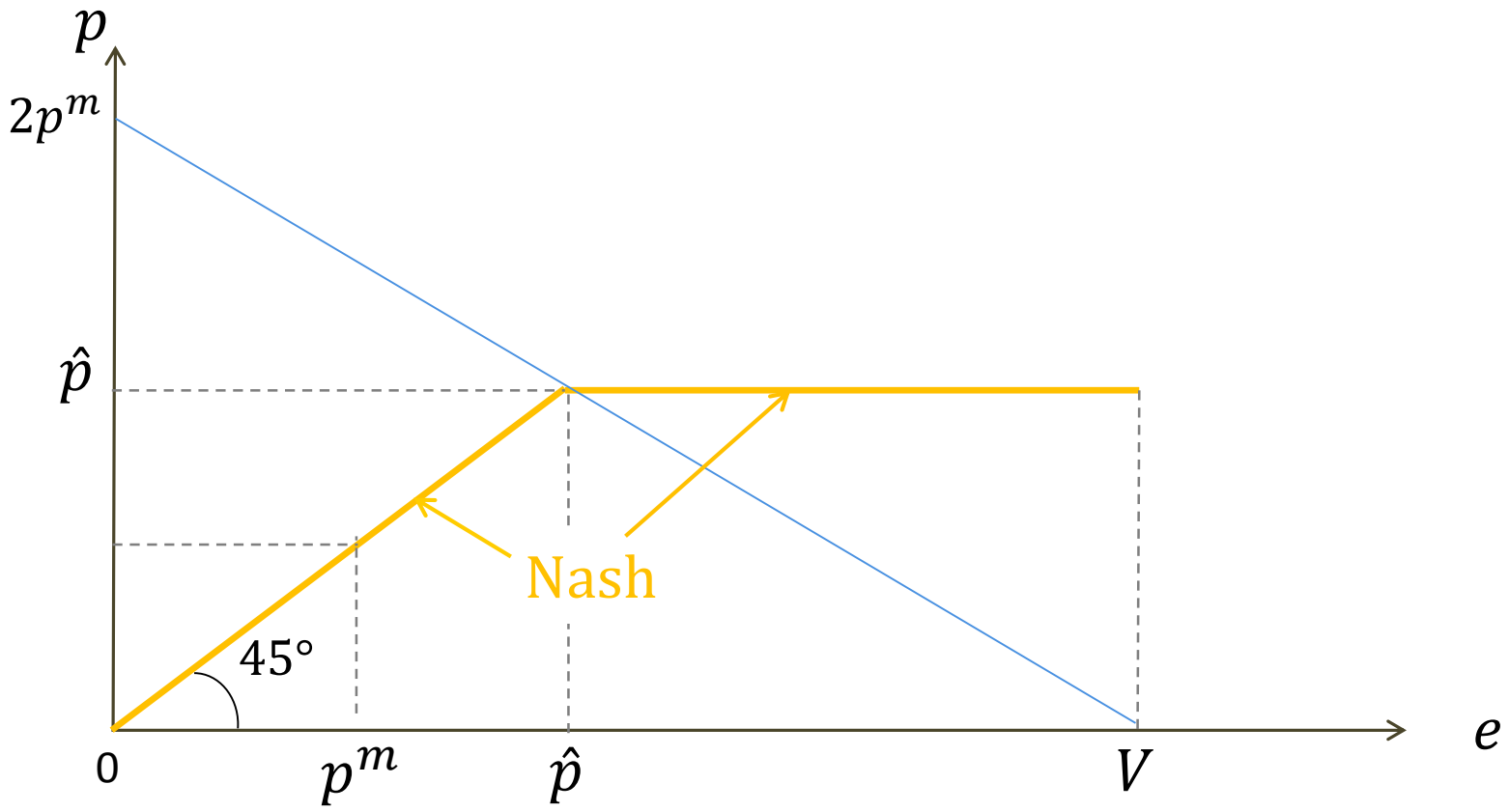
