The Efficiency Effects of Platform Ranking Regulation

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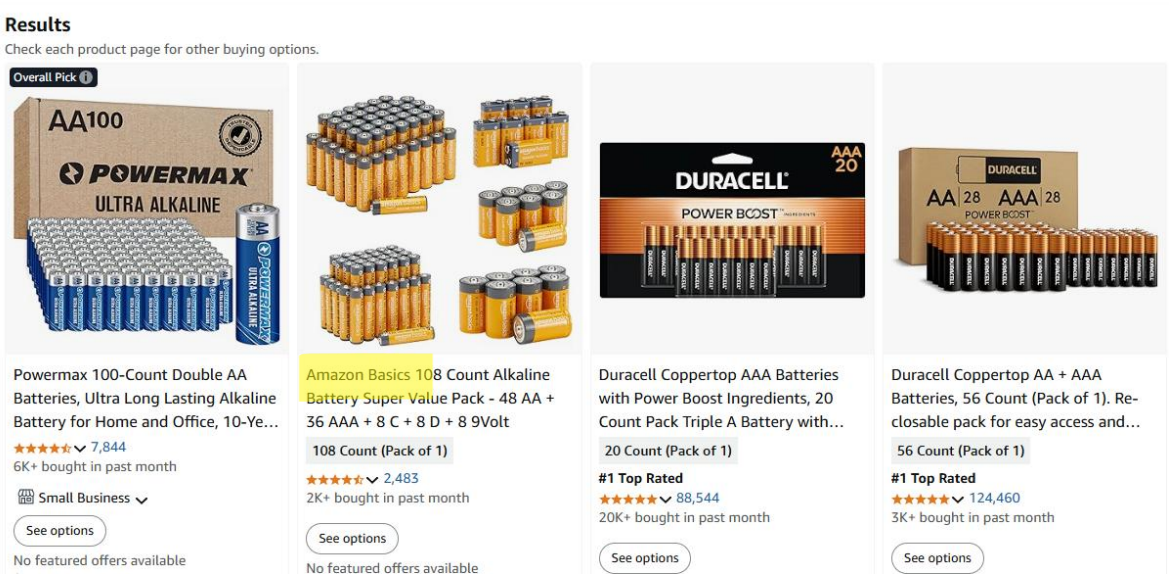
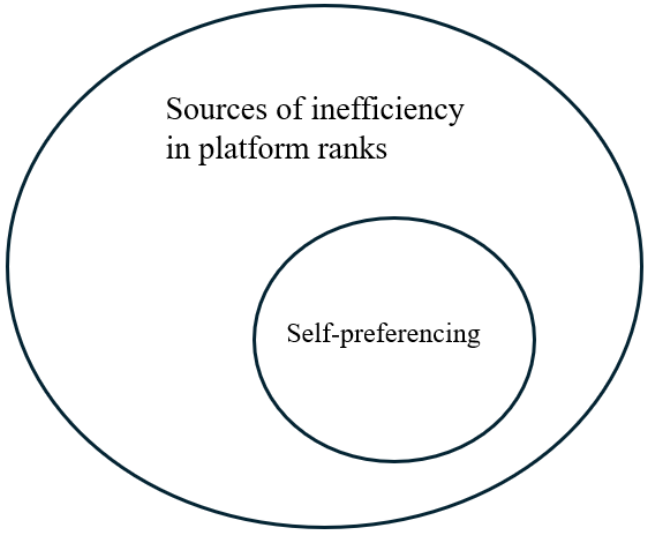
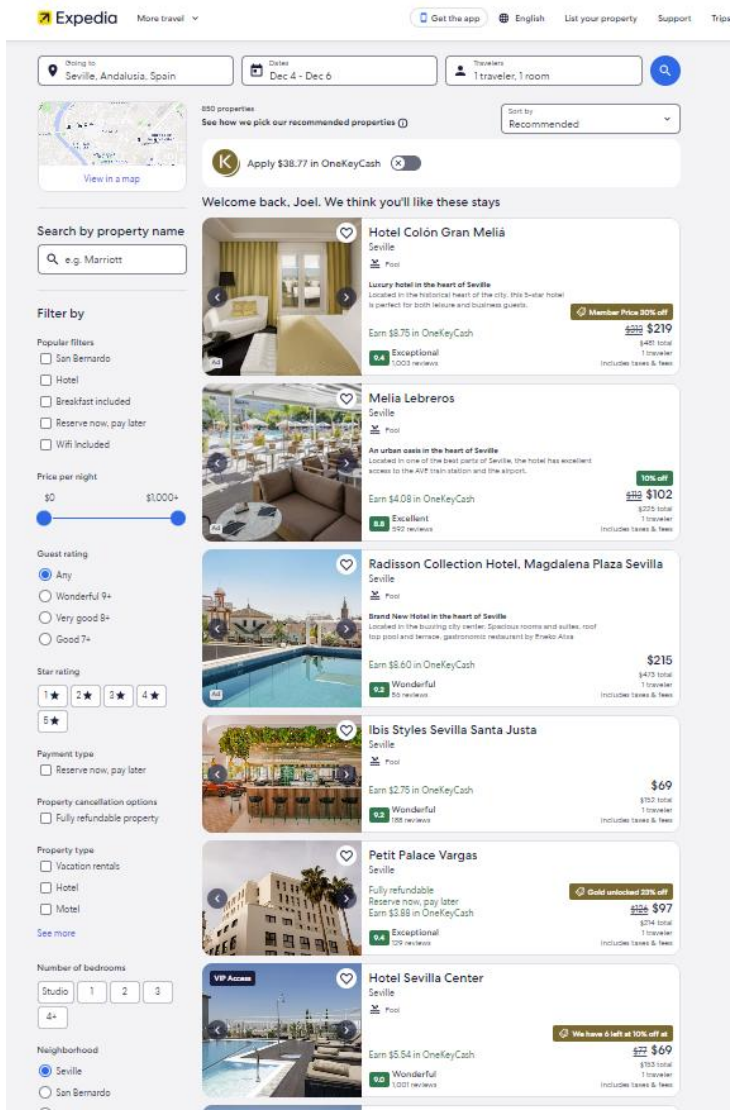
DMA: “Self-preferencing” is now illegal

