Channel Coordination on Exclusive vs. Non-Exclusive Content under Endogenous Consumer Homing

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SweRIE 2025, 24 February 2025, Stockholm

Research Question

Does a *snowballing effect* exist in content distribution platform markets, where a high ex-ante level of exclusives lead to consumer multihoming, which lead to even stronger incentives to distribute new content exclusively?

How does this interplay affect the wholesale terms of trade between platforms and content providers?

WIRED's consumer recommendations

Video Streaming

"All streaming services have some **exclusive content**, but there's also […] **overlap**…"

And:

"Think about the **features** you need and **compatibility** with your […] devices"

"Streaming services support various levels of **video quality**"

Music Streaming

"All of these services' **libraries pretty much mirror each other**, with tens of millions of songs ranging from the popular to the obscure."

"The things that separate streaming services are the **quality of music discovery** […] the **experience** on […] apps, what devices you can use them with, and their **sound quality**. "

Simon Hill, 2023. Which Streaming Services Are Actually Worth Your Money?. Wired Magazine.

Matt Jancer, 2023. The Best Music Streaming Services to Get Your Groove On. Wired Magazine.

Literature

- **Horizontal differentiation with consumer multihoming**
  - Hotelling (1929); Kim and Serfes (2006); Anderson et al. (2017)
- **Content provision to horizontally differentiated platforms, with consumer singlehoming, lead to non-exclusive distribution on both platforms**
  - Armstrong (1999); Weeds (2015); Stennek (2014)
- **With consumer multihoming, exclusive distribution by one platform to consumers, and lump-sum fee as wholesale terms of trade**
  - Jiang et al. (2019)
- **Assuming consumer singlehoming, content provider prefers using a per-consumer wholesale price over a lump-sum fee as wholesale terms of trade**
  - Armstrong (1999)

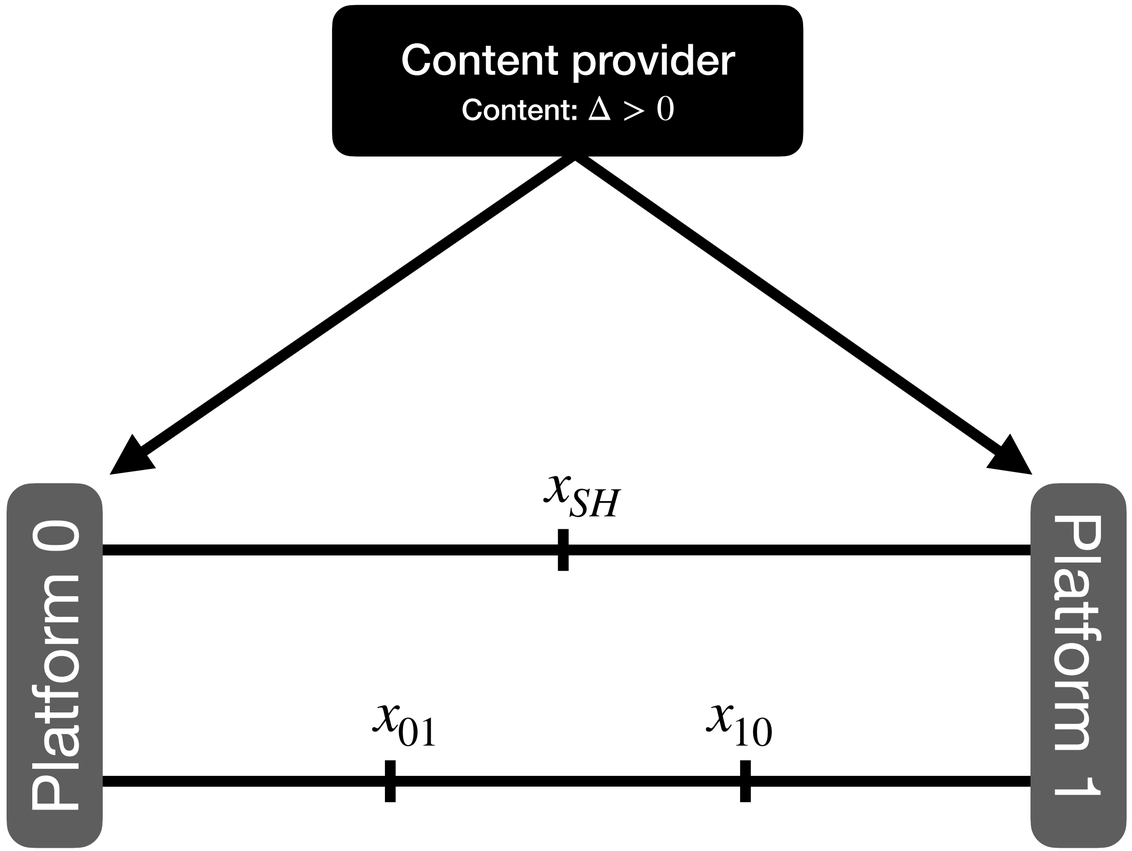
Model

Model

Layout

(Armstrong, 1999; Stennek, 2014; Weeds, 2015; Jiang et al., 2019)

