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

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Research Question

Does a snowballing effect exist in content access platform markets, where high existing incremental value leads to consumer multihoming, which in turn encourages content providers to pursue exclusive distribution?

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

Model

Model

Layout

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

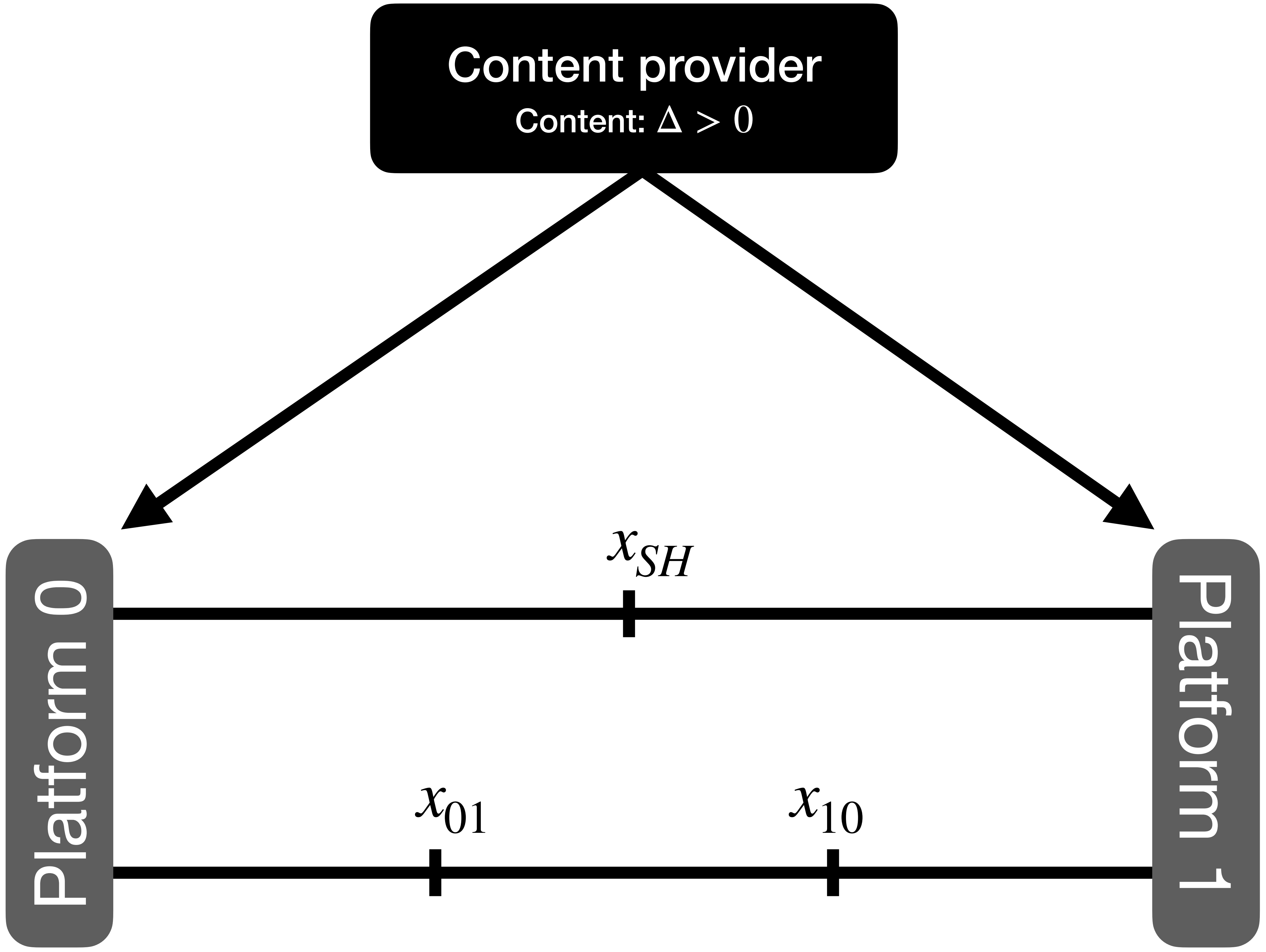
- Downstream, distribution platforms, $i = 0,1$

- Upstream, independent, monopoly content provider

- Subgame Perfect Nash Equilibrium, two-stage game:

