Regulating Platform Fees under Price Parity

Renato Gomes (Toulouse) Andrea Mantovani (Bologna)

Virtual Market Design Seminar

May 4th 2020

Toulouse School of Economics

Information Platforms

- information/matching platforms increasingly important:
  - marketplaces, OTA's, Uber, OpenTable, studentnannies.com, Nurses On Line, etc
- agency model often employed
- opportunistic behavior is challenge for business:
  - subsequent interactions outside of platform
  - show-rooming: gather info inside platform, transact outside
- price parity clauses aim at preventing the latter:
  - prices cannot be lower elsewhere
  - availability, conditions no better elsewhere

Price Parity: Opposing Views

- platforms claim price parity essential for business
- competition authorities see it as source/reinforcer of platforms' market power
- common theory of harm:
  - reduces competition between platforms
  - barrier to entry
  - raises prices in coordinated manner (common selling agent)
- scrutiny over price parity by EU competition authorities

Price Parity: Recent Decisions

Table 1: Main decisions on Price Parity Clauses (PPCs) in the EU, 2015-17

Apr 2015	Decisions by the French, Italian and Swedish competition authorities: *Booking.com* commits to switch from wide to narrow PPCs
Jul 2015	*Booking.com*'s commitment comes into effect in the EU
Aug 2015	**Macron Law promulgated in France: all PPCs prohibited**
Oct 2015	Italian Parliament proposes a law to eliminate all PPCs
Dec 2015	Bundeskartellamt prohibits *Booking.com* from applying PPCs
Nov 2016	Austrian Parliament approves a law eliminating all PPCs
Aug 2017	**Italian Parliament approves Liberalization Law: all PPCs prohibited**
Nov 2017	Belgian Government proposes to outlaw all PPCs

Amazon market place: price parity banned in UK, removed in US

Removing Price Parity

- not clear produces tangible results:
  - sellers might still practice it to be in good terms with platform (fear of being down-listed)
  - in France: cannot be imposed, but can be voluntarily accepted (preferred partner programs)
  - unsophisticated pricing: scarce propensity to price differentiate
  - limited awareness of the policy changes
- ECN 2017: only minor changes in the commission fees following the major decisions... (still very high, average 20%)
- Hunold et al. (2020): OTAs penalize hotels that charge lower prices elsewhere with worse rankings
- Mantovani et al (2020): limited effect on prices in short/medium run

Parallel Debate on Payments Cards

- policy/academic debate on whether one should uphold, reform, or ban price parity
- yet, little consensus has emerged...
- parallel in the payment industry:
  - no-surcharge rule prevents merchants from price discriminating
- alternative strategies:
  - lift no-surcharge rule (UK, Netherlands, New Zealand, Australia, etc)
  - regulate interchange fee (US, EC, Brazil, etc)
- EC proposed in July 2013 to allow surcharging for cards which fee structure is currently *not* subject to regulation (Amex)

Alternative: Regulate Platform Fees under Price Parity

- goals of this paper:
  - how to regulate information platforms
  - derive optimal cap
  - relate cap regulation to competition policy alternatives
- theory of harm based on contractual externality among firms
- propose simple test to assess platform contribution to producer/consumer surplus
- show that banning price parity akin to cap platform fee inefficiently low

Related Literature

- Edelman and Wright (2015):
  - platform over-invests in provision of non-pecuniary benefit, higher prices, lower welfare
- Boik and Corts (2016) and Johnson (2017):
  - parity clauses lead to higher commissions, which, in turn, increase final prices and prevent entry by low-cost competitors
- Ronayne (2015) and Ronayne and Taylor (2019)
- Wang and Wright (2019)
  - argues narrow better than wide price parity; good compromise if otherwise platforms not viable
- Johansen and Vergé (2017)
  - price parity $\Longrightarrow$ firms become more prone to delisting $\Longrightarrow$ participation constraint tighter $\Longrightarrow$ commissions decrease
- Bisceglia et al. (2019)

Model

Consumers and Firms

- N firms indexed by $j \in \mathscr{N} \equiv \{1, \ldots, N\}$
- unit-mass continuum of consumers: $\mathscr{I} \equiv [0, 1]$
- consumers have single-unit demands
- consumer's gross utility from firm j's product: $\hat{v}_j = v_j + z_j$
  - v_j is the vertical component of preferences
  - z_j is the consumer-specific match value of firm j
- for each consumer, $z \equiv (z_1, \ldots, z_N)$ is iid draw from symmetric cdf G with supp $\mathbb{R}_+^N$ and pdf g
- each firm j faces constant marginal cost c_j per sale; price is p_j