- Downstream, distribution platforms, $i = 0,1$
- Upstream, independent, monopoly content provider
- Subgame Perfect Nash Equilibrium, two-stage game:
  1. Access pricing stage
  2. Price competition stage



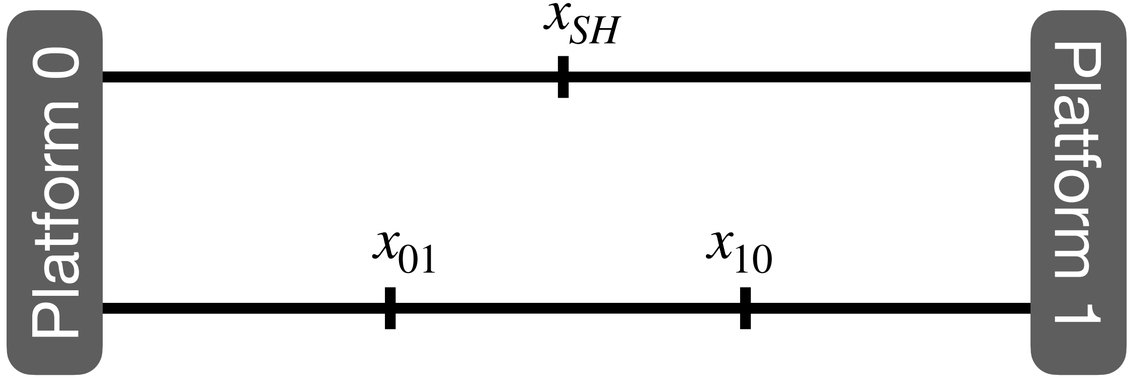
Model

Demand

(Hotelling, 1929; Kim and Serfes, 2006; Anderson et al., 2017)

- Consumer singlehoming utility:
  $u_i(x) = n + \varepsilon_i - p_i - t\,|X_i - x\,|$
- Singlehoming demand follows from *indifferent-consumer margin,* $u_0(x) = u_1(x)$:
  - $D_i^{SH} = \frac{1}{2} + \frac{\varepsilon_i - p_i}{2t} - \frac{\varepsilon_j - p_j}{2t}$

- Consumer multihoming utility:
  $u_B = n + \varepsilon_0 + \varepsilon_1 - p_0 - p_1 - t$
- Multihoming demand follows from *singlehomer-multihomer margins,* $u_i(x) = u_B$:
  - $D_i^{MH} = \frac{\varepsilon_i - p_i}{t}$

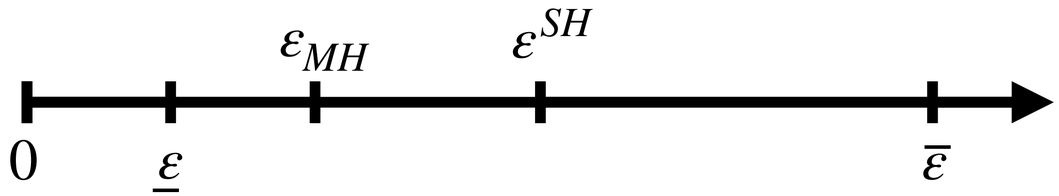


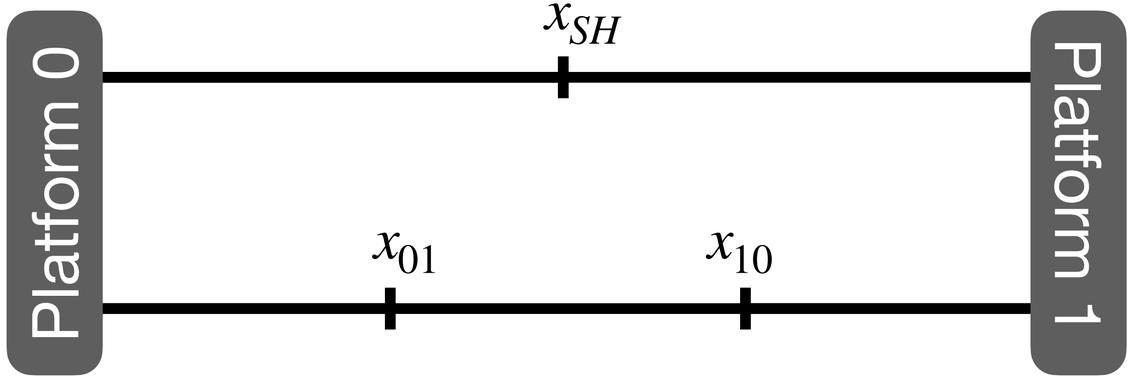
Analysis

Analysis

Stage 2 Nash equilibrium

- Equilibrium candidates:
  - Singlehoming: (p_i^{SH}, π_i^{SH})
  - Multihoming: (p_i^{MH}, π_i^{MH})
- Deviation contraints:
  - $\pi_i^{SH} - \pi_i^{MH} > 0$
    iff $\varepsilon < \varepsilon^{SH}$
  - $\pi_i^{MH} - \pi_i^{SH}(p_i^{SH}(p_j^{MH}), p_j^{MH}) > 0$
    iff $\varepsilon > \varepsilon_{MH}$