  1. Access pricing stage

  2. Price competition stage

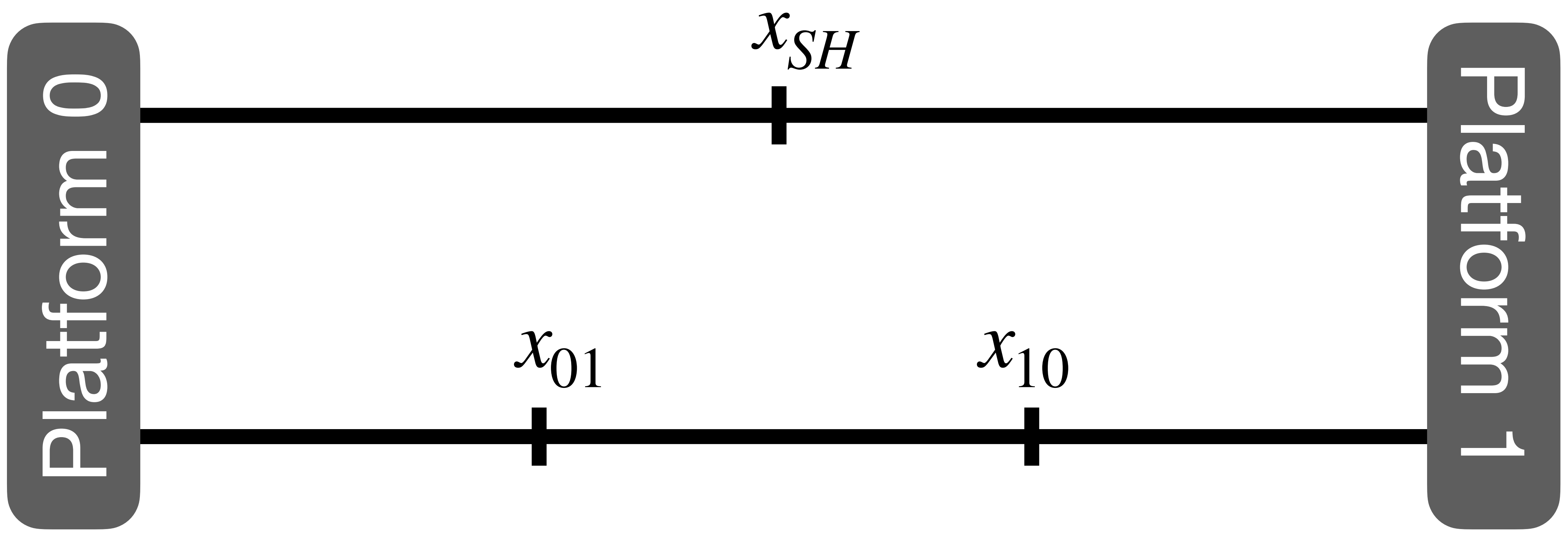


Model

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,* $u_0(x) = u_1(x)$:
  - $D_i^{SH} = \dfrac{1}{2} + \dfrac{\varepsilon_i - p_i}{2t} - \dfrac{\varepsilon_j - p_j}{2t}$
- Consumer multihoming utility:
  $u_B = n + \varepsilon_0 + \varepsilon_1 - p_0 - p_1 - t$
- Multihoming demand follows from *singlehomer-multihomer margins,* $u_i(x) = u_B$:
  - $D_i^{MH} = \dfrac{\varepsilon_i - p_i}{t}$