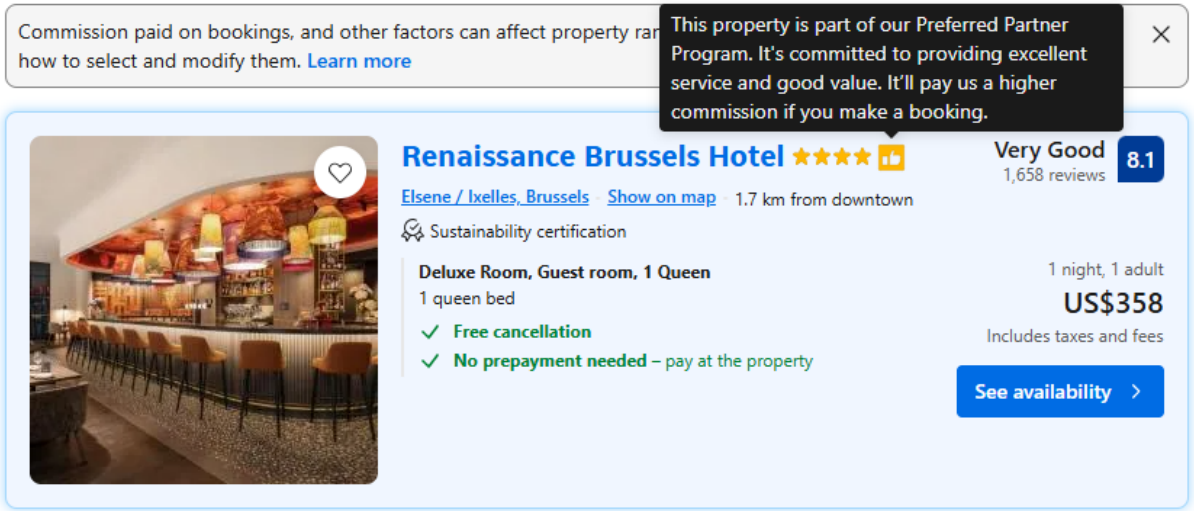
- Urgent need to detect and measure welfare consequences of platform ranking choices
- Current regulatory attention to “self-preferencing” in rankings at powerful platforms
- <u>But</u>: even without first-party products,
  platform incentives may be misaligned with the social planner





General setting: potential for other inefficiencies





→ How "bad" are platform ranking objectives for welfare?

Observability and ideal regulation

We provide definitions of inefficiency and self-preferencing in platform rankings

- Regulating to efficiency requires observing some hard-to-observe things
  - marginal costs, product quality, commissions,…

→ Ideal (or actual) regulation will be difficult to implement

→ What types of (feasible) regulations are most effective?

Preview

- Main question 1: How “bad” are platform ranking choices?
  - Platform profit maximization generates a welfare cost (mostly) neglected by regulation
  - … even when self-preferencing is impossible
  - Big costs especially to third-party sellers

- Main question 2: What types of (feasible) regulations are most effective?
  - Feasible regulation of ranking behavior can prevent big welfare losses

Coming up

- Model of platform sales and rankings
- Welfare analysis of commission and ranking arrangements
    - Constant and variable commission
    - Integrated platforms (potential for self-preferencing)
- Regulation implementation and challenges
    - Model-based detection and data needs
- Feasible regulation approaches
    - Behavioral generally beats structural

Model

A model of platform sales and rankings

- Three parties
  - Consumers choose among ranked alternatives
  - Sellers choose prices
  - The platform chooses the ranks
- Ranks, prices, and welfare outcomes (CS & PS) are the results of…
  - Selling arrangements (commissions)
  - How the platform ranks products (whether it pursues its own profit)

Consumers

- Ex-post, realized utility from product j:

Rank-independent mean utility

$$u_{ij} = \delta_j^0 + \alpha p_j + \epsilon_{ij}$$

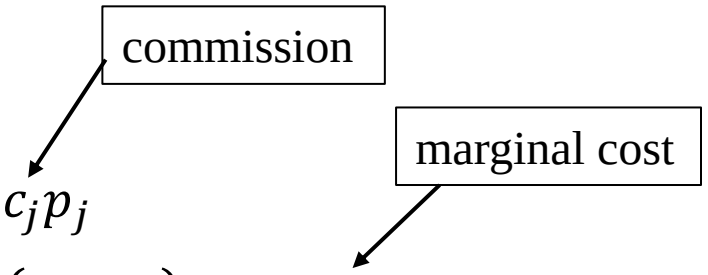
- Purchase probability also depends on rank:

$$s_j = \frac{e^{\delta_j + \gamma r_j}}{1 + \sum e^{\delta_j + \gamma r_j}}$$

- Sales depend on prices and ranks of all products: $q_j = q_j(p_j, r_j; P, R)$

Payoffs to sellers and the platform

- Third-party products:
  - Platform gets: $c_j p_j$
  - Third-party seller gets: $(1 - c_j)p_j - mc_j$



- First-party products:
  - Platform gets: $p_j - mc_j$

- → PS and its components:

$$\text{total } PS = \sum_{j \in J}(p_j - mc_j)q_j = \underbrace{\sum_{j \in J_p}(p_j - mc_j)q_j + \sum_{j \in J_{3p}} c_j p_j q_j}_{\text{platform PS}} + \underbrace{\sum_{j \in J_{3p}} \left((1 - c_j)p_j - mc_j\right) q_j}_{3^{\text{rd}} \text{ party PS}}$$

The platform's ranking choice

- Big combinatoric problem ($N!$ choices)
    - See Compiani, Lewis, Peng, Wang (2021)

- Simplify, starting with two *welfare frontier* extremes:
- a) Maximize CS: rank in descending order of rank-independent mean utility δ_j
- b) Maximize PS: rank by rank-independent var. profit $\left(p_j - mc_j\right)e^{\delta_j}$