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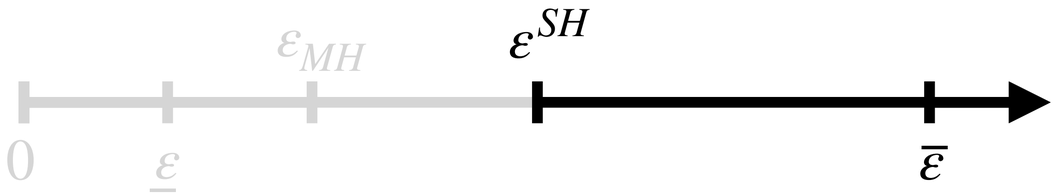
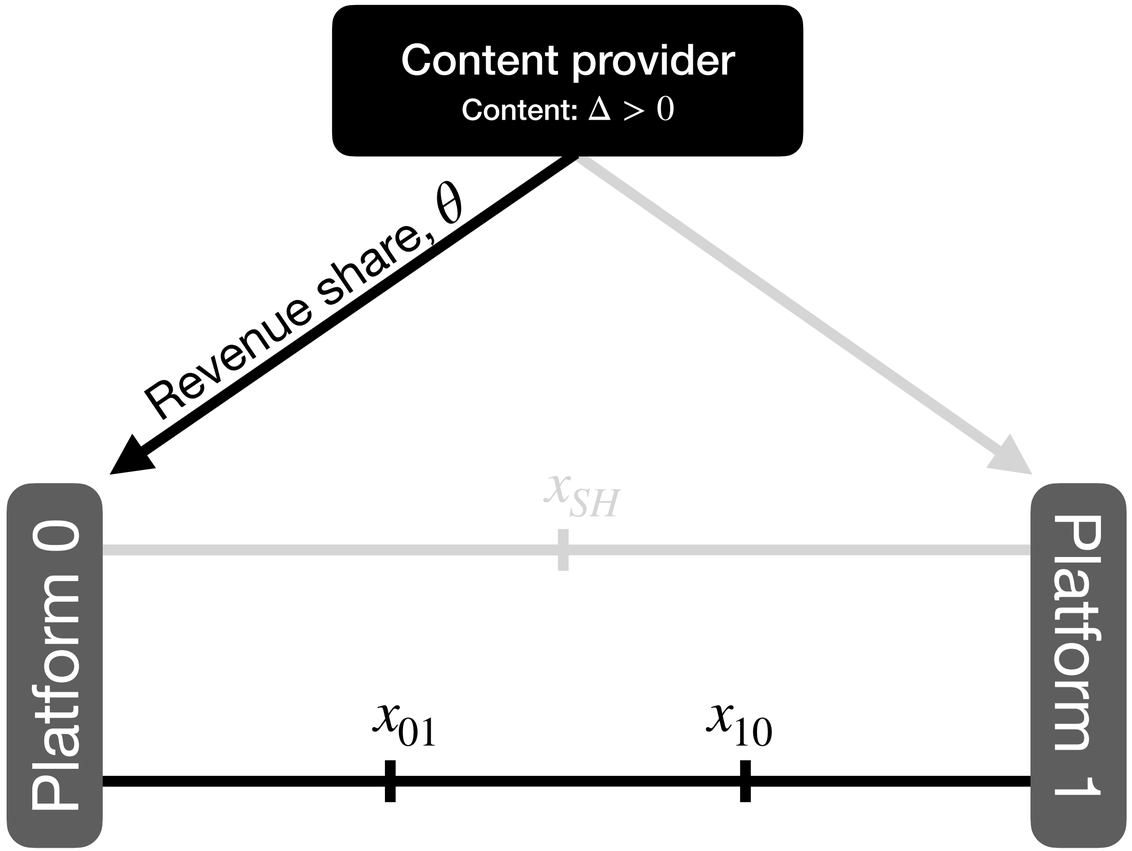
Analysis

Stage 1: consumer multihoming



- Non-exclusive distribution
  access price: s.t. $\pi_1^{MH}(\Delta, \Delta) \geq \pi_1^{MH}(\Delta,0)$
  - $\pi_{CP}^{MH}(\theta, \theta) = \pi_{CP}^{MH}(w, w) = 0$

- Exclusive distribution:
  access price: s.t. $\pi_0^{MH}(\Delta,0) \geq \pi_0^{MH}(0,0)$
  - $\pi_{CP}^{MH}(\theta,0) > 0, \pi_{CP}^{MH}(w,0) > 0$



