

# Competition in Digital Markets

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# What has changed in the digital world?

- From digital markets to the digital economy
- Competition with digital disruption displays some different features because of *network effects* and *dynamic economies of scale*
- BigTech platforms have been instrumental in the digitalization process
- Irruption of AI and algorithms
- Concerns: dominance, privacy, discrimination, collusion

**WHICH ARE THE DRIVERS?**

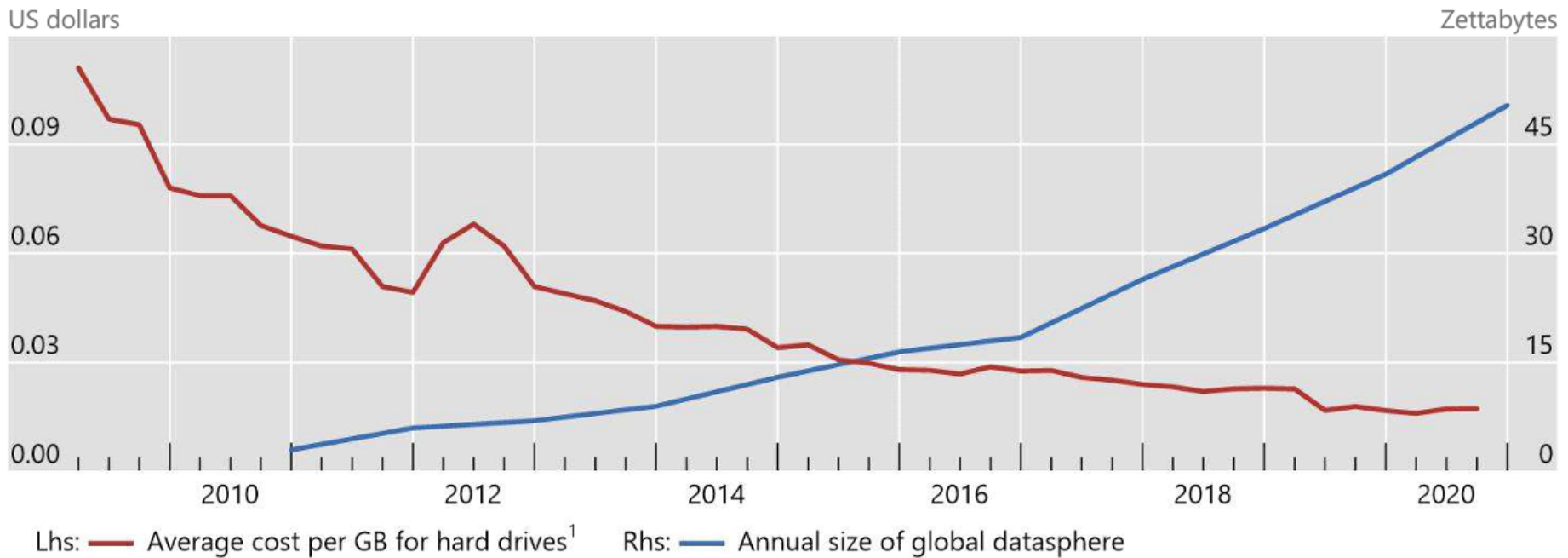
# Digital disruption drivers

- **Supply** (technological developments):
  - **APIs**, standard for data sharing in “open banking”, diminish switching costs, increasing contestability.
  - **Cloud computing**, flexible in delivering services and cost effective.
  - **Smartphone** as customer interface and central channel for delivery of financial services and platform for third-party developers (especially in Asia).
  - **Digitization of commerce** and real-time transacting capability.
  - **Blockchain/smart contracts**.
  - **Digital currencies** and new forms of payment systems
  - **AI** (renaissance from Alan Touring)/**ML**
- **Demand**:
  - Enhanced **consumer expectations**.
  - **Demographic** factors: younger cohorts.
  - Decline in **reputation** of incumbents.
  - Tech-firms: **Socially responsible** and greater social value?
- **Covid-19**