→ The welfare frontier comes from weighted sums of these two

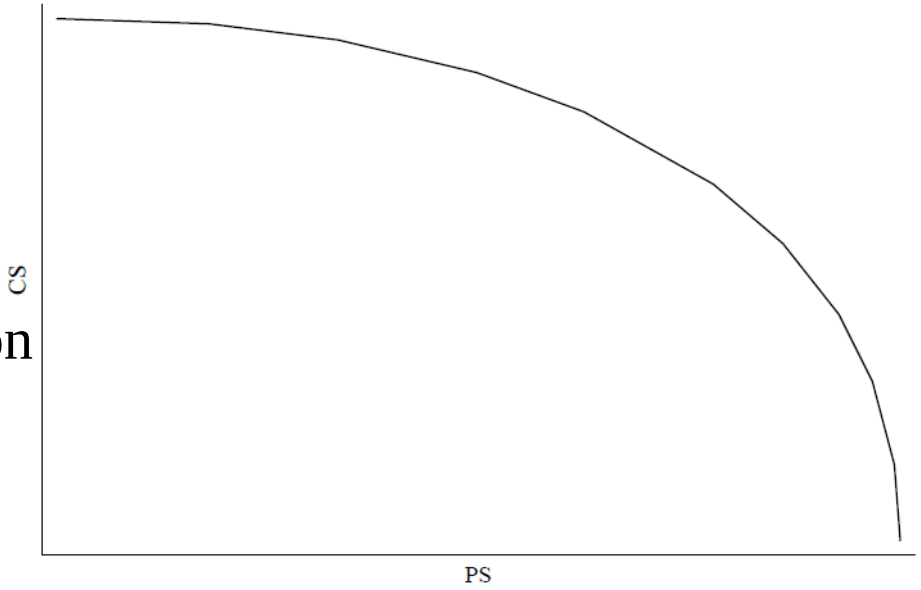
Welfare frontier

- Ranks according to $(p_j - mc_j)e^{\delta_j}$ maximize PS
- Ranks according to e^{δ_j} maximize CS

- Hence, define the **welfare frontier** as ranking based on

$$I_j^* = \delta_j + \kappa \ln(p_j - mc_j)$$

- Endpoints
  - $\kappa = 1 \Leftrightarrow$ PS max
  - $\kappa = 0 \Leftrightarrow$ CS max



- Welfare frontier lives in a "commodity space"
- Suggests a regulator utility function

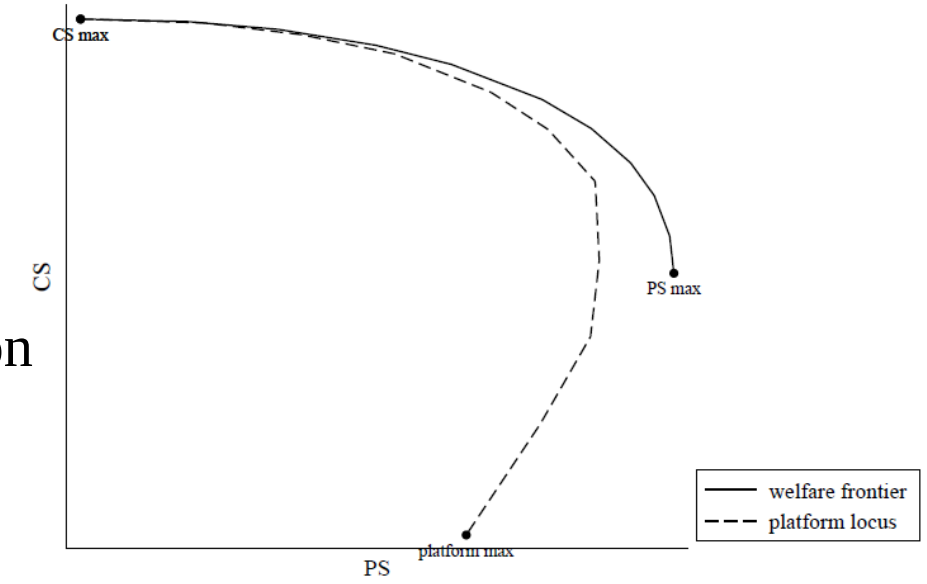
Platform locus

- Ranks according to $\boldsymbol{c_j p_j e^{\delta_j}}$ maximize platform π
- Ranks according to e^{δ_j} maximize CS

- Hence, define the **platform locus** as ranking based on

$$I_j^* = \delta_j + \kappa \ln(\boldsymbol{c_j p_j})$$

- Endpoints
  - $\kappa = 1 \Leftrightarrow$ Platform π max
  - $\kappa = 0 \Leftrightarrow$ CS max



- Platform locus interior to welfare frontier
- Note the upward-sloping region
  - Improvements in CS & overall PS available

Welfare analysis

Model solution

- Numerical example
  - $mc_j \sim U(0,5)$
  - $\alpha \sim N(-0.1, 0.01)$
  - $\delta_j \sim N(-4, 0.1)$
  - γ = -0.5, (-0.75 to -0.25)
  - $c_j = N(0.2)$, std. dev. between 0 & 0.05

Sensitivity analyses:

- correlated mc & α
- Range of commissions
- Range of commission variability

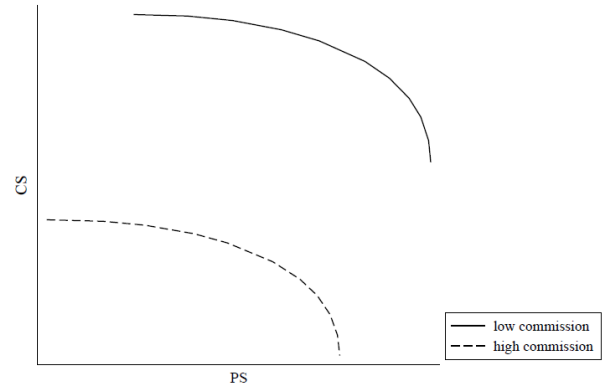
- 50 products × 50 "markets"

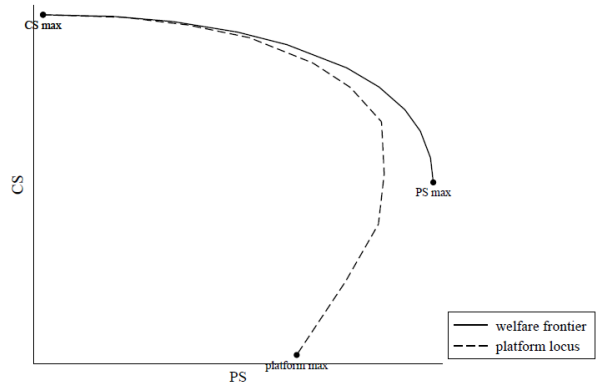
- Given selling arrangement (c), solve simultaneously for prices and ranks
  - … on the welfare frontier
  - … on the platform locus

Overview: what do we examine?