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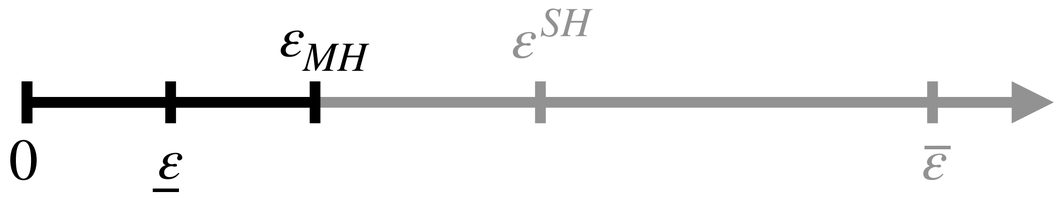
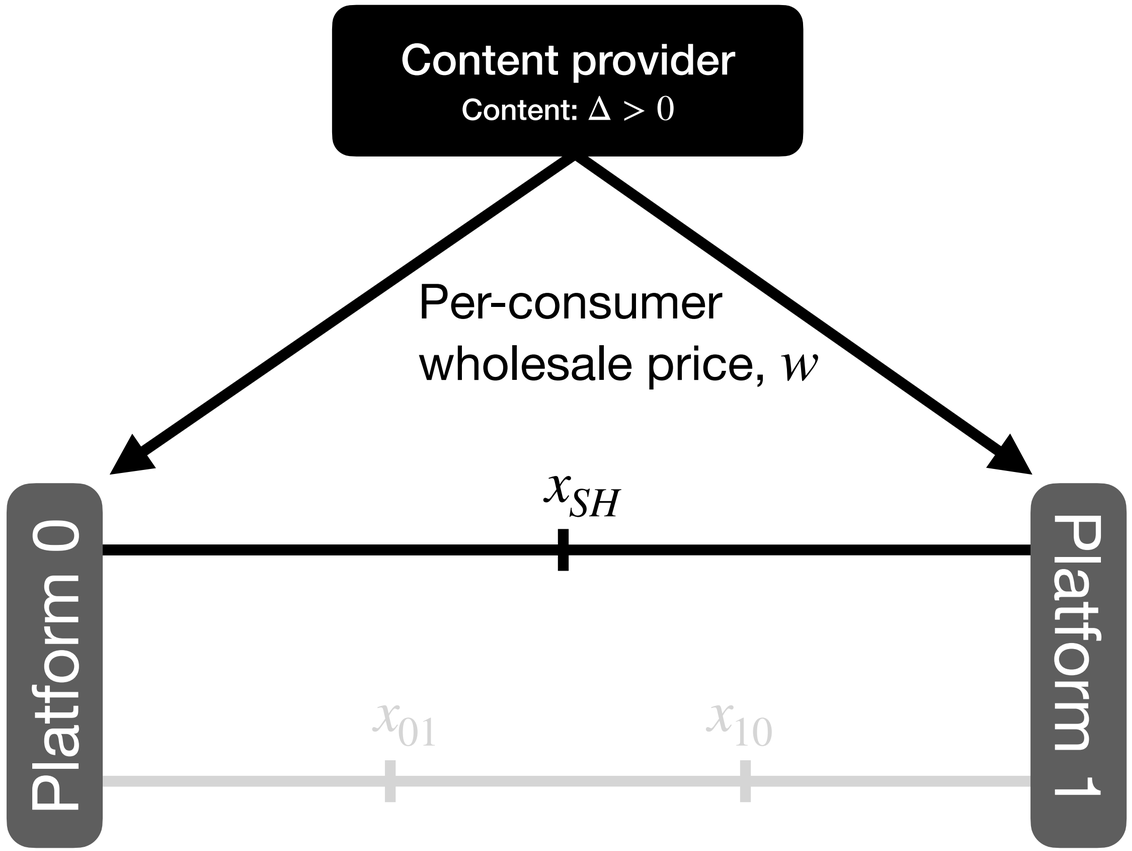
Analysis

Stage 1: consumer singlehoming



- Non-exclusive distribution:
  access price: s.t. $\pi_1^{SH}(\Delta, \Delta) \geq \pi_1^{SH}(\Delta, 0)$
  - $\pi_{CP}^{SH}(\theta, \theta) > 0, \pi_{CP}^{SH}(w, w) > 0$

- Exclusive distribution:
  access price: s.t. $\pi_0^{SH}(\Delta, 0) \geq \pi_0^{SH}(0, 0)$
  - $\pi_{CP}^{SH}(\theta, 0) > 0, \pi_{CP}^{SH}(w, 0) > 0$



