Algorithms and Market Power

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Introduction

- Algorithmic data exploitation has borne benefits for companies and consumers alike

- However, concerns have been raised by academics and policymakers regarding the effects of data use:

  - Data-driven discrimination
  - Data-related barriers to entry
  - Collusive potential of algorithmic pricing

I. Data and Price Discrimination

- The use of personal data provides firms with the *ability* to identify individual consumers preferences and willingness

- Price-discrimination: personalized prices based on differences in preferences (and not in cost)?

- Little evidence of algorithmic price personalization
  - Credit cards offers, insurance products, recommendations (Buy-box, rankings), discount coupons

Effect of price-discrimination

- Individualized prices
  - some consumers win others may pay higher prices than with uniform pricing
  - If it is done by monopoly, this may be beneficial or detrimental on average to consumers
- Enhanced personalized services
  - better matching between products and consumers
- Price-discrimination intensifies competition
  - The average price may decrease
  - If there is enough competition, this may be beneficial to all consumers

Reaction of consumers

- When algorithms exploit the information to the detriment of consumers, aware consumers will hide information, or distort it
  - Refuse to give information, restrain from buying, reduce usage

- A firm may then want commit not to price-discriminate
  - if it also uses information to improve the quality of the service or it offers customized services to customers who provide personal data

II. Algorithms and barriers to entry

- Algorithms raise the importance of the data as a strategic factor in the competition process, which raises several economic issues

- Exclusive access to data (input foreclosure)
  - Nielsen exclusive contracts supermarkets in Canada, Brokers' incentives to sell exclusive access,

- Personal data protection and privacy laws "distort" competition and technological choices

- Economies of scale, scope and speed
  - "Nowcasting": the capacity of a company to use the velocity at which a dataset grows to discern trends well before the others

Algorithms and network effects

- Algorithms induce data-driven indirect network effects
  - In some markets, the marginal cost of quality-enhancing innovation is decreasing in the amount of data about user preferences or characteristics generated by users
  - Due to these network effects, the market eventually tips (even for small initial quality differences), with one firm becoming dominant

- Switching costs
  - The service used by an individual has more information about her, and can therefore offer her a higher-quality 'personalized' service than new entrants
  - Data portability

III. Algorithms and collusion

- There is extensive use online of algorithmic pricing
  - See European Commission enquiry on online retailing
  - Firms monitor each others prices
  - Firms use automated algorithms to adjust prices
  - In the future there will be more and more machine learning to determine price strategies

- Concerns that this will foster collusive pricing whereby firms tacitly coordinate on high prices, monitor each other and retaliate on those cutting prices
  - Algorithm may be better at monitoring and retaliating

III. Algorithms and collusion

- Ezrachi and Stucke (2016) identify four categories of data-driven collusion:
  - "Messenger": Use of algorithms to assist in implementing and/or monitoring a cartel agreement
  - "Hub and Spoke": Use of an algorithm to determine a 'market price' charged by several users – cluster of vertical agreements
  - "Predictable Agent": Each firm unilaterally uses an algorithm as a way to deliver predictable outcomes and enhance market transparency, which creates favorable conditions for conscious parallelism
  - "Autonomous Machine": Machines programmed to determine means to achieve a given target (e.g. maximize profit) through self-learning and experiment.

Collusion?

- Some elements points to more collusion
  - The use of algorithms increase market transparency on the supply side
  - Algorithms can be « gamed » and manipulated to collusion (Salcedo, 2015) but this requires strong assumptions
  - Intelligent machine can « learn » to cooperate

- But some other elements points to other directions
  - Market transparency is increased for consumers using algorithm
  - Sophisticated algorithm may well converge to a competitive equilibrium
  - Personalization of pricing makes collusion difficult

Conclusion

- Firms may refrain from engaging in price discrimination, despite being able to do so, because of consumers' strategic responses to their pricing/privacy policy.

- Barriers to entry can be either technological, legal or behavioral. In particular, privacy-enhancing policies may lead to barriers to entry.

- More (theoretical and empirical) research is needed to understand the effects of algorithmic pricing on competition.