- Two environments:
  - Platform selling only third-party products (e.g., Booking)
  - Integrated platforms also selling their own (e.g., Amazon)

- Two mechanisms:
  - Selling arrangements (e.g., commission) affect feasible welfare
    - → Location of welfare frontier
  - Platform ranking choices affect deviations from frontier
    - → Location of the platform locus

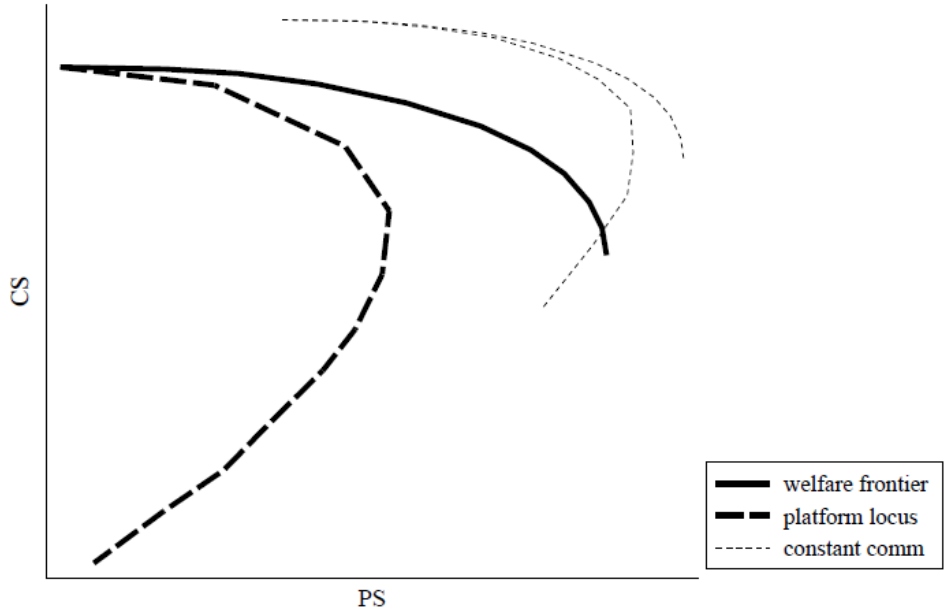




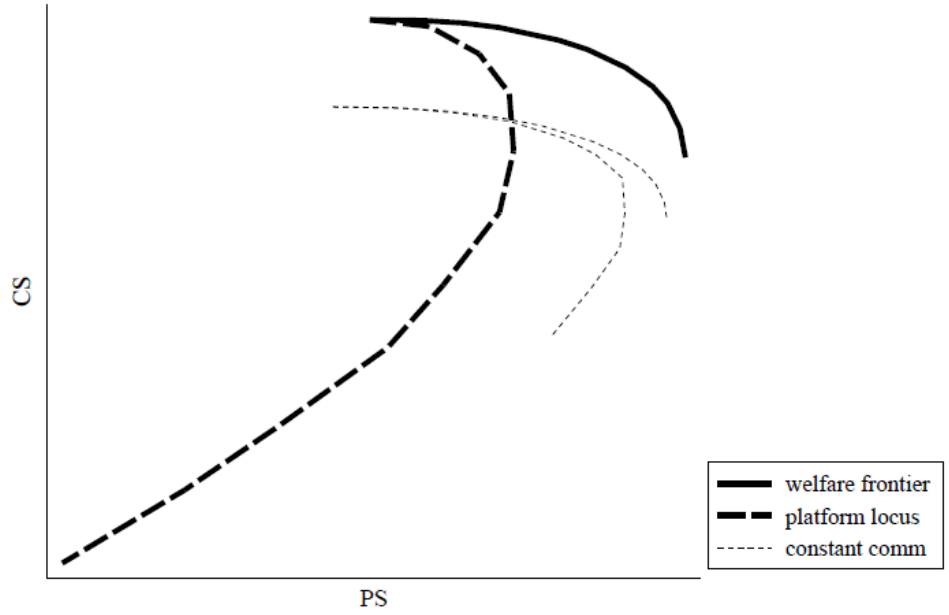
Summary of welfare results (1)

- Variable commissions:
  - Welfare frontier location depends on which products pay high commission
  - Platform profit incentives are especially harmful