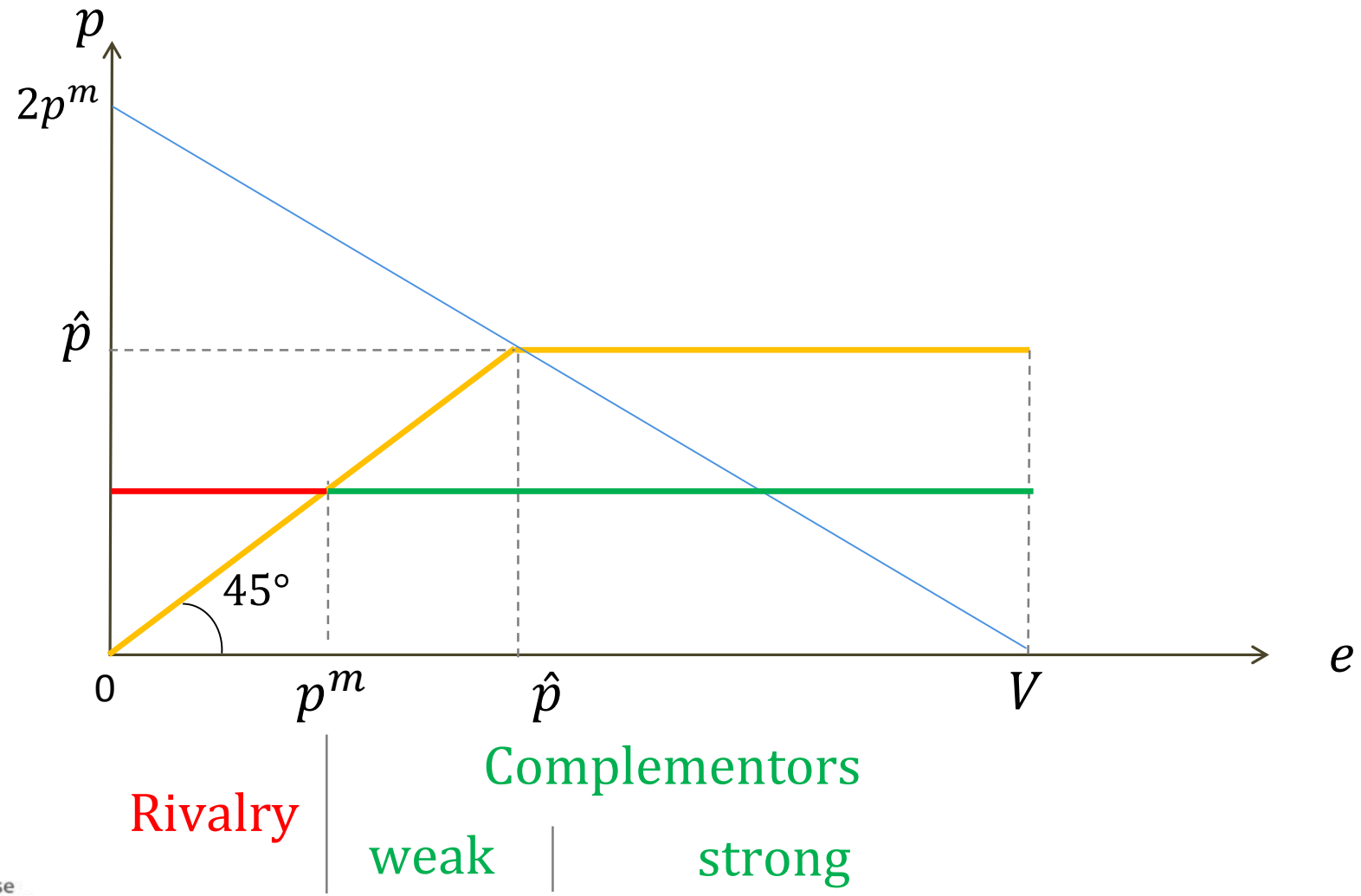