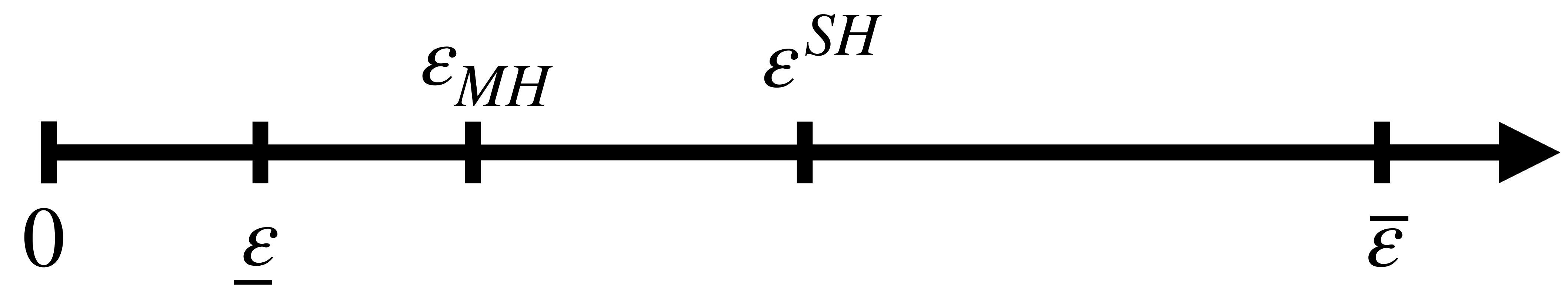


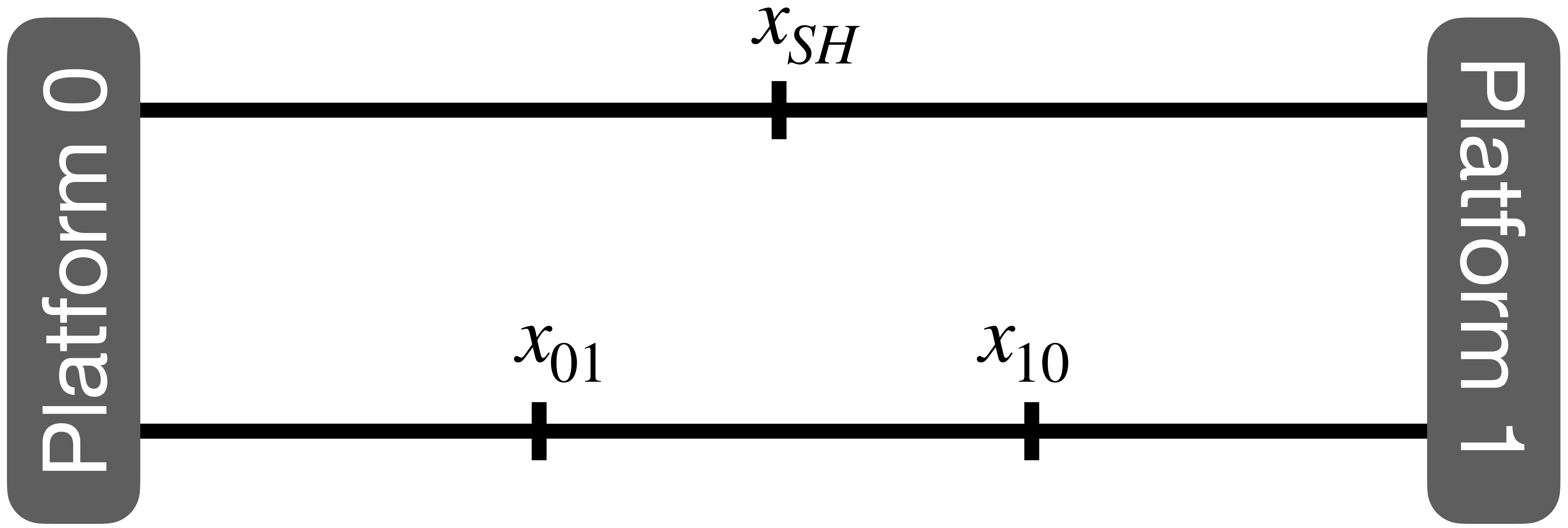
Analysis

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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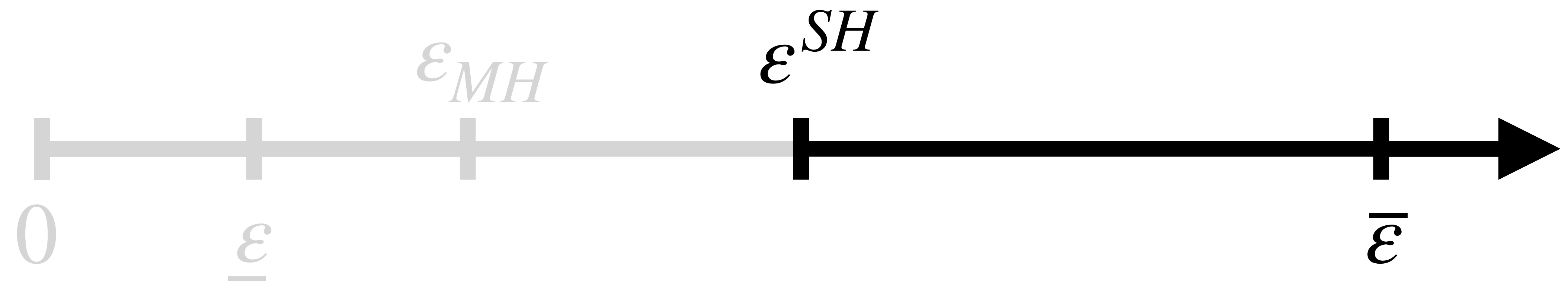
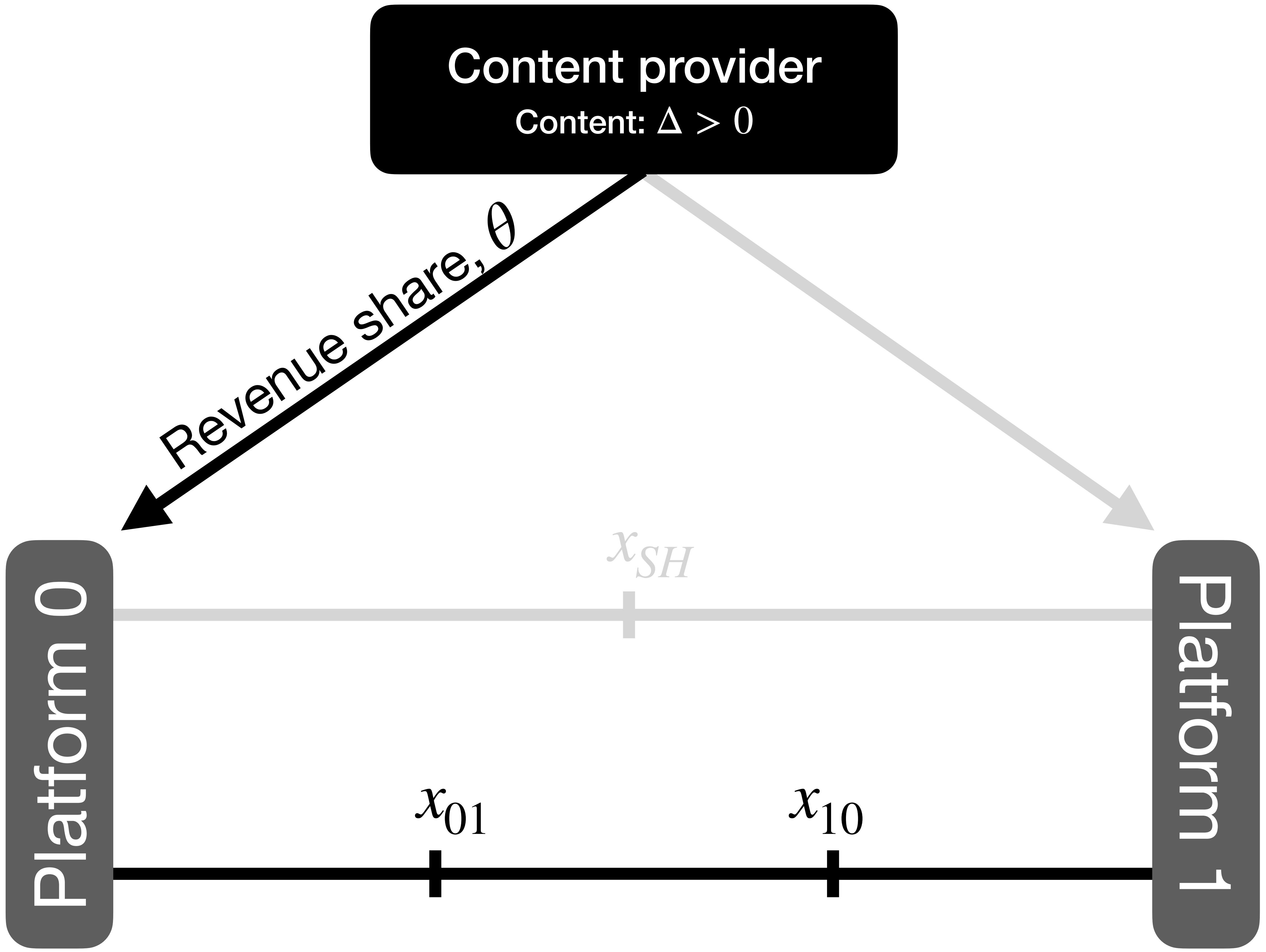
Analysis