# Digital economics

- Digital technology lowers *search costs* and has a profound impact on the economy (prices, varieties, markets, firm organization) and society
- *Network effects* (direct and indirect) are central to the digital economy
- *Platforms* emerge as a prominent system to distribute products and provide matching services
- Network effects generate demand and supply economies of scale, leading to path dependence, tipping, and dominance
- Data and its treatment are central to the digital economy
- Big Data/AI/ML is about prediction
  - Shift from causality to patterns and correlations to get novel and valuable insight from the data

# Costs of data storage decline as global data volumes surge



From Sep 2017, data extrapolated using the growth rate in price per MB from <http://www.jcmit.net/diskprice.htm>. The increase in 2012 is explained by flooding in Thailand, where one-third of hard drives were produced globally. One zettabyte is one trillion gigabytes.

Source: Feyen et al. (2021)

# The economics of data

- Metaphors to describe data.
  - **Oil** (private: rival, excludable), **sunlight** (public: non-rival, non-excludable), or **infrastructure**: data as private (US), public (China), or club good (EU).
- Which one of the three views will dominate?
- Malleable economics of data (club good)
  - Non-rival: infinitely copyable, can be used by many people without limiting the use by others.
  - Excludable: technologies like encryption can control who has access to them.
- New institutions must be created to reflect tensions and trade-offs, as was the case for intellectual property.

# BIG DATA, ECONOMIES OF SCALE, AND COMPETITIVE ADVANTAGE

- Are Big Data/AI going to be the next General Purpose Technology, as were the steam engine or electricity?
- Will it be controlled by a few firms?



# Competition and the Economics of BigTech: A Framework

# Two-stage game

## **First stage** (strategic variables, capabilities)

- Choose **capability**  $x$  to reduce cost (efficiency) or/and **capability**  $a$  to improve demand (quality/perceived quality) at (fixed and sunk) cost  $F(x, a)$ .

## **Second stage** (tactical variables)

- Compete in the marketplace (say price or quantity)

## Observation:

- Choice of strategic variables influence the market outcome at the second stage

# Gaining a competitive advantage: examples

- Cost (capability  $x$ )
  - Invest to reduce costs
  - Learning curve (search, data)
  - Opportunity cost (e.g., offering app, service –say search- for free that raises demand for the premium version or gets revenue from advertisers)
- Demand (capability  $a$ )
  - Invest (R&D) to improve product, new products
  - Product choice and positioning
  - Advertising to gain brand image/loyalty
  - Network effects to build customer base, achieve critical mass

# Natural oligopoly

- The beer industry is dominated by 2 firms in the US and by 3 firms in Portugal, while the US market is 50 times larger.
- With *endogenous* sunk costs to obtain capabilities, the number of firms is less sensitive to market size.
- With strong enough *increasing returns*, a larger market size need not mean more firms in the market
  - E.g., investing (advertising, R&D) to gain market share when the latter is very sensitive to the effort of firms
  - May have a few entrants even if exogenous entry cost is low: “natural oligopoly”
- The general impact of digitalization may foster a shift from small to large firms, raising concentration.
  - “Superstar” firms favored by technological change gain market share, increasing concentration and margins
- The rise in industry concentration correlates with IT adoption.



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## GAFAM

WHAT IS THE BUSINESS MODEL OF EACH FIRM?

WHAT IS “NEW” IN THEIR SUCCESS STORY?