Panel A: High comm for high qual



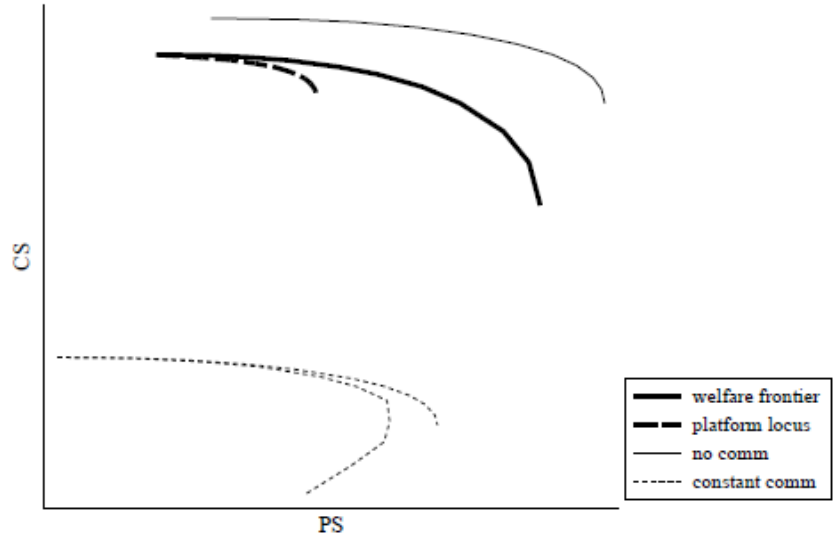
Panel B: High comm for low qual



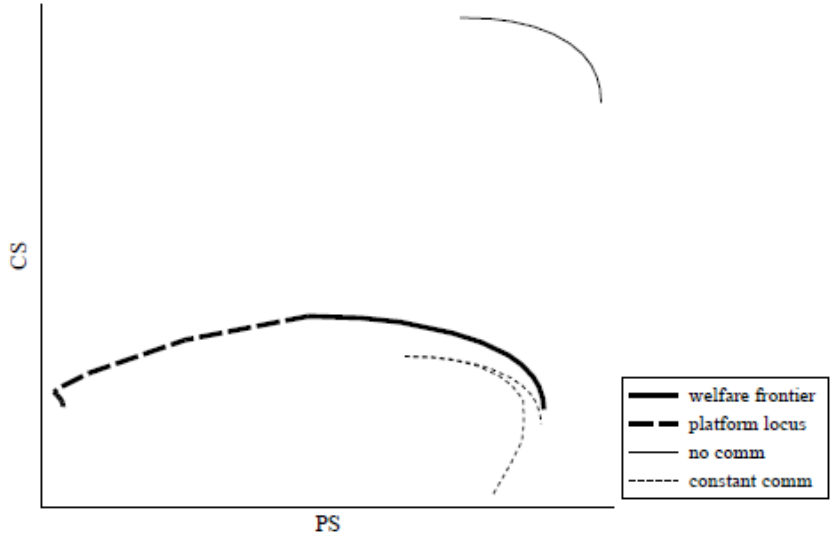
Summary of welfare results (2)

- Integrated platforms:
  - Welfare frontier shifts out without double marginalization
  - Platform locus depends on quality of platform products

Panel A: high-qual platform products



Panel B: low-qual platform products



Compliance and detection

Efficient rankings are on the welfare frontier

- Welfare frontier:

$$I_j = \delta_j + \kappa \ln(p_j - mc_j)$$

- But there are more potential rank determinants:

$$I_j = \underbrace{\beta_1 \delta_j + \beta_2 \ln(p_j - mc_j)}_{\text{efficient}} + \underbrace{\beta_3 \ln(p_j) + \beta_4 \ln(c_j) + other}_{\text{inefficient}}$$

- Without platform products, this is not “self-preferencing”

Integrated platform and self-preferencing

- Suppose regulators required efficient rankings
- Then inefficiency – and self preferencing – are present if

$$I_j = \underbrace{\delta_j + \kappa \ln(p_j - mc_j)}_{\text{efficient}} + \psi D_j$$

platform product indicator

- But DMA doesn't explicitly forbid, say, revenue max
- So, self-preferencing, for legal purposes, might be present if

$$I_j = \underbrace{\delta_j + \kappa \ln(p_j - mc_j) + \beta_k \ln(p_j)}_{\text{allowed}} + \psi D_j$$

Note: hard to find "self-preferencing" if we also allow differential payoffs/commissions

Inferring index function parameters

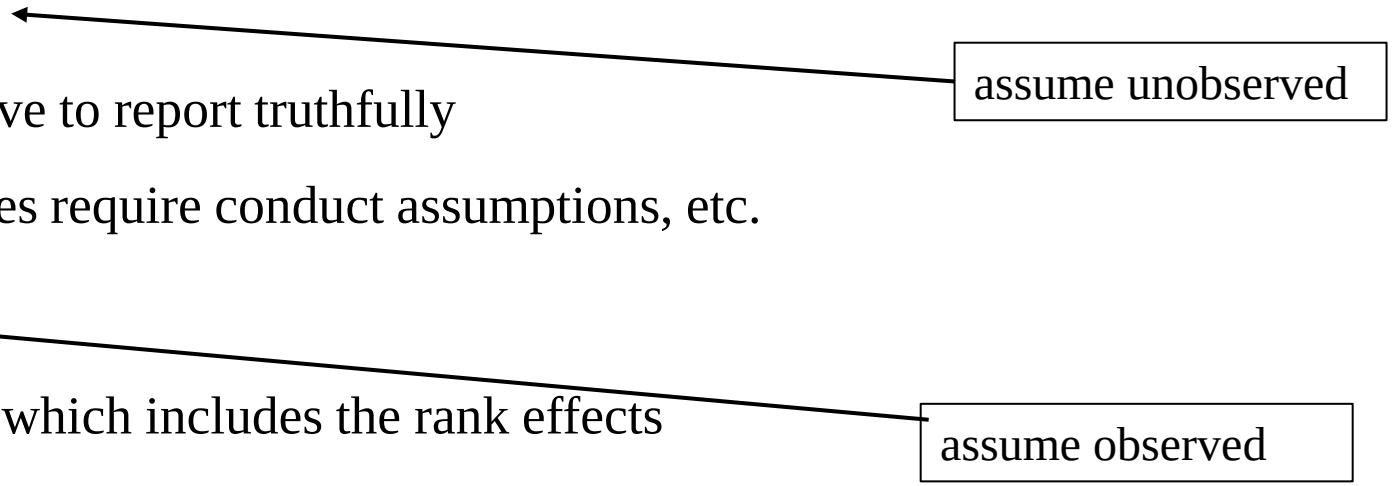
Suppose we observe all terms in the index function

- Three approaches:
  - Regress rankings on RHS terms (e.g., Jürgensmeier & Skiera, 2025; Farronato et al. 2023)
    - Requires linearity and cardinality of the index function
  - Rank-ordered logit of rankings on RHS terms (Hausman-motivated)
    - Still requires linearity in $X\beta$
  - Solve for δ_j to compare qualities at similar rankings (e.g., Aguiar et al., 2021)

Observability challenges

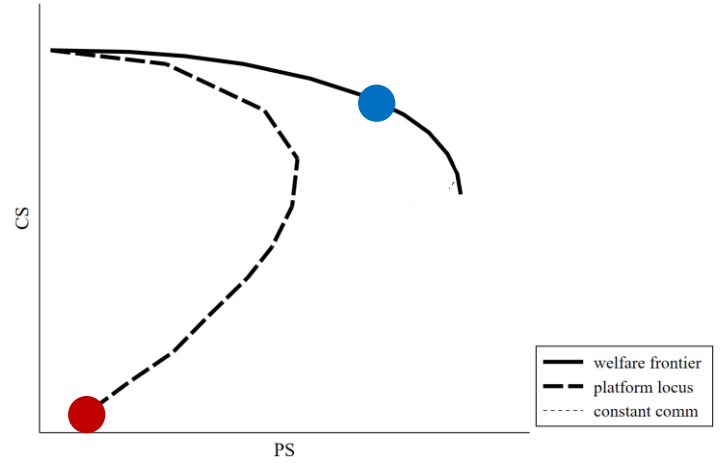
Some terms in the index function are hard to observe