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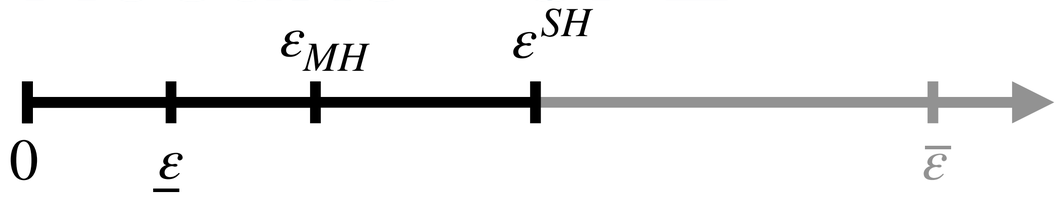
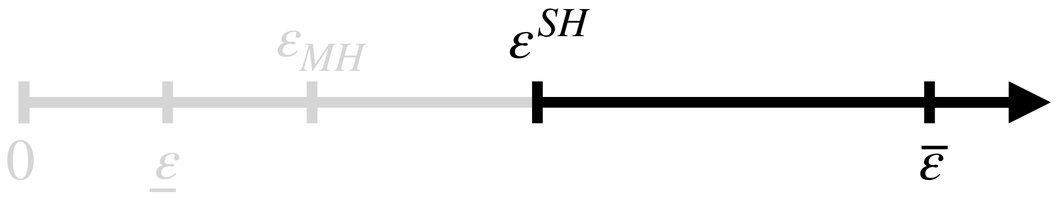
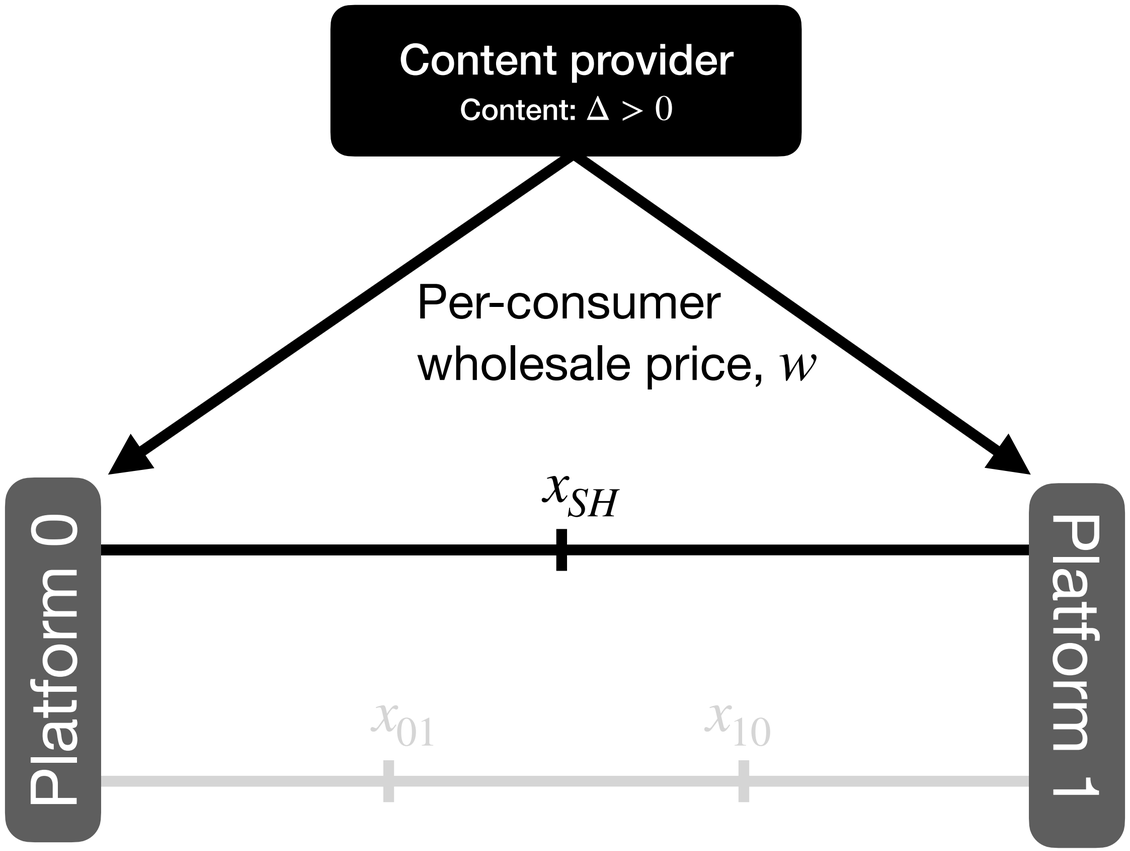
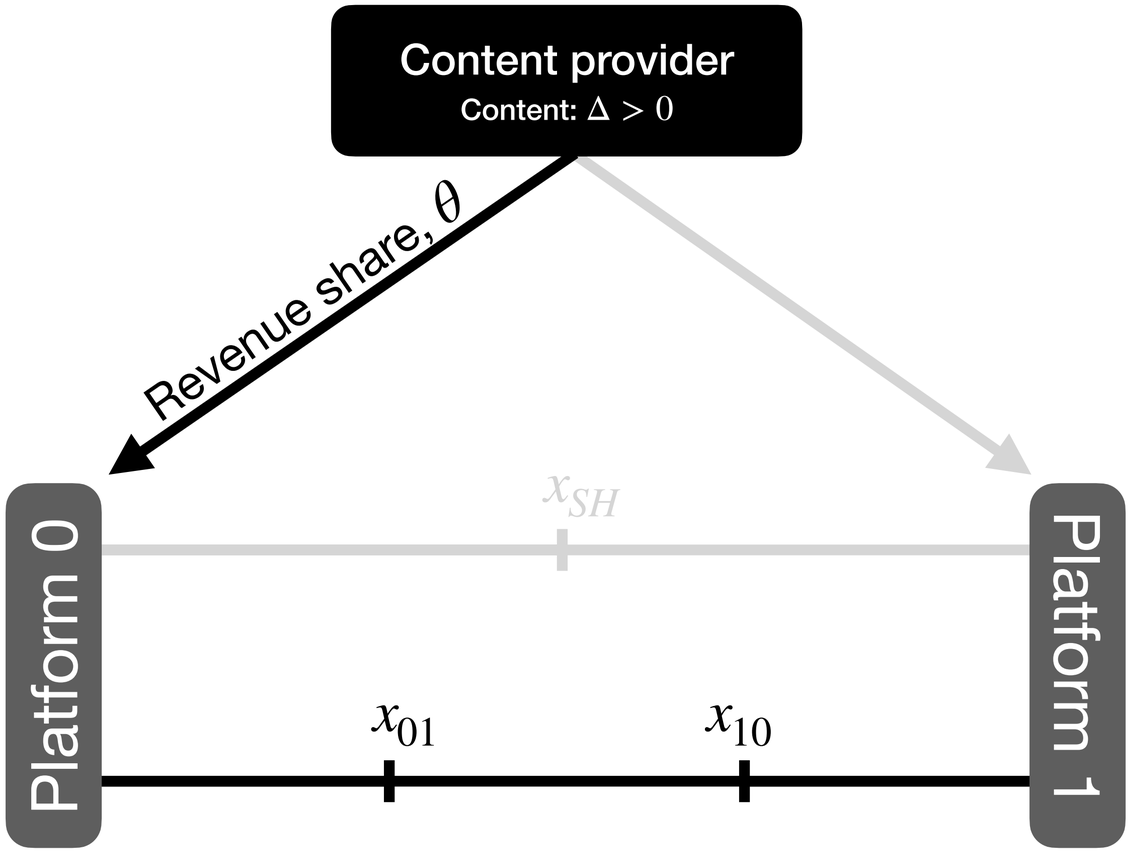
Results - SPE