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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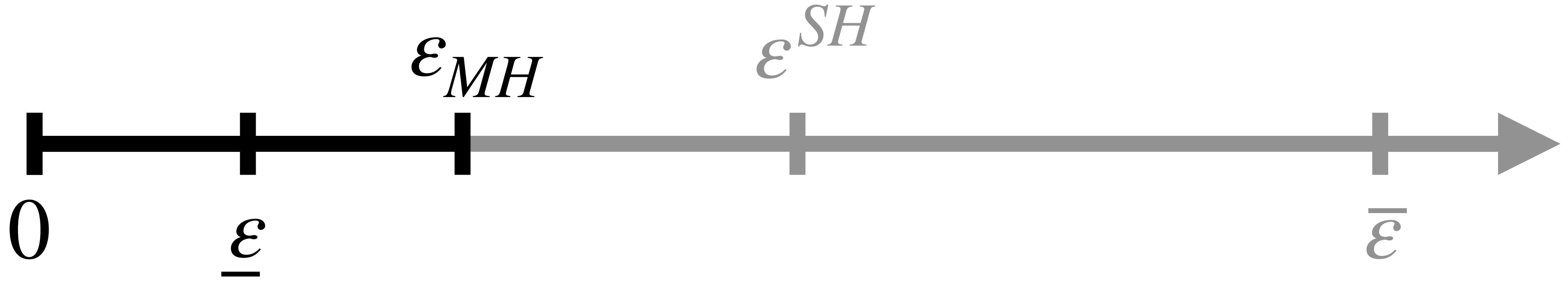
Analysis

Stage 1: consumer singlehoming



- Non-exclusive distribution:
  access price: s.t. $\pi_1^{SH}(\Delta, \Delta) \geq \pi_1^{SH}(\Delta, 0)$
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- Exclusive distribution:
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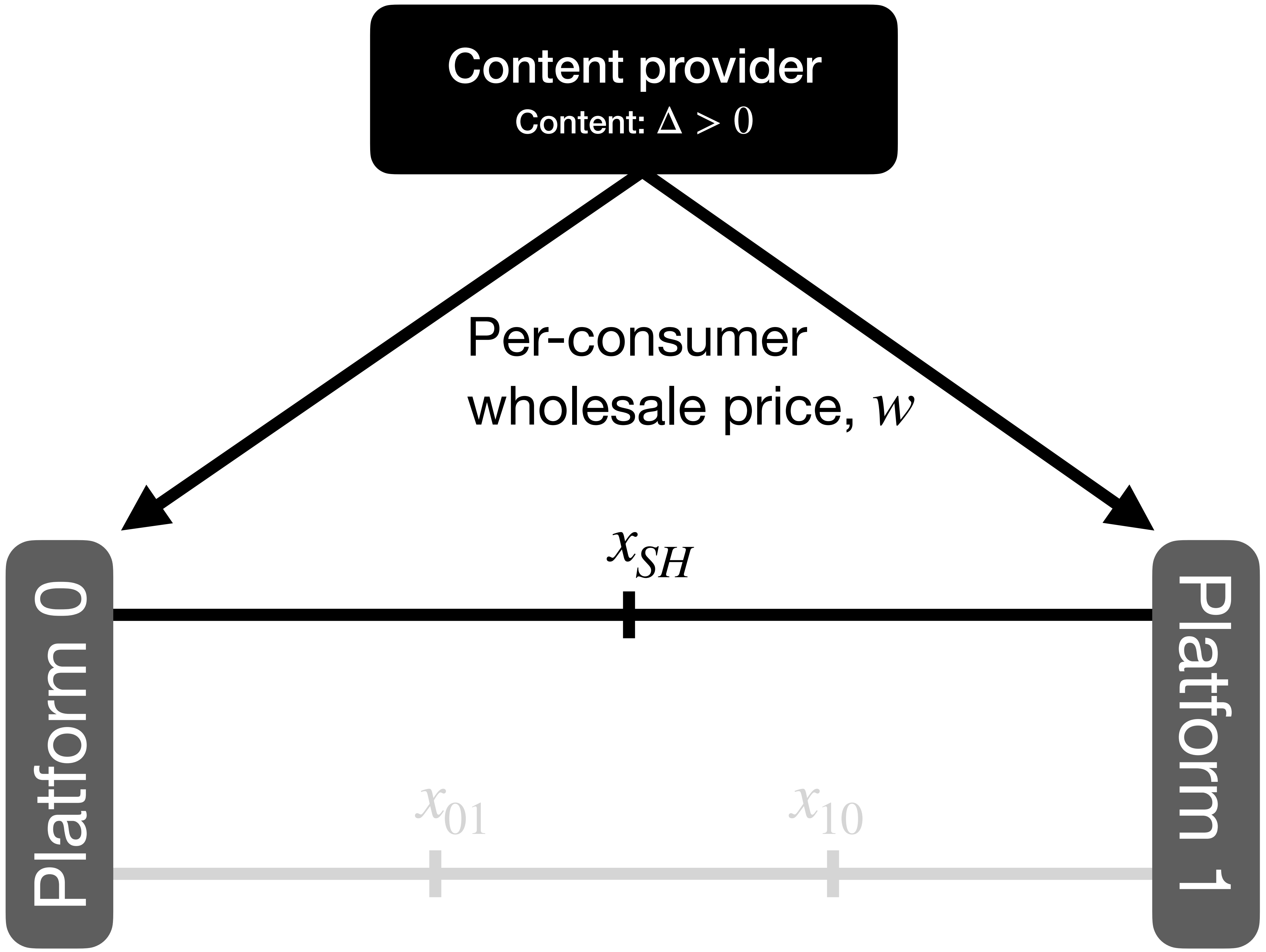

