Peer-to-peer Sharing vs Secondhand Market: Implications on the Manufacturing of Durable Goods

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Durable goods and the second-hand market

- Durable goods and the second-hand market
  - Waldman (1996)
  - Anderson and Ginsburgh (1994)
  - Hendel and Lizzeri (1999)
- Secondhand market: discriminate consumers
- Tendency to reduce the durability of the product to increase the price of new units

The explosive growth of sharing platforms

- Airbnb:
  - 100 million users
  - Averages 500,000 guests per night,
  - More than 180 million guest stays annually
  - Nearly 22% more than Hilton Worldwide
  - Expected value at IPO in 2019: $120 billion
- Uber
  - Operates in more than 250 cities
  - Exceeds the market capitalization of companies such as Delta Air Lines, American Airlines and United Continental
  - Value at IPO on 09/05/19: $70 billion
- Blablacar
  - 70 million users in 2019
  - Available in 22 countries
  - Value in Sep 2015: $1.6 billion

This paper

- Competition between a **manufacturing firm**, the **secondhand market** and the **peer-to-peer sharing market**
- Extension of Anderson and Ginsburgh (1994) EER
- To shed light on
  - The differences between sharing and secondhand markets
  - Their different implications on the manufacturing firm
  - How the manufacturing firm can profit from the sharing economy

Sharing vs. secondhand vs. the manufacturing firm

- Similar impacts of the secondhand and sharing market on the manufacturing firm
  - "Cannibalization effect"
  - "Value effect" via the "liquidation" of the product
- Secondhand market
  - High-valuation consumers $\rightarrow$ low-valuation consumers
  - Requires replacement
- Sharing market
  - Short rental activities during the idling time of the product
  - High-valuation consumers $\leftrightarrow$ low-valuation consumers
  - Does not requires replacement

The literature on P2P sharing of durable goods

- Benjaafar et al. (2018), Horton and Zeckhauser (2019): no manufacturer
- Fraiberger and Sundararajan (2015): calibration of dynamic model with data from Getaround $\Rightarrow$ Ownership decreases with the sharing market
- Abhishek et al. (2018): the manufacturer vs sharing market $\Rightarrow$ the manufacturer may profit from sharing if the consumer base is not too heterogeneous neither too homogeneous

The model

The manufacturing firm

- Monopolistic manufacturer
- Durable goods last for 2 periods
- Durability δ: the probability that the product functions in Period 2
- No cost of production

Consumers

- Unit mass of consumers
- Heterogeneous in the valuation for usage of the product $v \sim U[0,1]$
- Owners of used products can sell them on the secondhand market
- All owners can rent their products (new or used) on the sharing market with probability α
- Non-owners rent the product on the sharing market with probability α
- The secondhand and sharing markets are perfectly competitive
- The price of used goods p_U and rental fee f are determined at market clearance

Timeline

- In the steady-state period
  1. The manufacturer chooses price of new product p_N
  2. Owners of used products sell them on the secondhand market and buy new products to replace
  3. Owners of end-of-life products get rid of them and buy used product to replace
  4. The sharing market open
  5. The secondhand and sharing markets clear
- The model is solved by SPNE