KEYS TO THEIR STRATEGY

# GAFAM R&D expenditure

- Apple: Innovation/quality investment to increase willingness to pay of consumers
  - Needs constant innovation/broadening range of products
  - New methods of production (Cupertino-China supply chain?)
  - New markets: smartphone, app economy, extending to services
- Microsoft: Ease of use/interface
  - Network effects: direct with network (Windows, servers) and indirect with programs
  - Cloud
  - Opportunistic second mover in AI (efficiency effect in innovation)
- Amazon: online customer fast home delivery
  - Dealer and marketplace / Monopsony power
  - Network effects (range of products, search economies)
  - Big Data feedback loop
  - High investment in infrastructure (logistics, warehousing, cloud)
  - Diversification into cloud services, advertising

# GAFAM R&D expenditure

- Google: internet search performance
  - Search engine with big data generates positive feedback in the search algorithm
  - Sell online advertising
  - First mover in AI but slow because of the replacement effect
- Facebook: social network/communication
  - Network effect with large user base, data feedback loop
  - Concentrating on online advertising
  - Diversifying into the metaverse, third mover in AI
- Summary:
  - R&D spending and product design
  - Exploitation of *network effects* looms large in leveraging early head starts in the customer base
  - Dynamic *learning curve* and feedback effect
  - History matters (first mover, second mover, and replacement effect)

# BigTech life cycle

- Start
  - Attracting a critical mass of users to the platform, usually with no charges for customers (early mover advantage with network effects),
  - add functionalities to enhance users' experience,
  - create an *ecosystem* to increase the costs of switching to other platforms.
- Growth phase:
  - Exploit economies of scale and network externalities to reach the tipping point.
- Mature phase:
  - Exploit economies of scope across products and services and heavily use big data analytics.
  - Diversification (e.g., entering into financial services).