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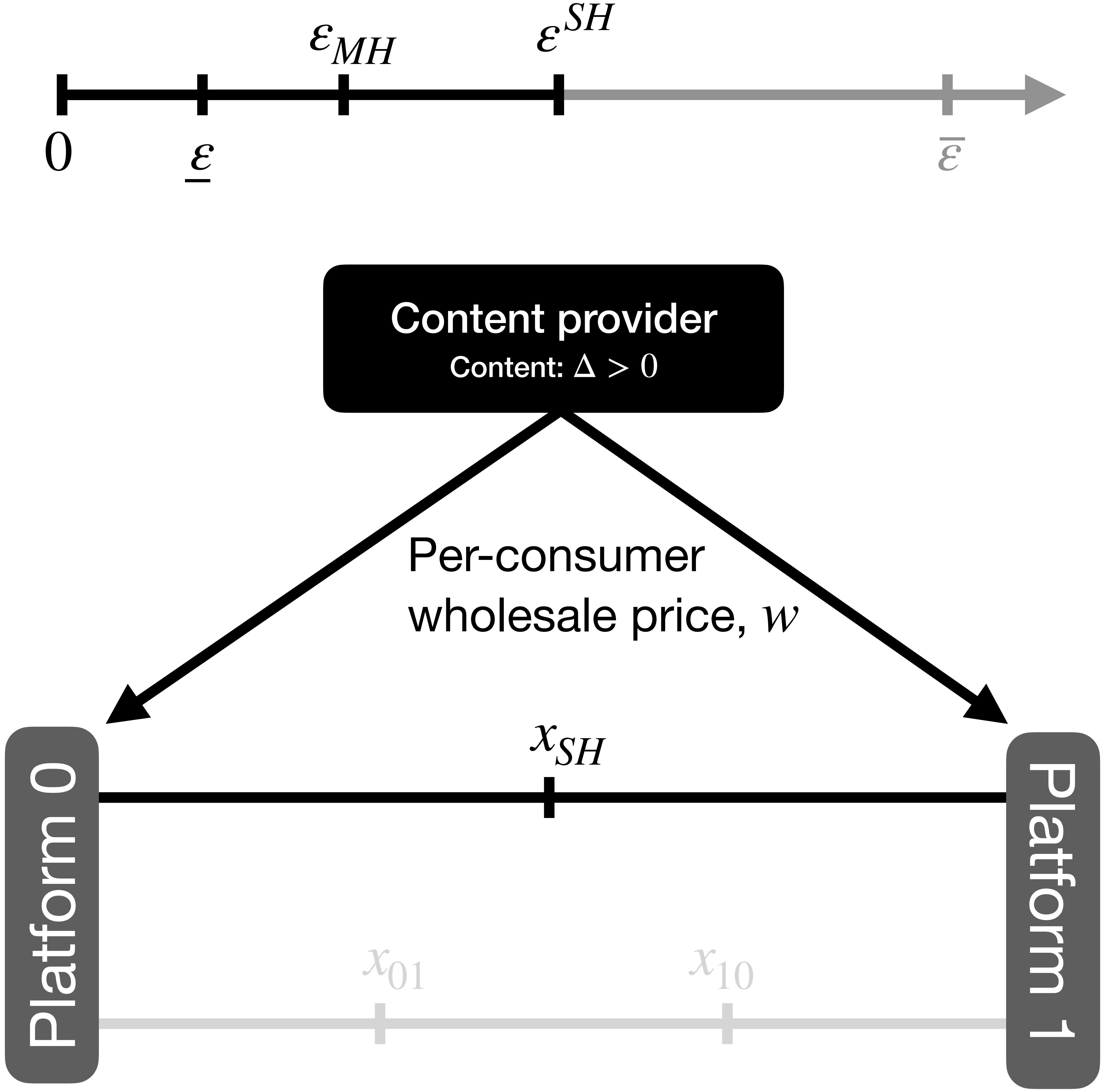
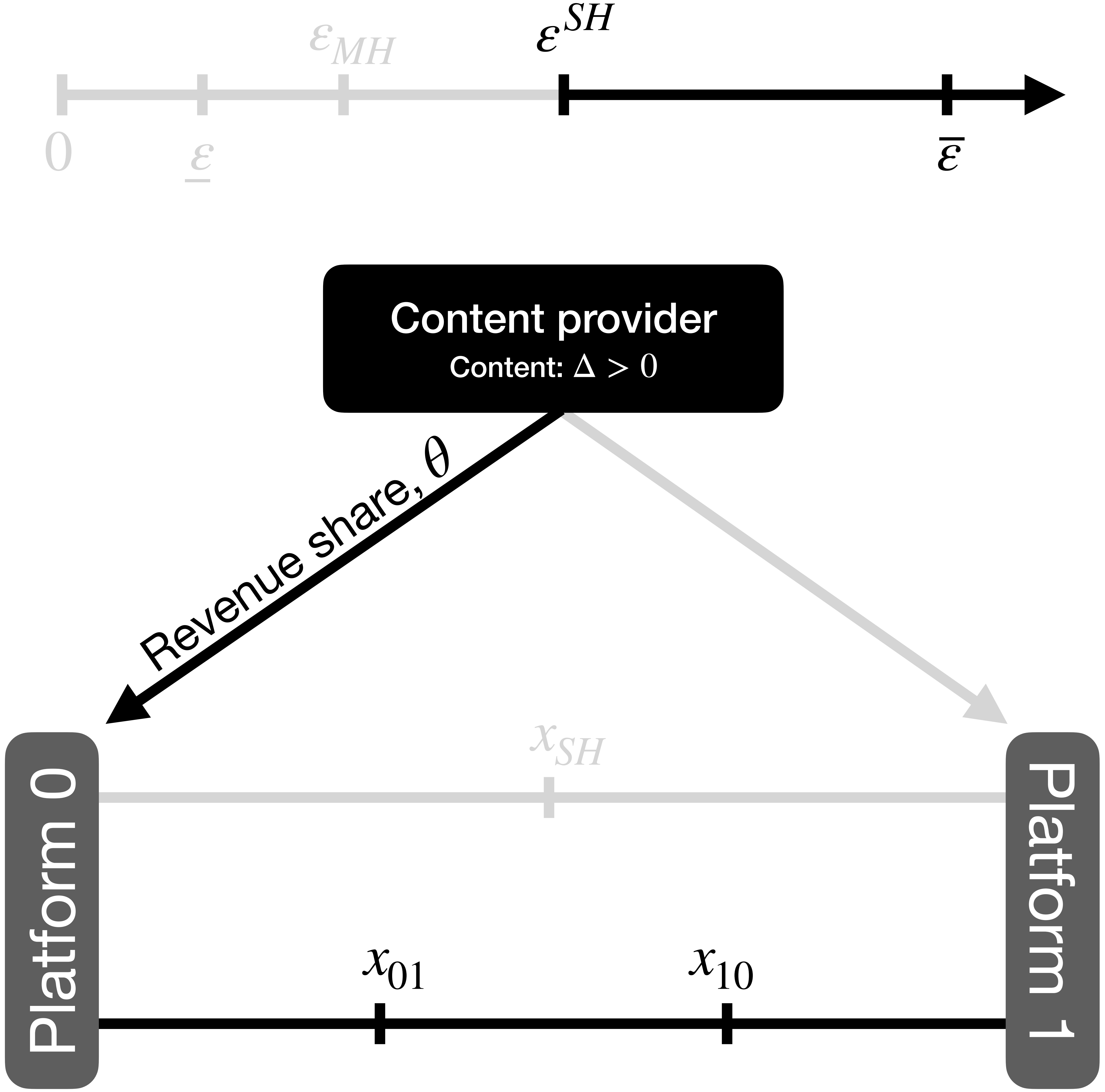
Results - SPE