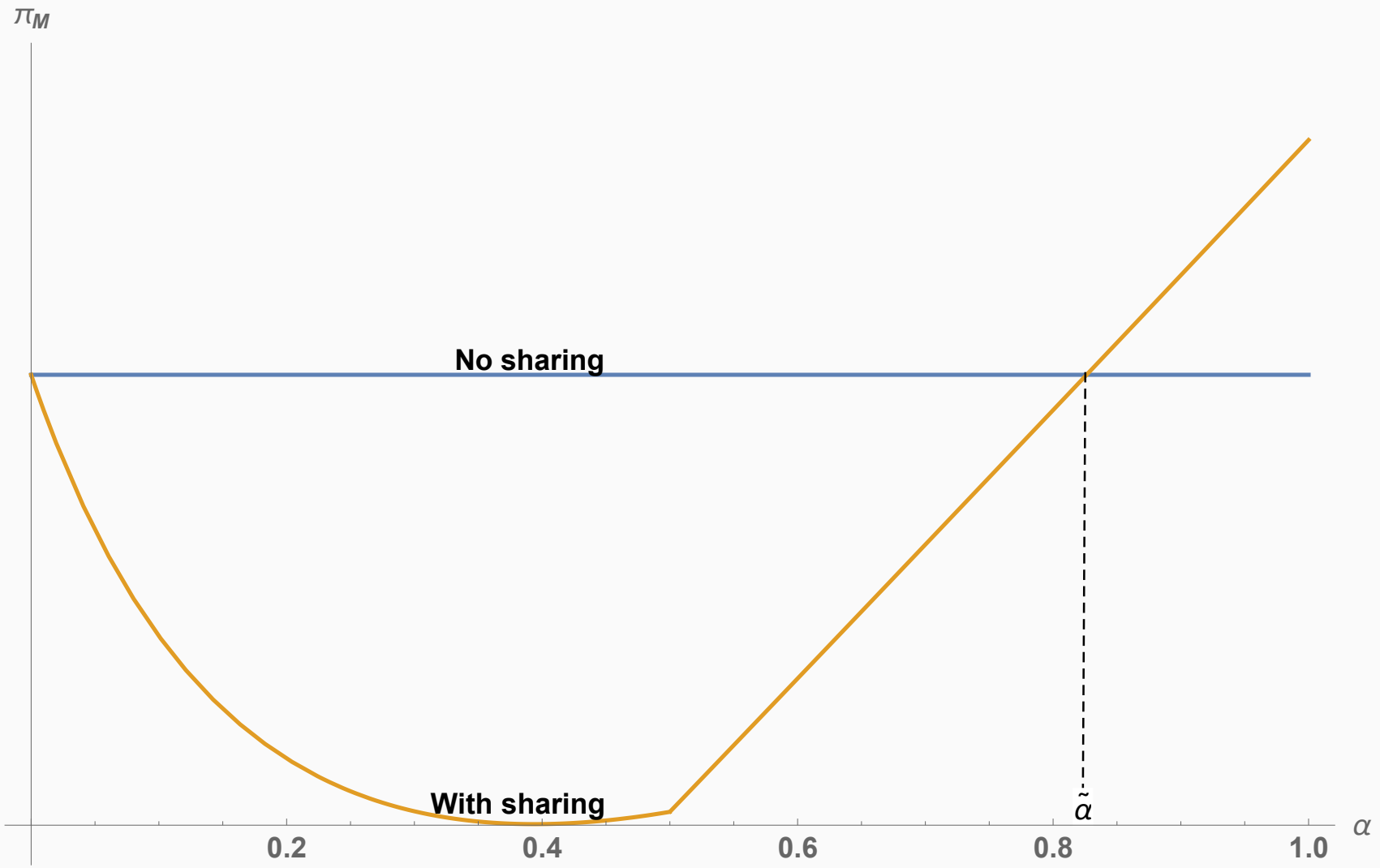
Choices of consumer of type v

- Sell used product, buy new product
  - N: $U_N = v + \alpha f - p_N + p_U$
- Get rid of EOL product, buy used product
  - U: $U_U = \delta(v + \alpha f) - p_U$
- Do not buy any product, rent it on the sharing market
  - R: $U_R = \alpha(v - f)$
- Remain inactive
  - O: $U_O = 0$