- Monopoly price

$D(2p^m) + 2p^m D'(2p^m) = 0 \rightarrow \hat{p} > p^m$ (double marginalization)

IS COORDINATION GOOD OR BAD?

- Impact of coordination



REGULATORY OVERSIGHT

- ***Problem: which scenario is the relevant one?***

  Requires detailed knowledge about users' preferences:

  - Degree of « *essentiality* » of the patents
  - Distribution of technology adoption cost (demand elasticity)

- ***Information-free screen: independent licensing***

  - Lerner & Tirole *AER* 2004; Guidelines: US, Europe, Japan, …
  - Does not affect welfare-enhancing pools $(p^N > p^m)$
  - Restores competition when welfare-decreasing pools $(p^N = e < p^m)$ undercutting the pool is profitable: $\underbrace{\left(2p^m - e\right)}_{1}\underbrace{D\left(2p^m\right)}_{4} > \underbrace{p^m}_{2}\underbrace{D\left(2p^m\right)}_{3}$

    undercutting

- ***Issues***

  - Multiple equilibria ($n > 2$): Aleksandra Boutin (2014)
  - Coordinated effects?

TACIT COORDINATION (1/2)

Rivalry $(e \leq p^m)$ Sustain $p > p^N = e$	Must sustain price $p > e \Rightarrow$ incomplete technology $\frac{\tilde{\pi}(p)}{2} \geq (1-\delta)\tilde{\pi}(p) + \delta\pi(e)$
Weak complementors $(p^m < e \leq \hat{p})$ Sustain $p < p^N = e$	Deviation: would like to charge above $\hat{p}$ (impossible) $\Rightarrow$ charges e $\pi(p) \geq eD(p+e) + \delta\pi(e)$
Strong complementors $(p^m < \hat{p} \leq e)$ Sustain $p < p^N = \hat{p}$	Issue: optimal punishments (Abreu's codes) $\pi(p) \geq (1-\delta) \max_{\tilde{p} \leq e} \{\tilde{p}D(p+\tilde{p})\} + \delta\pi^p$

TACIT COORDINATION (2/2)

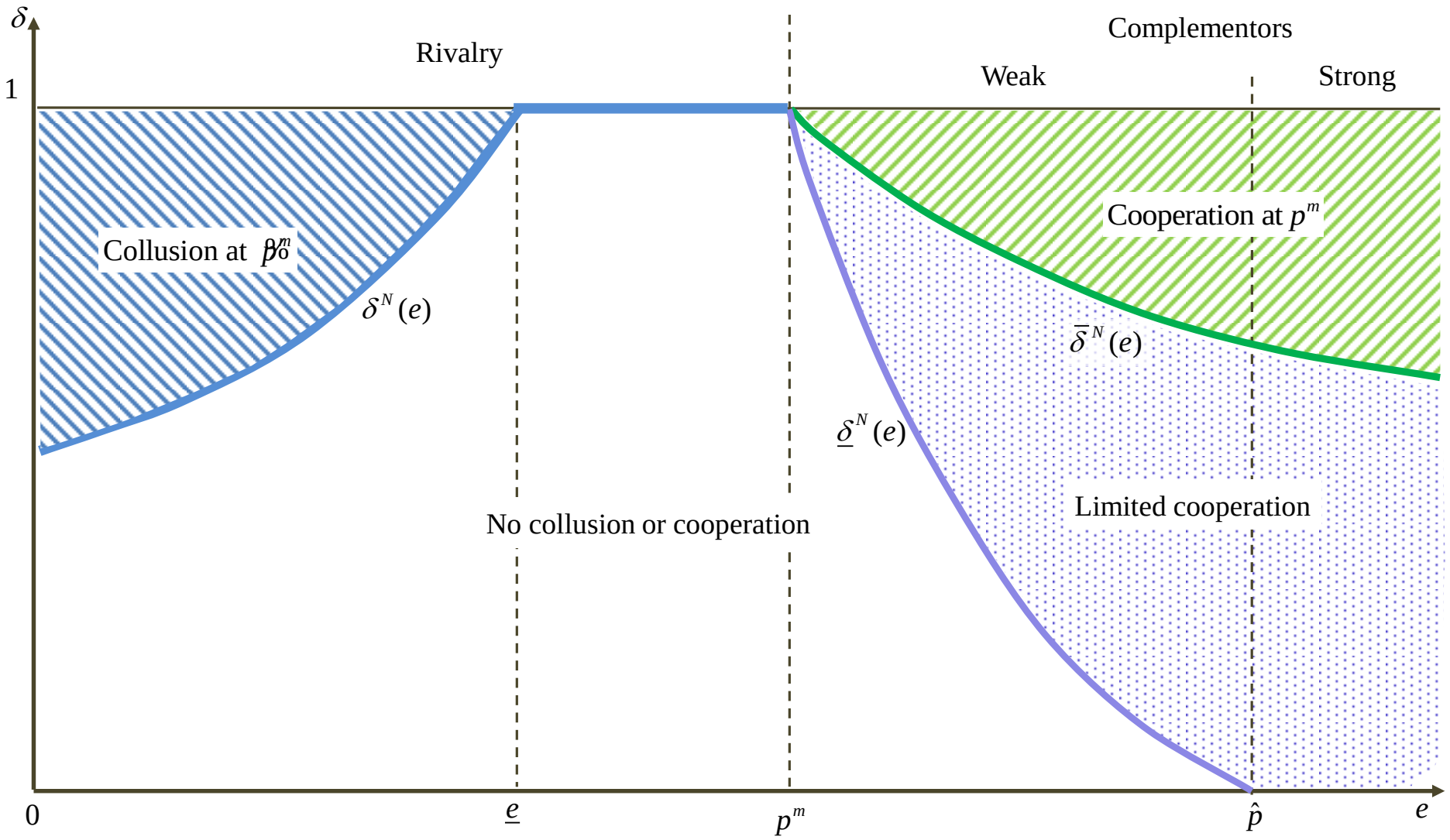


Figure 1: Most profitable equilibrium

JOINT MARKETING & INDEPENDENT LICENSING (1/2)