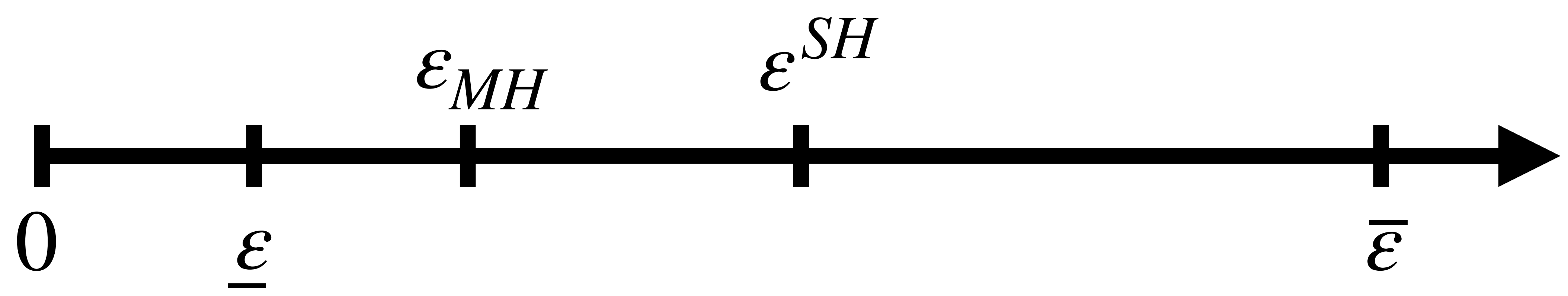
ε_{MH}
ε^{SH}
0
$\underline{\varepsilon}$
$\overline{\varepsilon}$
Content provider
Content: $\Delta > 0$
Per-consumer wholesale price, w
x_{SH}
x_{01}
x_{10}
Platform 0
Platform 1