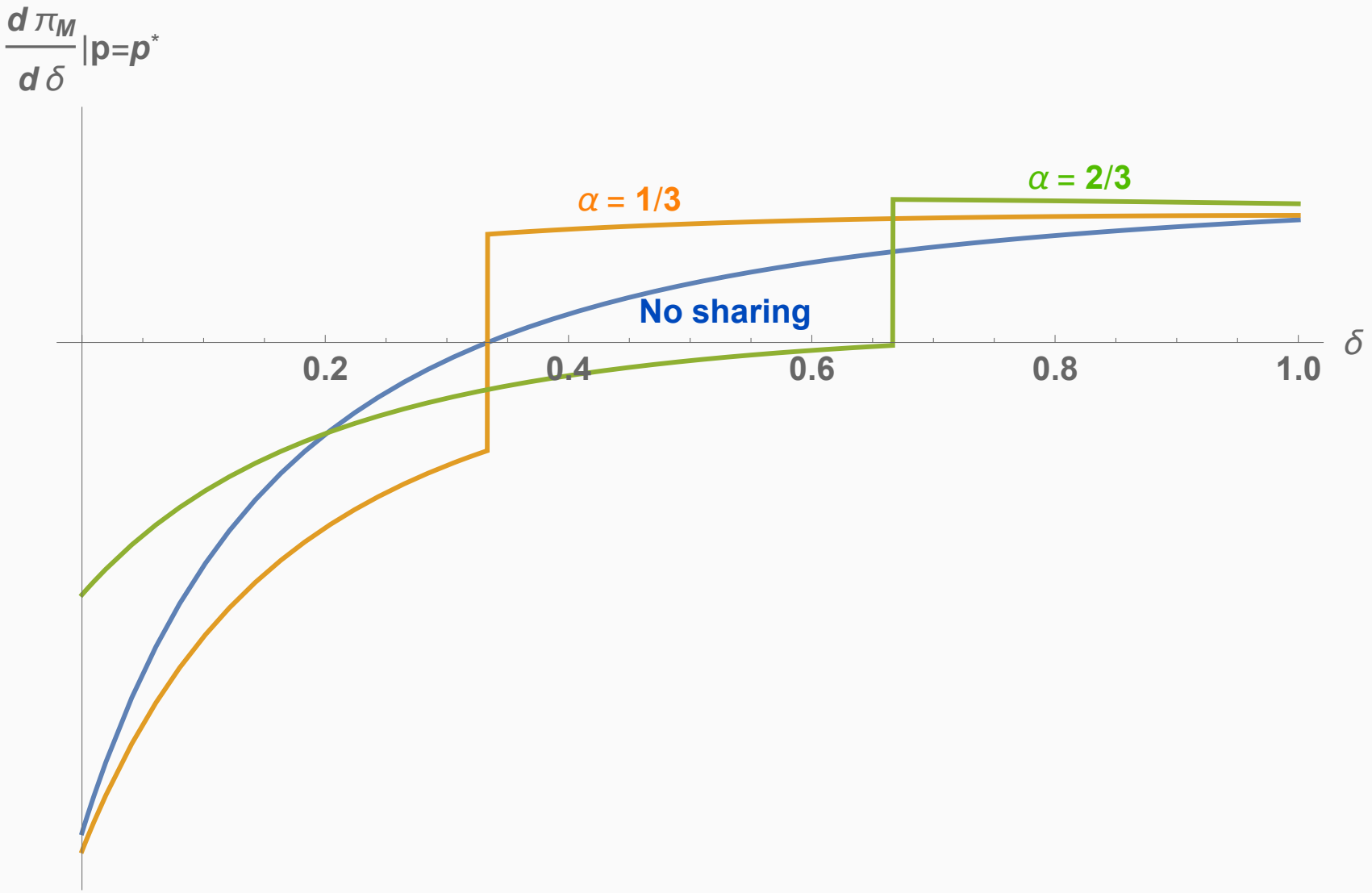
SPNE

- $\alpha < \delta$: $v_{NU} > v_{UR} > v_{RO}$
  - $v > v_{NU}$: buy new products
  - $v \in [v_{UR}, v_{NU}]$: buy used products
  - $v \in [v_{RO}, v_{UR}]$: rent products
  - $v < v_{RO}$: stay inactive
- $\alpha > \delta$: $v_{NR} > v_{RU} > v_{UO}$
  - $v > v_{NR}$: buy new products
  - $v \in [v_{NR}, v_{RU}]$: rent products
  - $v \in [v_{RU}, v_{UO}]$: buy used products
  - $v < v_{UO}$: stay inactive