- Challenge 1: mc_j
  - Sellers have no incentive to report truthfully
  - Econometric approaches require conduct assumptions, etc.
- Challenge 2: δ_j
  - Can likely observe q_j, which includes the rank effects
  - Need causal rank effect γ: $q_j \propto \delta_j + \gamma r_j$
    - Run experiments (e.g., Expedia)
    - FE approaches based on appearance at different ranks (e.g., Reimers and Waldfogel, 2023)
    - Borrow $\hat{\gamma}$ from literature (e.g., Ursu, 2018)



Regulation challenges

- Without observing mc_j, efficiency in rankings cannot be enforced
- But unregulated rankings can lead to bad welfare outcomes

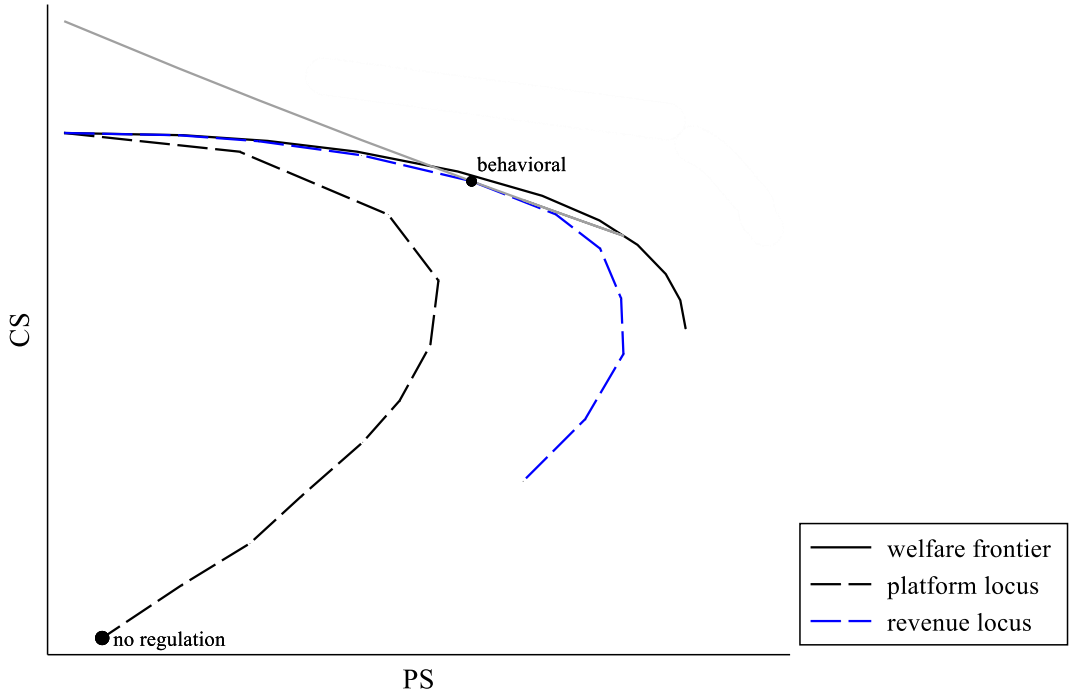


- So, what can regulators do?
  - Behavioral regulations – regulate rankings
  - Structural regulations – regulate commissions/selling arrangements

Feasible regulation

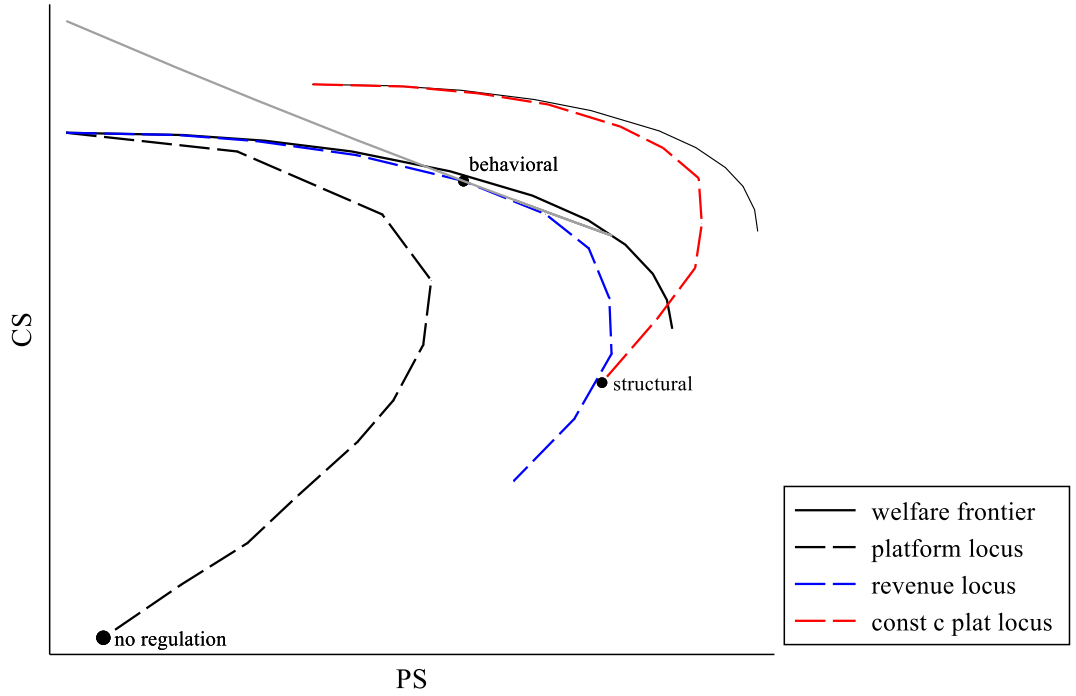
Behavioral regulation

- Allow variable commission for price setting
- Allow ranking only according to revenue locus
  - According to p_j, instead of $c_j p_j$
- Choose κ to maximize regulator utility $U(CS, PS)$