- Modeling
  - At $t=0$, pool sets price P for the bundle (and possibly prices for individual patents), as well as the revenue sharing rule
  - At $t=1,2,\ldots$, firms set prices non-cooperatively for their individual offerings
- *Independent licensing is irrelevant under complementors* $(e > p^m)$
  - Pool sets price $P = 2p^m$ (and "high" individual prices), shares $50-50$
    → not worth undercutting with individual offering $(p + e < 2p^m)$: as $e > p^m$,

$$\underbrace{\left(2p^m - e\right)}_{\text{undercutting}} D\left(2p^m\right) < p^m D\left(2p^m\right)$$

  - Corollary: *Pool always welfare beneficial if complementors*
    (weakly so if p^m is already sustainable without a pool, strongly so otherwise)
- *Rivalry* $(e < p^m)$
  - Symmetry facilitates sustainability
  - A pool charging $P = 2p$ is stable if: $\pi(p) \geq (1-\delta)\underbrace{(2p-e)}_{\text{undercutting}} D(2p) + \delta\pi(e)$

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JOINT MARKETING & INDEPENDENT LICENSING (2/2)

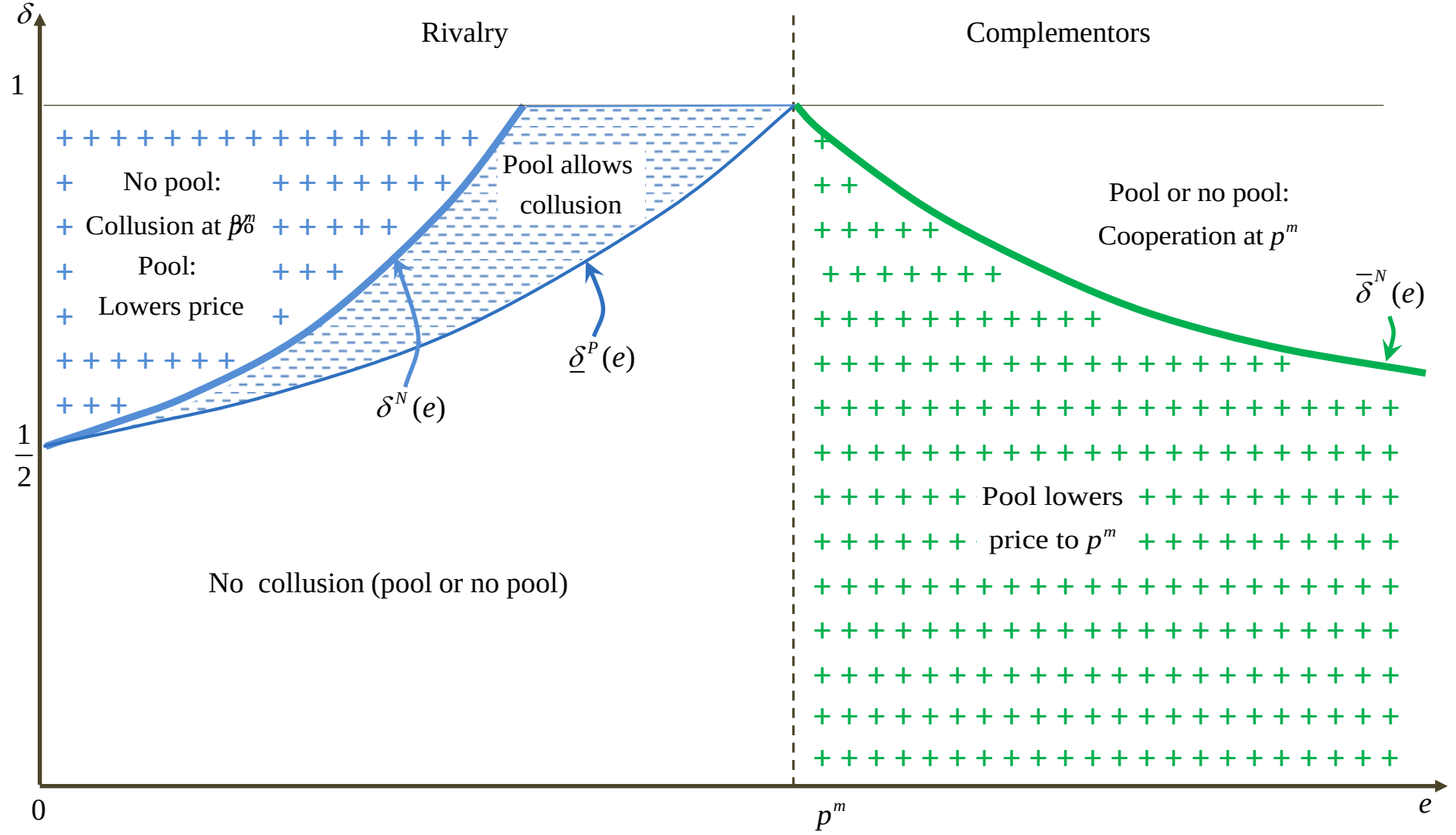

Figure 2: Impact of a pool
(+: beneficial; -: welfare reducing; blank: neutral)

LESSONS SO FAR

- ***Scope for tacit coordination***
  - Coordination easiest for strong substitutes or complements
  - This is when uncoordinated pricing most inefficient
- ***Impact of joint marketing alliances***

  Independent licensing does a good job
  - Does not prevent desirable cooperation
  - Can allow for more efficient collusion (socially desirable)

  … but is no longer a perfect screen: may allow for collusion that would not be sustainable otherwise

RESTORING A PERFECT SCREEN (1/2)

- *Additional regulatory requirement: Unbundling*
  - *Individualized prices*

$$P^P = S_{i=1,2}\, p_i^P$$

  - *No cross-subsidization*

firm i's dividend = pool's price times i's sales through the pool

→ the pool acts as if setting *price caps*

Note: Still *information-free* requirement

RESTORING A PERFECT SCREEN (2/2)

- **Proposition**: *Unbundling and independent licensing* make joint marketing always socially desirable:
  - still allows perfect cooperation if firms are complementors
  - restores no-pool outcome under rivalry
- Remarks
  - Does not prevent collusion (at $\tilde{p}^m$, when δ large enough)
  - Need both requirements (unbundling alone does not suffice to make pool always desirable)
  - Boutin (2014): also strengthens Lerner-Tirole's result for $n > 2$
  - Applies to more general frameworks … given unbundling
  - Could do better … with more information (e.g., more eff. coll.)