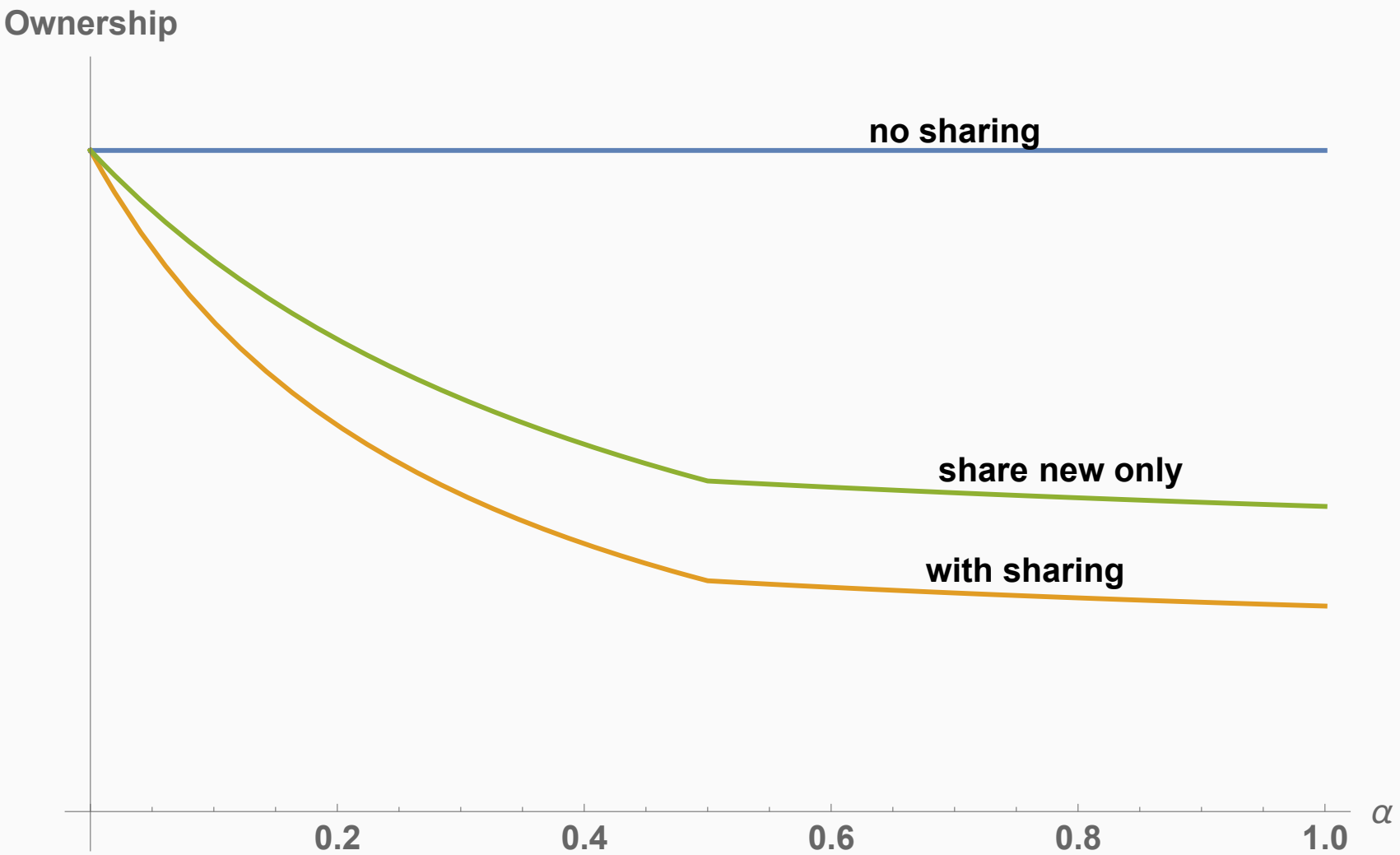
Profitability of the manufacturing firms ($\delta = 1/2$)



Incentive to change durability



Production level



Some concluding remarks

- The manufacturing firm earns higher profit with sharing if the sharing market has high capacity $\alpha > \tilde{\alpha}$
  - High "value effect": low-valuation consumers buy used products while middle-valuation consumers rent
  - Low "cannibalization effect": expansion of the "indirect customer base"
- To increase the probability that $\alpha > \tilde{\alpha}$, the manufacturing firm
  - increases durability level if it is initially low
  - decreases durability level if it is initially low
- Sharing reduce the level of production but has ambiguous impact on the incentive to change durability level

Profitability of "share-new-only" policy