ε_{MH}
ε^{SH}
0
$\underline{\varepsilon}$
$\overline{\varepsilon}$

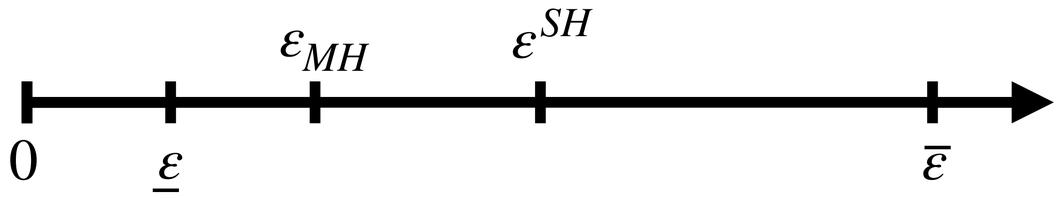

ε_{MH}
ε^{SH}
0
$\underline{\varepsilon}$
$\overline{\varepsilon}$


Content provider
Content: $\Delta > 0$
Per-consumer wholesale price, w
x_{SH}
x_{01}
x_{10}
Platform 0
Platform 1


Content provider
Content: $\Delta > 0$
Revenue share, θ
x_{SH}
x_{01}
x_{10}
Platform 0
Platform 1