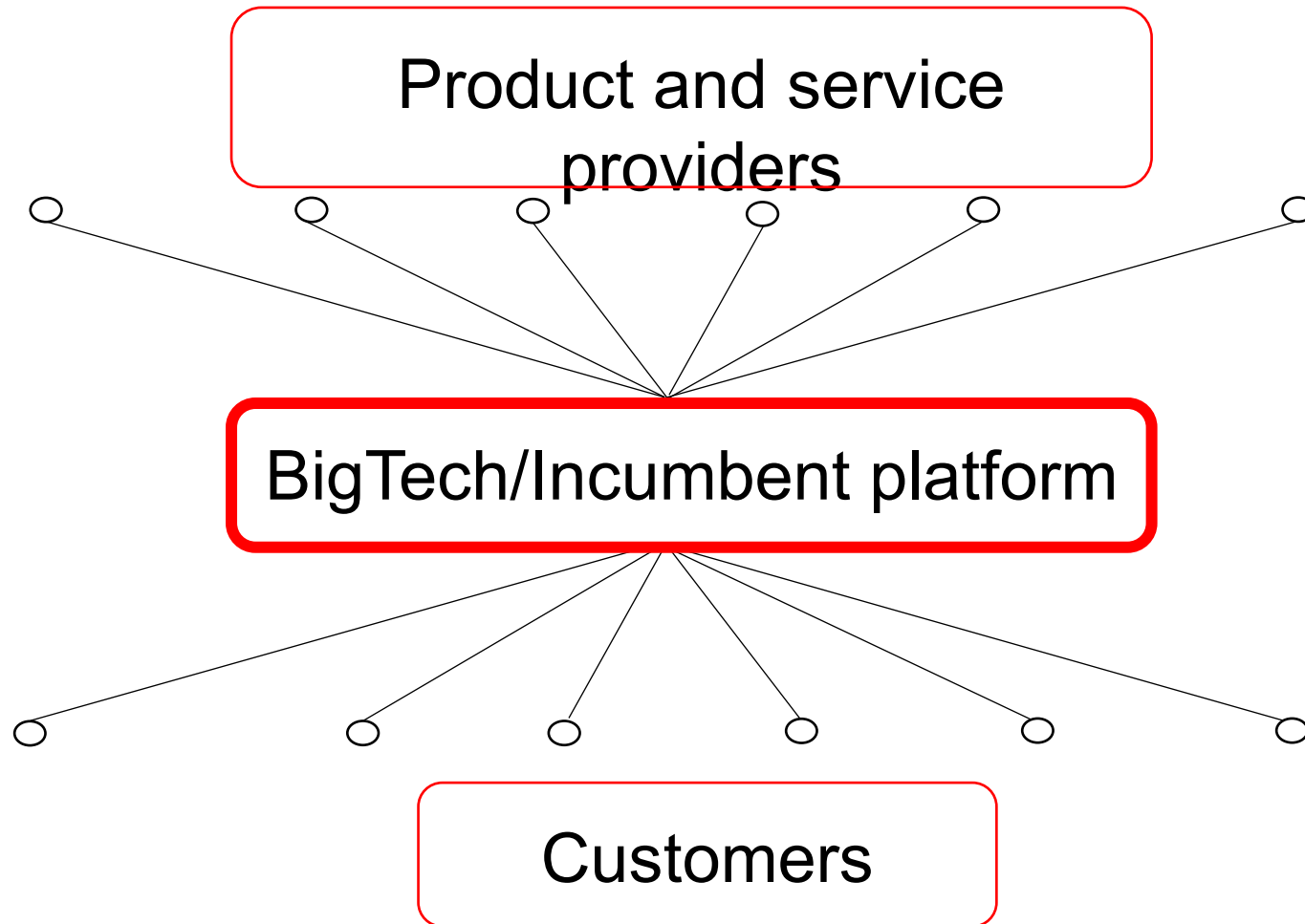


# Reinforced market power with Big Data: A feedback loop

- Monopoly on data from the activity of the platform.
- Process the data with AI and ML techniques to deliver services.
  - Entrants more efficient at processing information will grow faster than incumbents since they have incentives to produce more data for which they are better processors.
- Exploit network effects and economies of scale and scope.
- Generate more activity and data (ahead in the learning curve).
- This feedback loop consolidates an ecosystem with high endogenous switching costs for customers to change platforms consolidating the market power of the platforms.
- Financial services may complement and reinforce the platform business model: Payment services as a first step.

What determines the level of competition?

# The future: A platform-based oligopoly?



# What are the threats BigTech faces?

- Inertia: dynamic economies of scale, dominance, and big data (feedback effect)
- But disruption can open a new market and kill incumbent products (e.g., iPhone, AI?)
- Increased intra-bigtech competition
- Regulation, data privacy, and antitrust

# Regulation and antitrust

The new activism of regulators and antitrust authorities: Is size an offense again?

The challenges for regulators

# The new activism

- Network effects and mass data accumulation mean markets can tip faster than regulators can react to control monopolization tendencies in the digital economy
- The perception is that
  - current antitrust law may not be the right tool to control the market power of platforms,
  - antitrust has not coped with technological progress, and that
  - ex ante regulation should play a major significant role
- Actions in the US:
  - Biden's executive order in 2021 intended to curb big business's power.
  - Bipartisan bills in US Congress to control BigTech.
  - Appointment of an activist to chair the FTC: attack on the consumer welfare standard
  - Revision of US merger guidelines deemphasizing the focus on market power and emphasizing market structure over economic effects:
    - Broadening the scope beyond the consumer welfare objective, lowering concentration thresholds for presumptively illegal mergers, toughening the treatment of vertical mergers, scrutinizing minority shareholdings and serial acquisitions

# The new merger guidelines

- By emphasizing market structure over economic effects, the new MG may run counter to the results of economic analysis.
- Under the new guidelines, agencies can more easily block any merger in an industry prone to concentration.
- However, if this tendency to concentrate arises from a technological change that increases the importance of endogenous sunk costs (in R&D investments, for example), then concentration can be efficient.