INVESTMENT INCENTIVES (1/2)

- Does joint marketing promote the right investment incentives?
  - provide incentives to bring to market value-creating
  - rather than business-stealing innovations
- Suppose that
  - one piece of the technology is initially available
  - another innovator can invest $I/(1-\delta)$ to create a second one
- Impact of the pool?
  - *Rivalry region*
    - pool is neutral
    - does not affect investment incentives
  - *Complementors*
    - pool increases profits
    - hence encourages innovation

INVESTMENT INCENTIVES (2/2)

- Caution: For complementors, cannot directly conclude that pool is beneficial, because there can be business stealing:

$$\tilde{p}^m D(\tilde{p}^m + e) > p^m D(2p^m) \text{ for } e < e^*, \text{ where } p^m < e^* < \hat{p}$$

- Yet JMA with unbundling and independent licensing always desirable, as it is neutral for rivalry , and for complementors:
  - lowers price
  - fosters socially desirable investment

STRATEGIC JMA

- The JMA could also be used to punish deviation
  - E.g., the pool offers the deviator's IP for free afterwards
  - To avoid this, some restrictions on governance can help
    - Unanimity rule for price changes
    - Making reductions in bundle price irreversible
- Price discussions and information exchanges
  - How do firms reach a tacit « agreement »?
  - Focal points

CONCLUDING REMARKS (1/3)

- Important to understand when commercial cooperation is desirable or not (complements vs. substitutes)
  - relevant for IP rights ("essential" patents)
    - solves royalty stacking problem
    - avoids ex post legal disputes
  - … but also in many other industries
    - content carried by cable operators
    - payment systems used by merchants
    - providers included in health insurance network (Katz 2011)
    - music performance rights licensed by Pandora
    - product portfolios (e.g., alcoholic beverages in *GrandMet*)

CONCLUDING REMARKS (2/3)

- [Strategic interactions outside "perfect substitutes" environment]
- Look for requirements that require little or no information

  Here: Independent licensing + Unbundling
  - Identifies socially desirable function: *price caps*
  - Brings JMAs in safer territory

CONCLUDING REMARKS (3/3)

- Alternative to mergers?
- Facilitating practices with arbitrary extent of substitutability/complementarity
  - information exchanges through industry associations
  - advanced price announcements
  - product categorization (reducing number of prices)
  - resale price maintenance
  - ...