

Economics of Strategy for Online and Digital Markets

Topics in Economic Theory and Policy, 31C01000

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Lecture 9: Platforms

- Typology of platforms
- Equilibria in platforms
- Strength of the externalities
- Identifying externalities

“ “ Many, if not most markets with network externalities are characterized by the presence of two distinct sides whose ultimate benefit stems from interacting through a common platform. *–Rochet & Tirole (2003)*

” ”

Ad-supported media

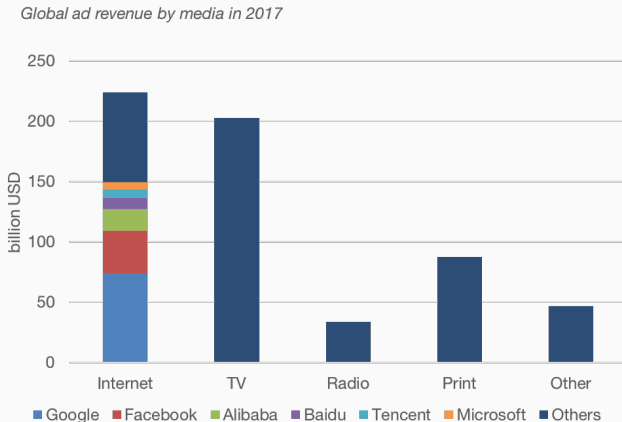


Figure. Large chunk of the ad revenue is shared by content creators.

Sources: eMarketer, Zenith.

Exchanges – Example: Andela



Figure. Andela matches African developers with global clients.

Figure: Tom Saater for The New York Times.

Software – Example: IBM

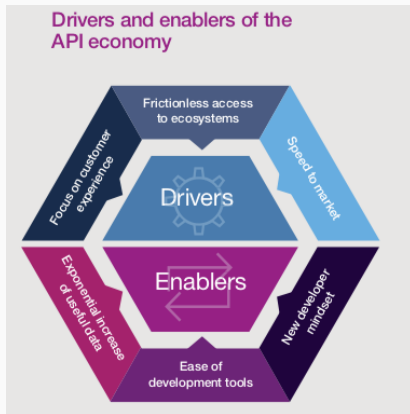


Figure. IBM creates building blocks for third party software developers who provide end customer solutions.

Transaction services – Example: MobilePay

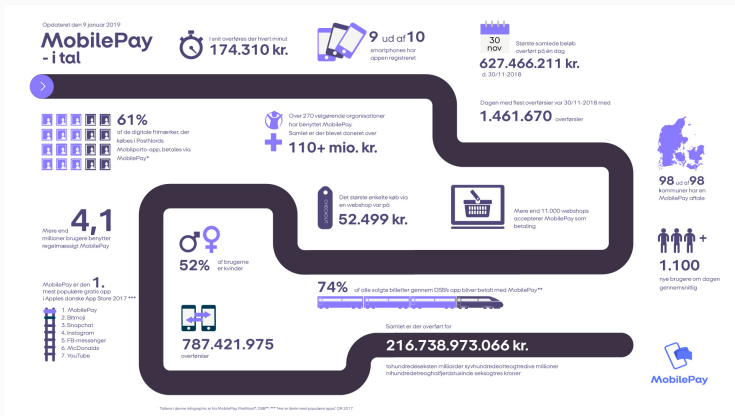


Figure. MobilePay is a mobile transaction payment system.

Figure: MobilePay.

- Advertising-supported media:
 - The platform creates content, buys content, or lets the users create content.
 - The content is used to attract viewers, the viewers are used to attract advertisers.
- Exchanges:
 - Buyers and sellers search for feasible trades and the best prices.
 - There are obstacles for them to achieve efficient allocation by bargaining with each other.

- Software platforms:
 - Users can run applications only if they have the same software platform as that relied on by the developers.
 - Developers can sell their applications only to users that have the same software platform they have relied on in writing their applications.
- Transaction systems:
 - Any method for payment works only if buyers and sellers are willing to use it.

- Platforms are matchmakers:
 - Ads: Find right ads to viewers/users.
 - Exchanges: Match buyers with sellers.
 - Software: Match developers, users, and hardware.
 - Transaction: Match consumers with merchants.
- A platform provides a way for the parties to enter into socially beneficial exchange or transaction, provided that:
 - The groups are distinct.
 - There are indirect network effects or inter-group externalities.
 - The platform can facilitate coordination more efficiently than the parties can by themselves.

Network effects on platforms

- Platforms create value when customers find good matches.
- Scale helps: if there are more customers, the chance that any particular customer will find a good match increases.
- But most customers on most platforms are not very good matches for each other.
- A smaller platform with many good matches is more attractive than a bigger platform with fewer good matches.
- Network effects result from getting the right customers, and not just more customers.