Results

Extensions / Robustness

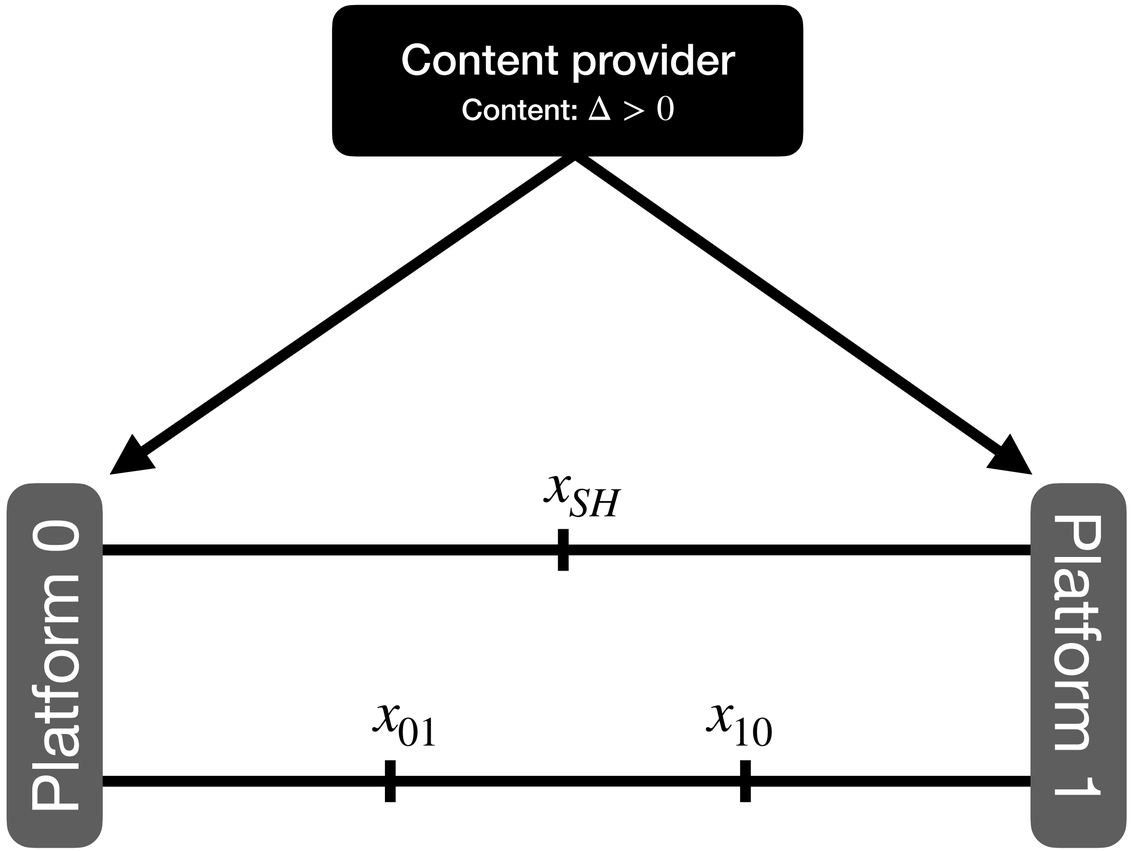


- **Exclusive distribution right:**

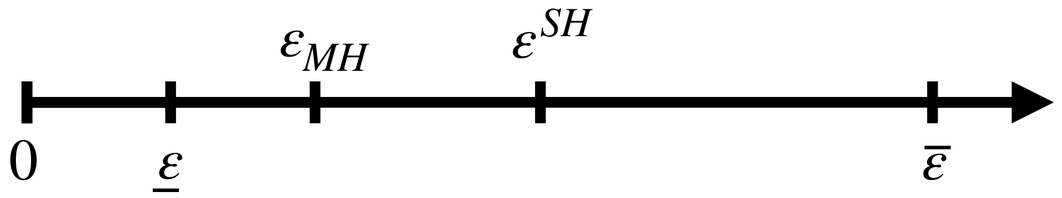
  ➡ Allowing for exclusive distribution rights has no impact on our results

- **Vertical Foreclosure**

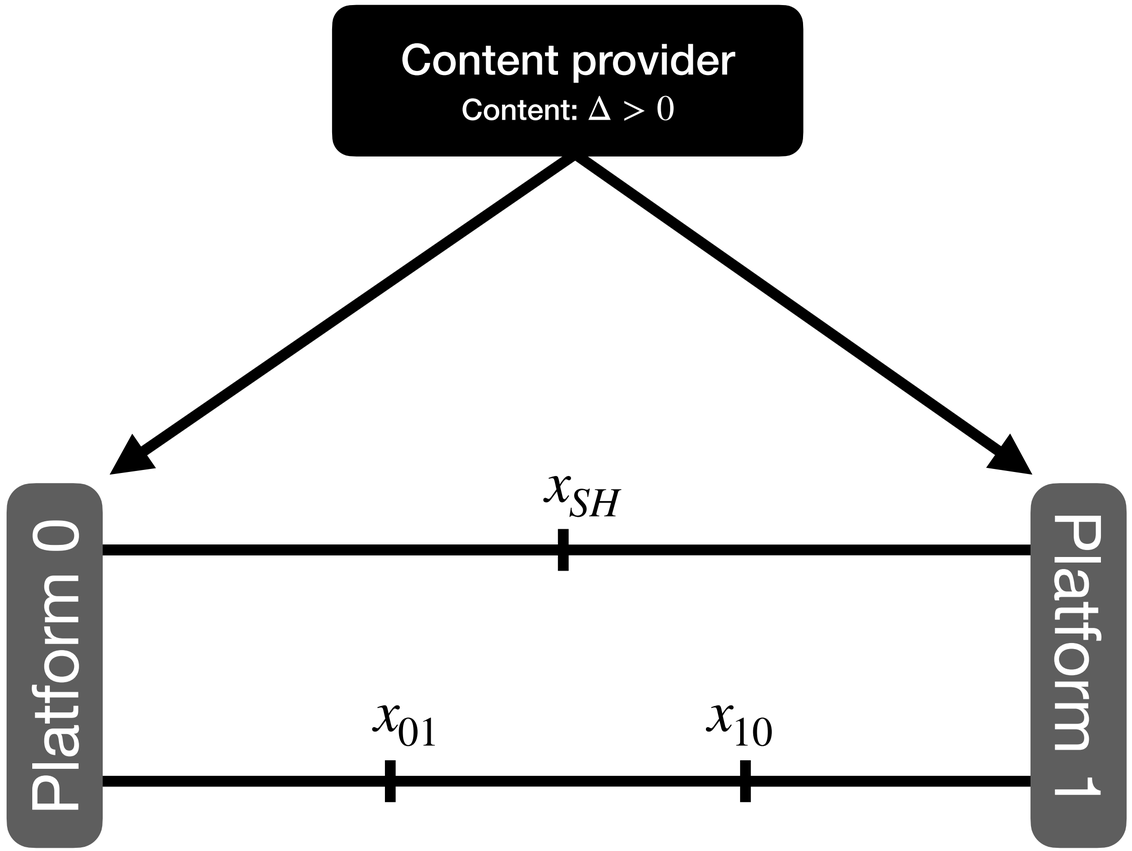
  ➡ When platforms are allowed to unilaterally deviate from singlehoming and induce consumer multihoming, platform 1 will not be vertically foreclosed from the market