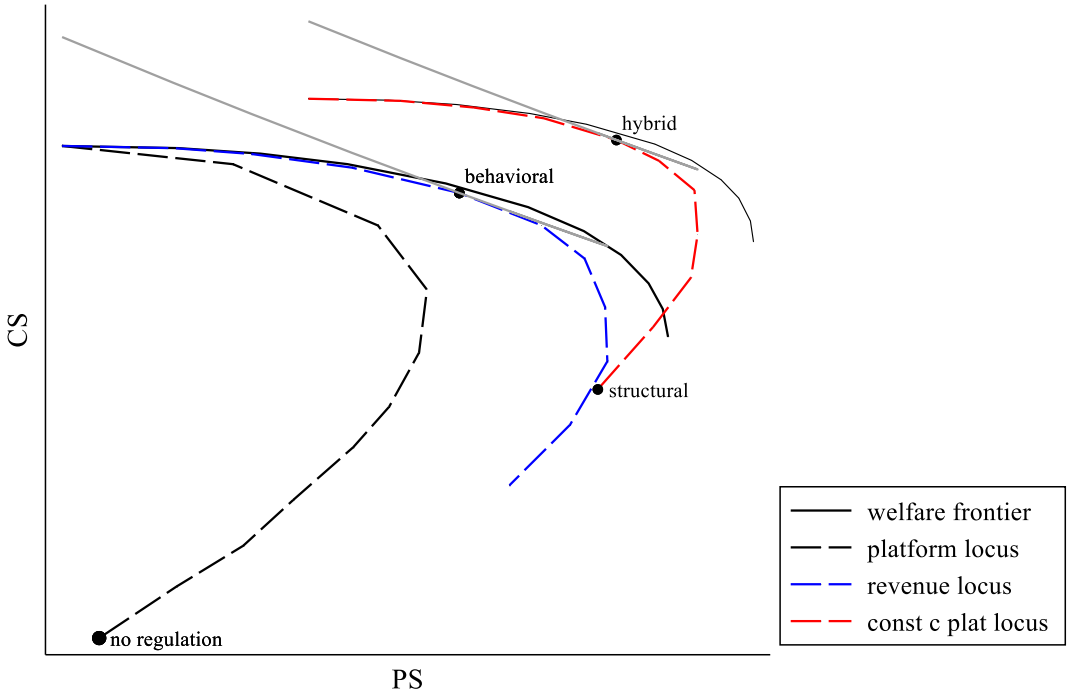
Structural regulation

- Allow only constant commissions
  - All products yield the same platform revenue
- Allow the platform to rank as it wishes



Hybrid regulation

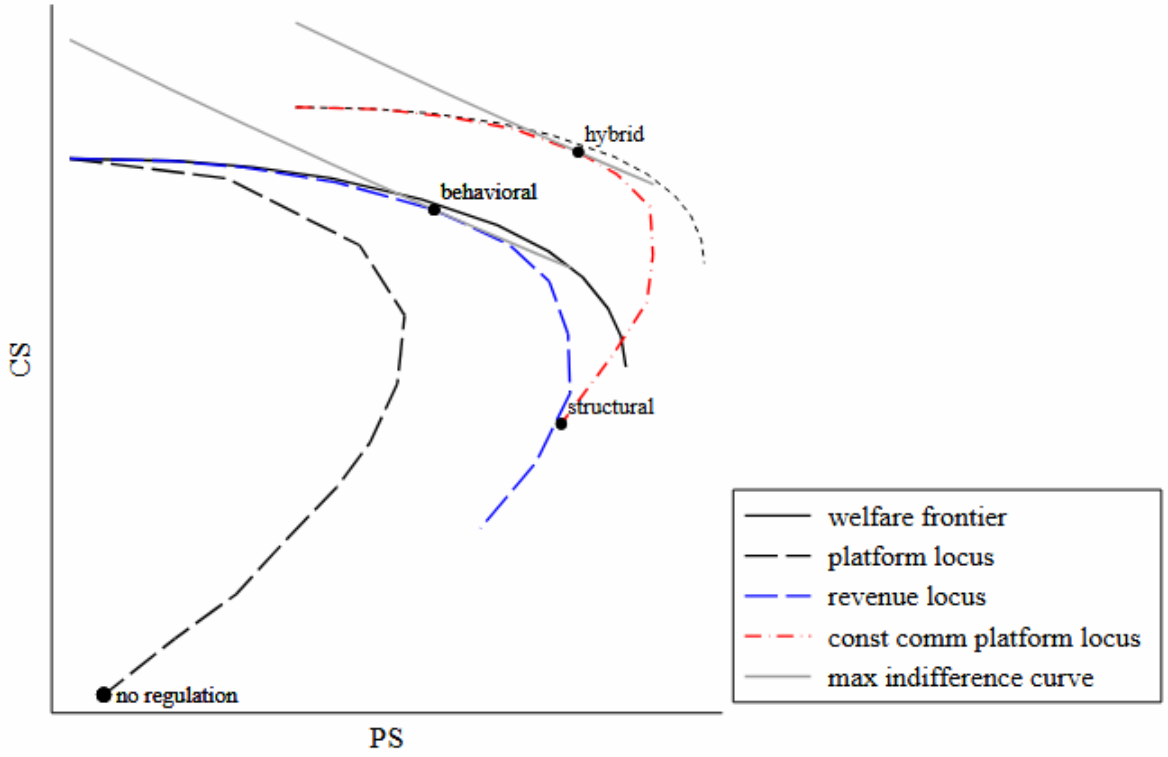
- Allow only constant commissions
  - All products yield the same platform revenue
- Choose κ to maximize regulator utility $U(CS, PS)$