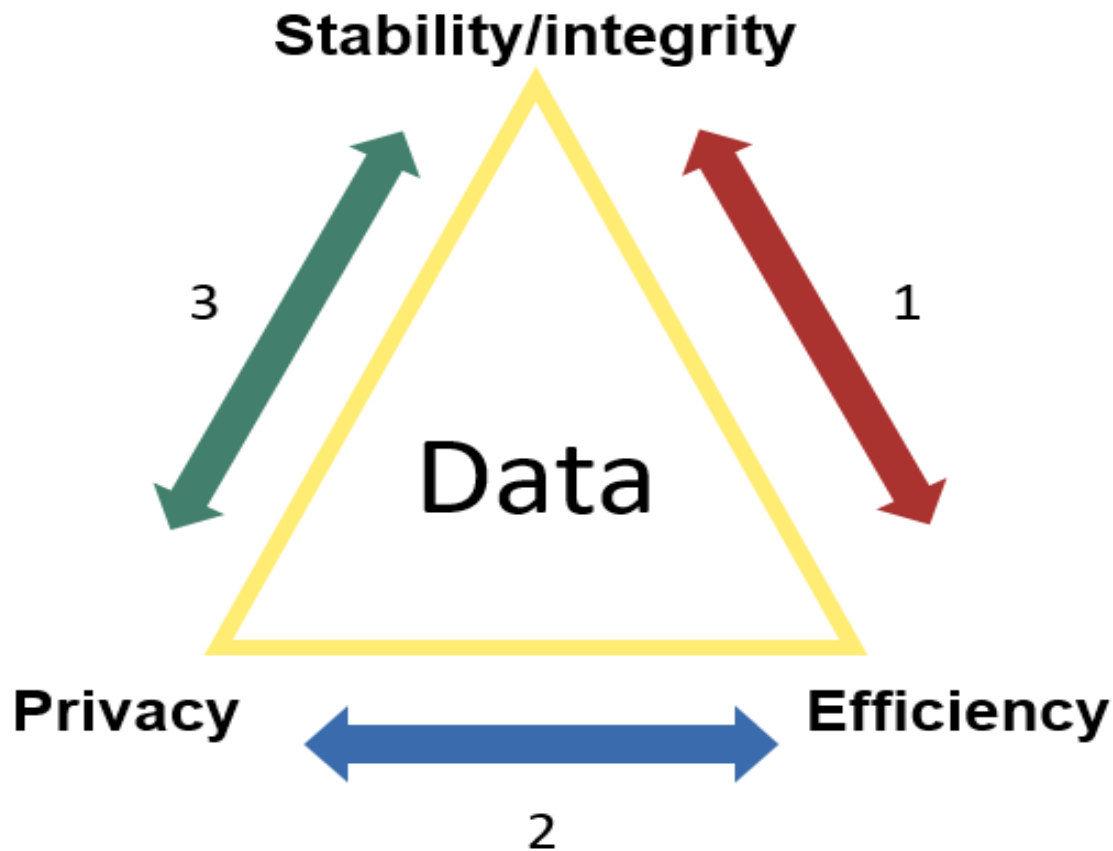
# The challenge for regulators and competition authorities



# Public intervention in the digital economy

- Network effects and Big Data dynamics may cause market failures: users may coordinate on inferior standards, firms may fail to make their products compatible and strive for differentiated ecosystems to increase market power, and platform dominance may arise in essential market segments.
- Platform competition is key (interoperability, data portability)
- Innovation: replacement vs efficiency effects
- Public intervention is prone to error and lags market developments, and when it tries to be forward-looking, it faces high uncertainty
- The digital economy raises privacy concerns and introduces new policy tradeoffs in data management.
- Consumer protection concerns come to the forefront.
  - Who controls the data (with the EU ahead with GDPR)
  - Security and fraud concerns when transacting in platforms.
  - Enhanced price discrimination capacity and fostering of behavioral biases of consumers and investors.

# Data policy tradeoffs with three objectives: trilemma



# The challenge of competition policy and regulation

- Ensuring that the welfare-enhancing disruptive capability of digital technology and platforms materializes, delivering benefits to consumers and society without endangering privacy, security of transactions, and market integrity.
- Main issue: How to strike a balance so that innovation is fostered for the good of society.

THANK YOU!