Concluding Remarks



- Bottleneck consumers and content distribution
- Snowballing effect



- Netflix AND Disney+ AND … AND HBO MAX
- Spotify OR Apple Music OR Tidal

References

References

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Appendix

Stage 2 Nash equilibrium

Consumer Singlehoming

- $p_i^{SH}(p_j) = \dfrac{t + (\varepsilon_i - \varepsilon_j) + p_j + c_i}{2}$
- $p_i^{SH} = t + \dfrac{(\varepsilon_i - \varepsilon_j) + 2c_i + c_j}{3}$
- $\pi_i^{SH} = \dfrac{\left(3t + (\varepsilon_i - \varepsilon_j) - (c_i - c_j)\right)^2}{18t}$
- $\varepsilon < \varepsilon^{SH} = \sqrt{2}t - \left(\dfrac{3-\sqrt{2}}{3}\right)\Delta \approx \sqrt{2}t$

Consumer Multihoming

- $p_i^{MH}(p_j) = p_i^{MH} = \dfrac{\varepsilon_i + c_i}{2}$
- $\pi_i^{MH} = \dfrac{(\varepsilon_i - c_i)^2}{4t}$
- $\varepsilon > \varepsilon_{MH} = \dfrac{2}{\sqrt{2}+3}\left((\sqrt{2}+1)t - \Delta\right) \approx 1.09t$

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Stage 1 Consumer multihoming

Revenue Sharing

- $\theta\frac{\varepsilon^2}{4t} \geq \frac{\varepsilon^2}{4t} \Longrightarrow \theta^{MH-0} = 1$
- $\pi_{CP} = 2(1-\theta^{MH-0})\pi_1^{MH-0} = 0$

- $\theta\frac{(\varepsilon+\Delta)^2}{4t} \geq \frac{\varepsilon^2}{4t} \Longrightarrow \theta^{MH-\Delta} = \frac{\varepsilon^2}{(\varepsilon+\Delta)^2}$
- $\pi_{CP} = (1-\theta^{MH-\Delta})\pi_1^{MH-\Delta} = \Delta\frac{2\varepsilon+\Delta}{4t}$

Per-consumer wholesale price

- $\frac{(\varepsilon-w)^2}{4t} \geq \frac{\varepsilon^2}{4t} \Longrightarrow w^{MH-0} = 0$
- $\pi_{CP} = w(2 * D_1(\Delta,\Delta,w)) = 0$

- $\frac{(\varepsilon+\Delta-w)^2}{4t} \geq \frac{\varepsilon^2}{4t} \Longrightarrow w^{MH-\Delta} = \Delta$
- $\pi_{CP} = wD_0(\Delta,0,w) = \frac{\varepsilon\Delta}{4t}$

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Stage 1 Consumer singlehoming

Revenue Sharing

- $\theta\frac{t}{2} \geq \frac{(3t-\Delta)^2}{18t} \Longrightarrow \theta^{SH-0} = \frac{(3t-\Delta)^2}{9t^2}$
- $\pi_{CP} = 2(1-\theta^{SH-0})\pi_1^{SH-0} = \Delta\frac{6t-\Delta}{9t}$

- $\theta\frac{(3t+\Delta)^2}{18t} \geq \frac{t}{2} \Longrightarrow \theta^{SH-\Delta} = \frac{9t^2}{(3t+\Delta)^2}$
- $\pi_{CP} = (1-\theta^{SH-\Delta})\pi_1^{SH-\Delta} = \Delta\frac{6t+\Delta}{18t}$

Per-consumer wholesale price

- $\frac{t}{2} \geq \frac{(3t-\Delta+w)^2}{18t} \Longrightarrow w^{SH-0} = \Delta$
- $\pi_{CP} = wD_1(\Delta,\Delta,w) = \Delta$

- $\frac{(\varepsilon+\Delta-w)^2}{4t} \geq \frac{\varepsilon^2}{4t} \Longrightarrow w^{MH-\Delta} = \Delta$
- $\pi_{CP} = wD_0(\Delta,0,w) = \frac{\Delta}{2}$

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