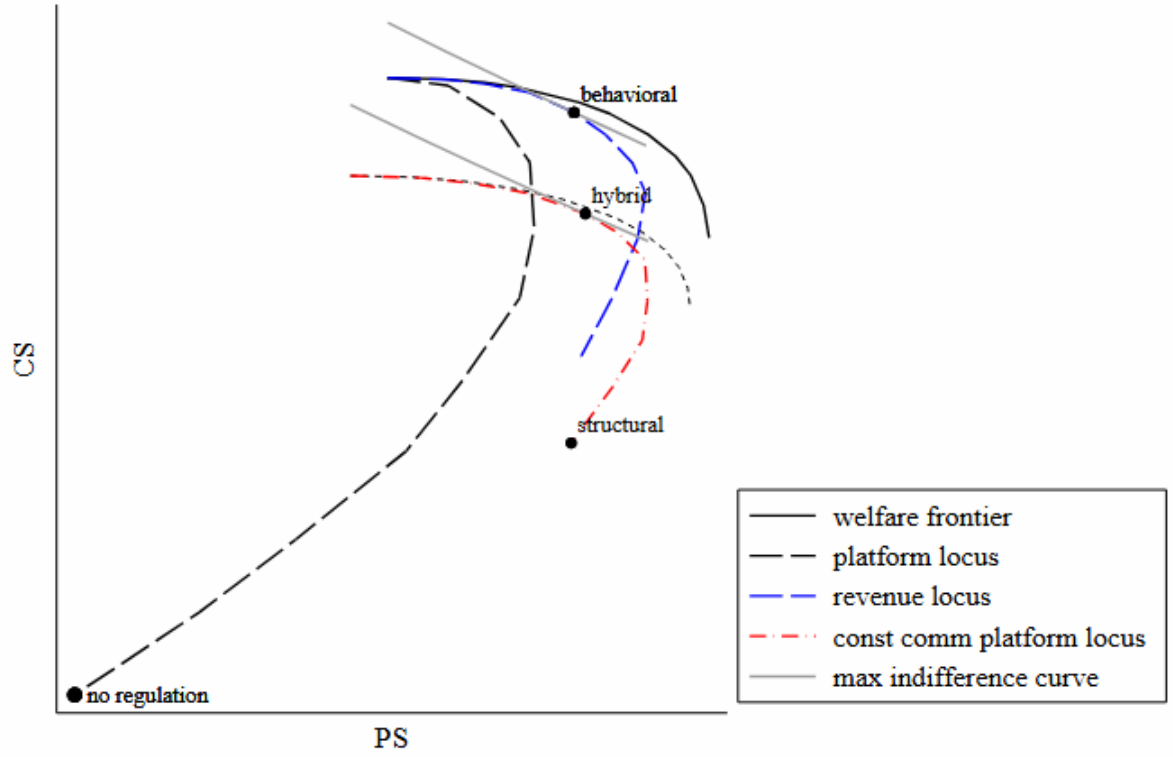
- Here: hybrid regulation is most effective
- More generally: effectiveness depends on selling arrangements
- (but not on other obvious parameters)

Commissions and product quality

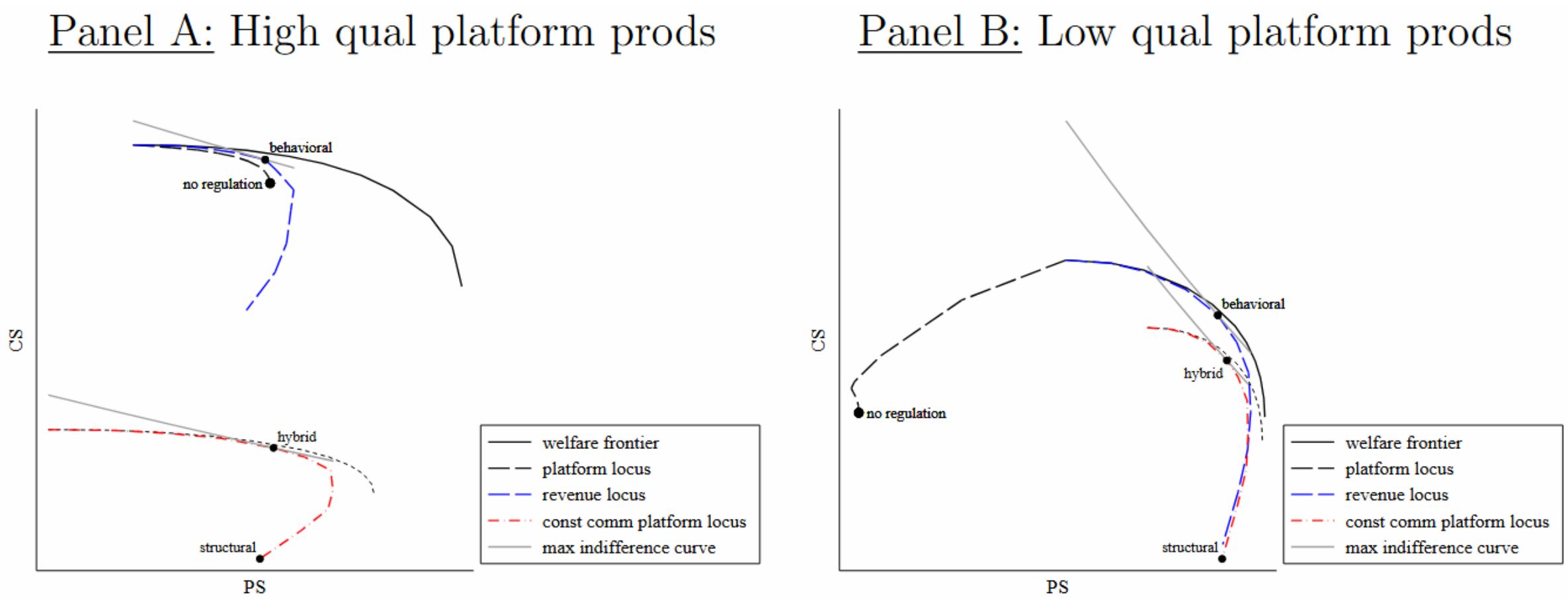
Panel A: High qual, high comm



Panel B: Low qual, high comm



Integrated platform product quality



Conclusion

- Policy is focused on self preferencing
  - This is only part of the problem
  - Rankings based on variable commissions (also) have large welfare costs
- Data challenges make regulations difficult to enforce
  - Some structural and behavioral rules can be enforced
  - These avoid big inefficiencies while delivering meaningful improvements
- We hope this analysis can help regulators dealing with dominant platforms