Reminder: Network effects

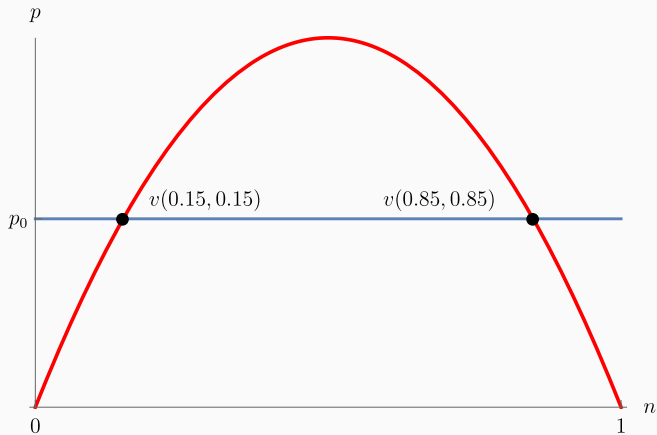


Figure. Equilibrium prices. A given price p_0 determines how many participants the network will end up having.

Reminder: Network effects

- To see how the demand curve forms, take the network effects with the people indexed from $v = 1, \dots, 1000$.
 - In the in-class exercise of lecture 8, this would correspond to the maximum value.
- Assume that the actual value for person v will depend on the number of people in the network, vn .
 - Likewise, this would be to the actual value.

Reminder: Network effects

- Consider what happens when only the person with highest maximum value, $v = 1000$, decides to join:
 - Because her/his valuation is the highest, no one else will join. The actual value from the network will be zero.
- If the 2nd highest valuation person, $v = 999$, also joins, then
 - The actual value for her/him is still low (999) because the 2nd person can only connect to 1 other person.
- When the 11th highest valuation, $v = 990$ joins
 - The actual value is much higher (9,900), because the network already has 10 others to connect to.
- At some point ($v = 501$ to be exact in this case), the decline in maximum value starts to dominate the benefits from increasing network size.

- With platforms, multiple user groups make even richer patterns possible.
- We will use a simplistic model for the platform demand.
- There are two sides: e.g. buyer and sellers.

- We assume the following valuations for the two sides:

$$v_b(n_b, n_s) = (1 - n_b)n_s$$

$$v_s(n_b, n_s) = (1 - n_s)n_b$$

where n_b is the number of buyers and n_s the number of sellers.

- This means that
 - The valuation on both sides decreases as the number of participants on their own side increases (as normal).
 - The valuation for the buyers depends on the number of sellers and vice-versa (externality).

*Note: n_b and n_s are normalized to represent market coverage, from 0 to 1, rather than absolute quantities.

- Assume that the platform charges a price for participation.
- Then the surpluses for the participants, if they join the network, are as follows:

$$\pi_b(n_b, n_s; p_b) = (1 - n_b)n_s - p_b$$

$$\pi_s(n_b, n_s; p_s) = (1 - n_s)n_b - p_s.$$

where p_b is the price for buyers and p_s the price for sellers.

Equilibria in platforms

- The buyers and sellers will be indifferent between not-joining and joining to the platform when their gain from joining the market just equals the cost for them, i.e. the prices:

$$(1 - n_b)n_s = p_b$$

$$(1 - n_s)n_b = p_s.$$

- If we fix the price, we can compute the combinations of n_b and n_s where the equations hold.
- If, for given prices p_b and p_s , there are n_b and n_s so that both of the equations hold simultaneously, then those n_b and n_s and prices p_b and p_s are a market equilibrium.

Platform equilibria

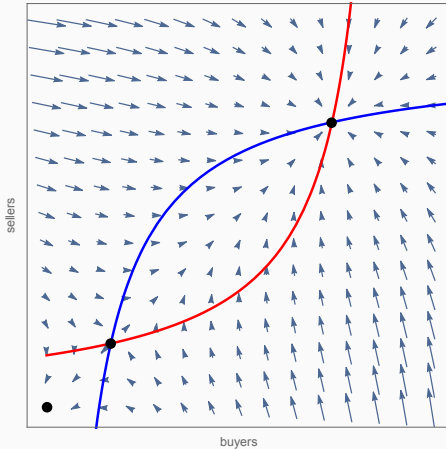


Figure. Indifference curves for buyers (red line) and sellers (blue line) with fixed prices. Black dots show the equilibria, and the arrows to which equilibria a given starting position would lead.

Demonstration of the platform effects.