Consumer Information

- firm j belongs to the consideration set of a consumer if he/she observes the pair $(\hat{v}_j, p_j)$
- consumers only transact with firms in their consideration sets
- not buying from any firm generates a zero payoff to consumers
- consumers heterogeneous on their consideration sets
- *consideration profile* $\sigma : 2^{\mathcal{N}} \to \mathscr{B}[0,1]$ maps each subset of firms into set of consumers who consider that set of firms
- firm j's *potential demand* under σ:

$$d_j[\sigma] \equiv \bigcup_{\{s : j \in s\}} \sigma(s)$$

is set of consumers whose consideration sets contain firm j

Symmetric Consideration Profiles

- σ is *symmetric* if:
  - all consumers possess consideration sets of the same size n
- this implies potential demands have size

$$|d_j[\hat{\sigma}]| = \frac{\hat{n}}{N}$$

Platform Expands Consumer Information

- baseline model: monopolistic platform
- before consulting platform: information described by symmetric $\underline{\sigma}$, with reach $\underline{n} < N$
- $\underline{\sigma}$ captures all information obtained outside of platform:
  - advertising by hotels, travel or shopping guides, friends' recommendations, previous experiences, etc
- all firms *listed in the platform* added to the consideration set of every consumer
- implicit assumption: visiting platform costless for consumers
- if all firms join, information described by $\bar{\sigma}$, with reach N

Externality on Non-Participants

- if all firms join, platform expands by $\frac{N}{n}$ size of cons. sets of consumers
- suppose all firms join the platform, except for some firm j
- consideration profile σ^{-j} such that:
  - all consumers that considered j now consider all other firms
  - those consumers who did not consider firm j now consider all firms other than j
- non-participant firm exposed to much more competition with than without platform

Contracting

- transaction within platform generates convenience benefit $b \geq 0$ to firms
- private contracting: platform offers each firm j fee f_j per sale
- platform is profit-maximizing
- platform operates if and only if profit exceeds revenue requirement $k \sim G$, with pdf ϕ and supp on $\mathbb{R}_+$
- k captures operating costs, monitoring costs, advertising, etc
- price parity is in place
- if a firm joins, all of its sales happen through the platform

Timing

1. platform privately observes cost k, and decides to (not) operate
2. platform privately offers fee f_j for each firm $j \in \mathcal{N}$
3. firms set prices and decide whether to join platform,
4. consumer buys from some firm he/she is aware of

- **solution concept:** perfect bayesian equilibrium with passive beliefs (for short, equilibrium)
- **assumption:** symmetric market: $\delta \equiv v_j - c_j$ invariant in j

Preliminaries

Consumer Purchasing Decision

- each consumer chooses "best" firm in his/her consideration set
- for each $i \in \sigma(s)$, consumer i buys from j if and only if

$$j = \arg\max_{k \in s} \left\{ v_k + z_k^i - p_k \right\}$$

Assumption

Regularity: *Let $n \geq 2$ and consider the cdf*

$$H^{(n)}(x) \equiv Prob_G \left[z_1 - z_2 \leq x \,|\, z_2 \geq \max\{z_2, \ldots, z_n\} \right],$$

with density $h^{(n)}(x)$ over $\mathbb{R}$. Then

$$x - \left(\frac{1 - H^{(n)}(x)}{h^{(n)}(x)} \right) \quad \textit{is increasing in } x.$$

Symmetric Pricing Equilibrium

- pricing equilibrium is *symmetric* if $v_j - p_j \geq 0$ constant in j
- prices increase one-to-one with the "vertical" quality of a firm

Lemma

Suppose firms compete under consideration profile σ, symmetric with reach $n \geq 2$. Then unique symmetric equilibrium such that

$$p_j^* = c_j + \lambda(n), \quad \text{where} \quad \lambda(n) \equiv \frac{1 - H^{(n)}(0)}{h^{(n)}(0)} \quad \text{for all } j \in \mathcal{N}.$$

- if all firms join at some symmetric fee f, equilibrium prices are

$$p_j^* = c_j + f + \lambda(N)$$

- special cases: logit and spokes models, among others
- markup $\lambda(n)$ maybe not decreasing (Chen and Riordan 2007, 2008)

Laissez-Faire

Equilibrium Characterization

Proposition

There exists a symmetric equilibrium where all firms join and pay a fee $f^* > b$, which solves

$$\frac{\lambda(N)}{N} = |d_j[\underline{\sigma}]| \cdot \max_{\Delta p} \left\{ \left(1 - H^{(N)}(\Delta p)\right) (\Delta p + f^* + \lambda(N) - b) \right\}.$$

equilibrium fee f^* leaves each firm indifferent between:

1. delisting, facing much reduced potential demand, but competing with lower marginal costs
2. remaining, enjoying large potential demand, but competing under no marginal cost advantage

also equilibrium if platform chooses public fee, observable by all firms

The Equilibrium Fee

- delisting reduces marginal cost $\Longrightarrow$ firm able to reduce price
- price adjustment Δp after delisting solves

$$\Delta p - \left(\frac{1 - H^{(N)}(\Delta p)}{h^{(N)}(\Delta p)} \right) + f^* + \lambda(N) - b = 0$$

- indeed, $\Delta p \leq 0$ (discount) if and only if net fee $f^* - b$ is positive
- platform has room to set $f^* > b$:
  - if $f = b$, then $\Delta p = 0$ and remaining in platform strictly better

Platform is "Must-Join"

Corollary

Consider two pre-visit consideration profiles, $\underline{\sigma}_0$ and $\underline{\sigma}_1$, and let f_0^* and f_1^* be their respective equilibrium fees. Then

$$f_0^* \leq f_1^* \quad \Longleftrightarrow \quad |d_j[\underline{\sigma}_0]| \geq |d_j[\underline{\sigma}_1]|.$$

- firms accept higher fees the smaller their (pre-platform) potential demands are
- provided potential demands remain constant, equilibrium fee is invariant to degree of competition among firms
- f^* grows unbounded as potential demands shrink
- often exceeds convenience/information benefits to consumers/firms

Platform Market Power

- **source:** contractual externality (Segal 1999) between firms
  - listed firms reduce demand of non-listed ones
  - reduction in outside option leaves room to high fees
  - potentially decreases producer and consumer surplus
- platform often appropriates more than contribution to welfare
- yet, banning price parity prevents platform from appropriating any of (ex-ante) informational benefits (as we shall see...)

Cap Regulation

Optimal Cap Regulation in Mature Markets

- consider cap regulation: $f \leq \bar{f}$
  - cap is inconsequential if $\bar{f} > f^*$, but binds otherwise
  - therefore, equilibrium platform fee is $f^r \equiv \min\{\bar{f}, f^*\}$
- because all firms join under this fee, platform's revenue is f^r

Welfare Measure

- combines two terms:
  - consumer and producer surplus
  - platform profit
- let $Z^{1:n}$ denote the first-order statistic out of $n \leq N$ coordinates of random vector $z \sim G$
- planner's objective is then

$$W(\bar{f}) \equiv \int_0^{f^r} \left\{ \delta + \mathbb{E}\left[Z^{1:N}\right] - f^r + b + (f^r - k) \right\} d\phi(k) + (1 - \Phi(f^r)) \left(\delta + \mathbb{E}\left[Z^{1:\hat{n}}\right] \right)$$

Welfare Measure: Comments

- "counterfactual" consideration profile $\hat{\sigma}$:
  - describes consumer information in world without platform
  - arguably exhibits reach $\hat{n}$ larger than $\underline{n}$
- implicit assumption: time searching by consumers is similar with or without platform
- ...but platform improves market information

Optimal Cap Regulation

Proposition

The welfare-maximizing cap is given by

$$\bar{f} = b + \mathbb{E}\left[Z^{1:N}\right] - \mathbb{E}\left[Z^{1:\hat{n}}\right].$$

- platform entry cannot hurt consumers and firms:
  - profit is bounded by externality imposed on other market participants
  - ...in the spirit of the pivot mechanism
- similar to "tourist test" of payment cards: with info benefits on top

Towards an Easier-to-Use Formula...

- cap not expressed in terms of observables...
- what distribution of consumer tastes across firms?
- **idea:** employ approximation techniques based on extreme value theory
- let market grow large $(\hat{n}, N \to \infty)$ holding $|d_j[\hat{\sigma}]|$ constant
- allows us to express cap as function of firms' potential demands and markups
- measurable through surveys or experiments

Asymptotic Equivalence

- from definition of symmetric information profiles:

$$\frac{\hat{n}}{N} = |d_j[\hat{\sigma}]|. \tag{1}$$

- random utility model: match values independent across firms

Proposition

Let match values be iid draws from well-behaved cdf G_1 with tail index γ. Then, as $\hat{n}$ and N grow large while satisfying (1),

$$\lim_{\hat{n},N\to\infty} \left\{ \frac{\mathbb{E}\left[Z^{1:N}\right] - \mathbb{E}\left[Z^{1:\hat{n}}\right]}{\lambda(N)} \right\} = \left(\frac{1 - |d_j[\hat{\sigma}]|}{|d_j[\hat{\sigma}]|} \right) \Gamma(\gamma+2),$$

where $\Gamma(\cdot)$ is the gamma function.