ε_{MH}
ε^{SH}
0
$\underline{\varepsilon}$
$\overline{\varepsilon}$
Content provider
Content: $\Delta > 0$
Revenue share, θ
x_{SH}
x_{01}
x_{10}
Platform 0
Platform 1

Results

Extensions / Robustness

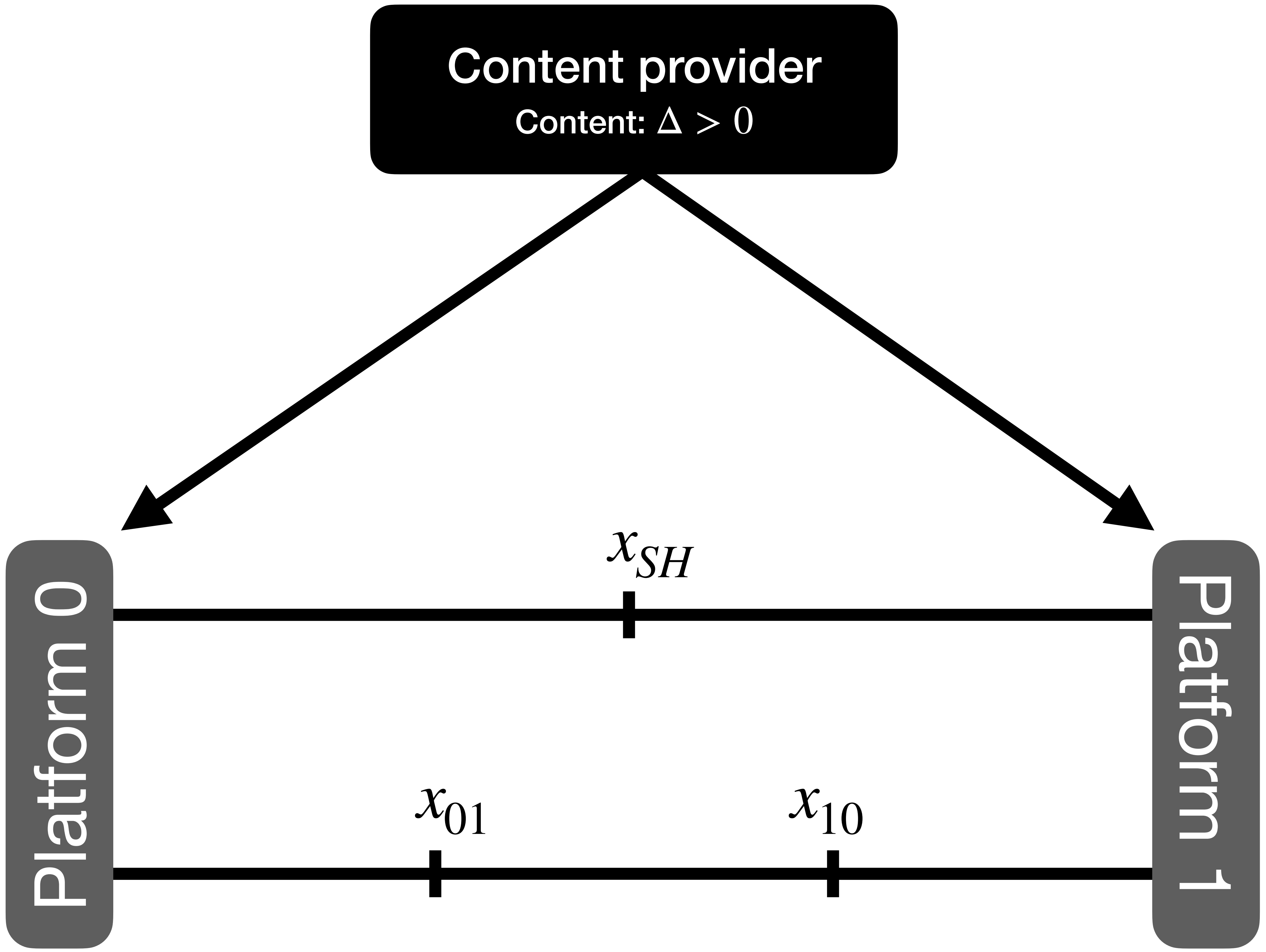


- **Exclusive distribution right:**

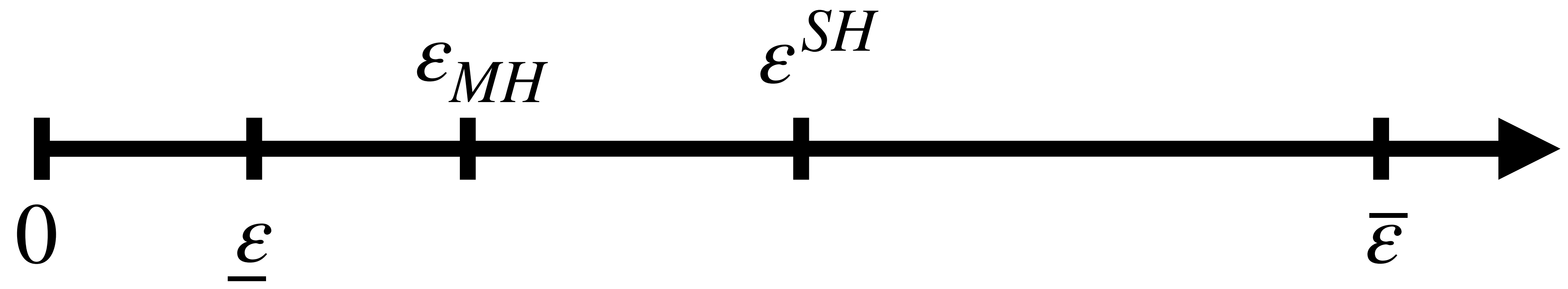
  ➡ Allowing for exclusive distribution rights has no impact on our results

- **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

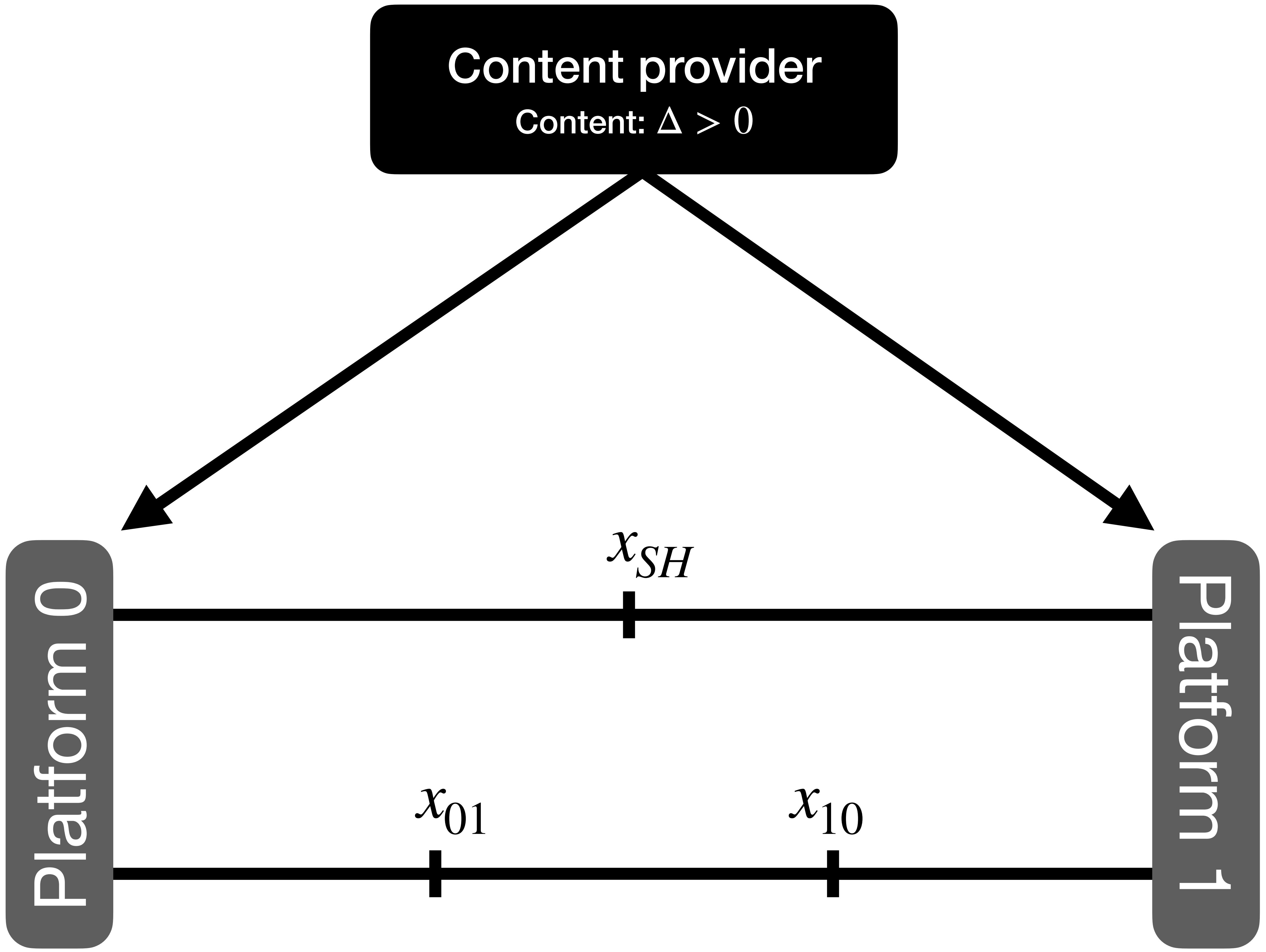


- Bottleneck consumers and content distribution

- 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

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

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

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

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

Per-consumer wholesale price

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

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

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Stage 1 Consumer singlehoming

Revenue Sharing

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

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

Per-consumer wholesale price

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

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

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