Approximation

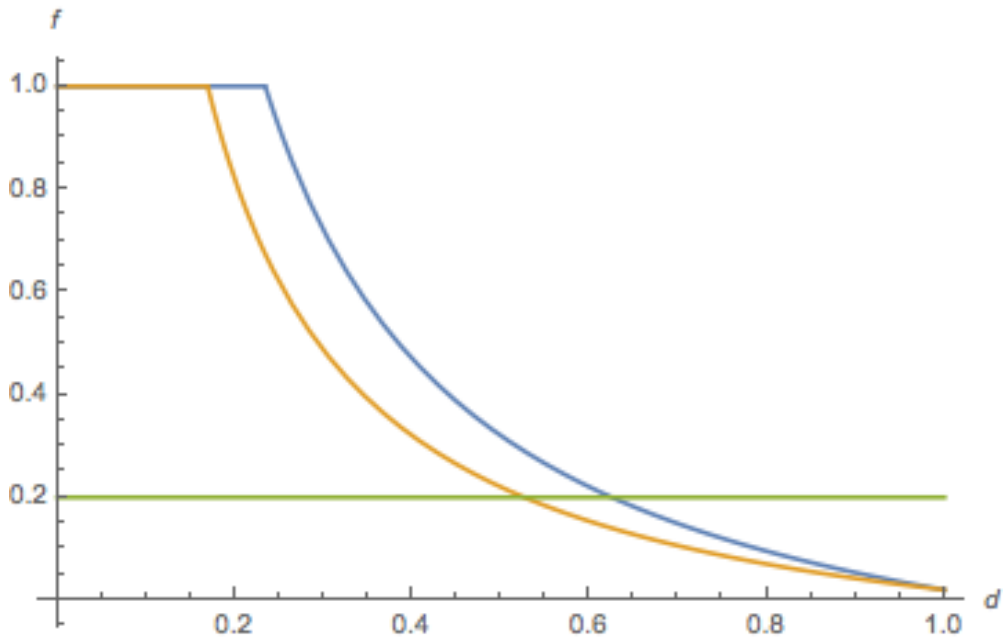
- for most distributions of interest, $\gamma \approx 0$ and $\Gamma(\gamma+2) \approx 1$
- we adopt the approximation

$$\bar{f} \approx b + \left(\frac{1 - |d_j[\hat{\sigma}]|}{|d_j[\hat{\sigma}]|} \right) \lambda(N)$$

- good performance in small samples if G_1 extreme value type 1
- convenience benefit and profit margin are observable
- "average" size of "counterfactual" consideration set more tricky

Illustration to OTA's

- most empirical sources estimate hotels markups to be in the range $20\% - 30\%$
- posit that convenience benefit commensurate to rates of online payment gateways (such as Paypal): 2%



Take Aways

scenario of low profit margin (20%)

- cap irrelevant if potential demand small: $|d_j[\hat{\sigma}]| \leq 0.17$
- if information benefit is nil ($|d_j[\hat{\sigma}]| = 1$), cap is convenience benefit: 2%
- cap is 20% if potential demand is $|d_j[\hat{\sigma}]| \approx 0.52$

scenario of high profit margin (30%)

- cap is 20% if potential demand is $|d_j[\hat{\sigma}]| \approx 0.62$

Other Remedies

Banning Price Parity

- firms now set two prices (platform and direct sales)
- assume consumers can:
  - gather information through the platform
  - consult direct-sales channel at no cost (but lexicographically prefer not doing so)

Proposition

Banning price parity outcome-equivalent to capping fee at $f \leq b$, which is inefficiently low, be the market mature or growing.

- in equilibrium, $f^* = b$

Discussion

- absent price parity, pricing equilibrium is

$$p^*_{plat} = c_j + f_j - b + \lambda(N) \qquad \text{and} \qquad p^*_{direct} = c_j + \lambda(N)$$

- so consumers buy through the platform if and only if $f_j - b \leq 0$
- only (ex-post) convenience benefit b recovered in equilibrium
- crucial that platform has no market power absent price parity
- otherwise, fee may well exceed or fall short of optimal level
- no reason to expect lifting price parity increases welfare

Predictions and Policy Implications

Positive Implications

1. *platform able to levy high fees due to contractual externality*
2. *firms accept higher fees the smaller potential demands are*
3. *fixed potential demands, equilibrium fee is invariant to degree of competition among firms*
4. *in mature markets, platform always decreases firms' profits*
5. *in growing markets, least competitive industries more likely to gain with platform*

Policy Implications

1. *utilitarian planner: under efficient cap, platform operates if and only if consumers and firms better-off*
2. *utilitarian cap approximately equal to relative expansion of firms' potential demands multiplied by profit margin*
3. *if the welfare measure does not include platforms' profits, optimal cap is tighter*
4. *holding constant potential demands, cap tighter in growing than in mature markets*
5. *banning price parity outcome-equivalent to inefficiently low cap*
6. *competition between platforms may fail to reduce fees under wide or narrow price parity; rather cap commissions*

Thank you for having me!