Strength of the externalities

- How does the strength of the inter-group externalities affect the platform demand?
- We can study the “strength” of externalities within our simplistic model by introducing parameters κ_b and κ_s as follows:

$$v_b(n_b, n_s) = (1 - n_b)\kappa_b n_s$$

$$v_s(n_b, n_s) = (1 - n_s)\kappa_s n_b.$$

- (Above both κ_b and κ_s equal to 1.)

Weak externalities: Platform does not form

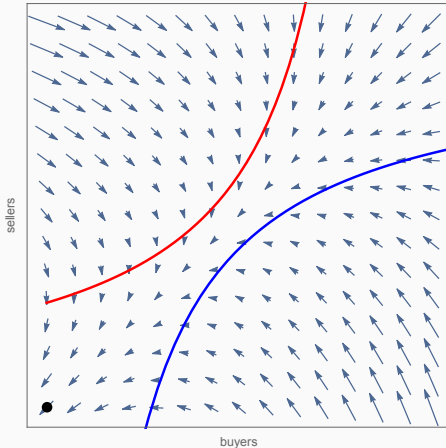


Figure. $\kappa_b = \kappa_s = 0.5$: Indifference curves for buyers (red line) and sellers (blue line) with fixed prices. Black dots show the equilibria, and the arrows to which equilibria a given starting position would lead.

Identifying externalities

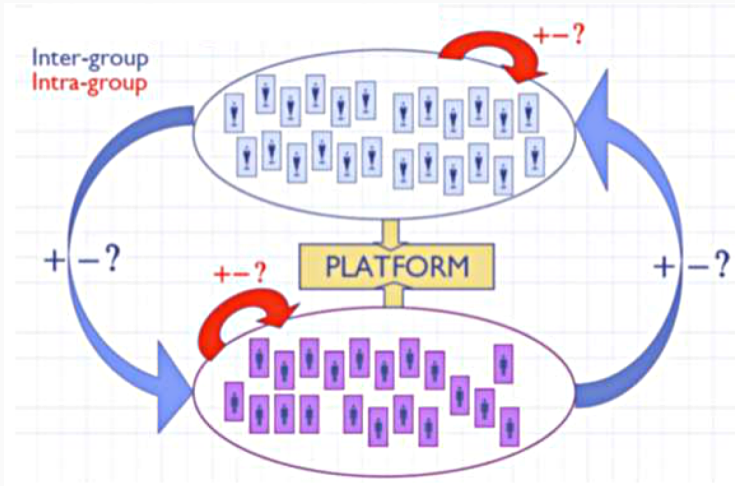


Figure. Externalities within a group and between groups.

Identifying externalities

	side	inter-group	intra-group
Ad market (traditional)	A. Viewers/readers	A to B: +	In A: 0
	B. Advertisers	B to A: -	In B: -
Ad market (social media)	A. Users	A to B: +	In A: +
	B. Advertisers	B to A: -	In B: -
Exchanges	A. Buyers	A to B: +	In A: - or 0
	B. Sellers	B to A: +	In B: - or 0
Software	A. Users	A to B: +	In A: +
	B. Developers	B to A: +	In B: -
Transactions	A. Consumers	A to B: +	In A: 0
	B. Merchants	B to A: +	In B: -

Table. Externalities within a group and between groups.

- In our simple model, the both inter-group externalities between buyers and sellers are positive, and there were no negative effects.
- How might the other cases look like?
- (Please do note, that these figures are illustrative, not a reflection of empirical situations.)

- In a simplistic social media ad market model:
 - Users benefit from other users participating to the network.
 - Advertisers benefit from users.
 - Users dislike advertisement.
- We can illustrate with the following model:

$$\pi_b(n_b, n_s; p_b) = (1 - n_b)\kappa_b n_b - \lambda_b n_s - p_b$$

$$\pi_s(n_b, n_s; p_s) = (1 - n_s)\kappa_s n_b - p_s.$$

- Parameter λ_b tells how strongly the users dislike ads.

Ad market model (illustrative)

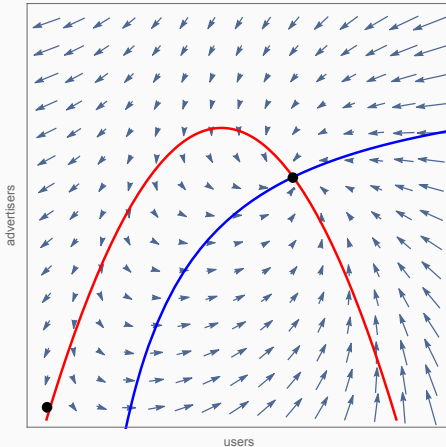
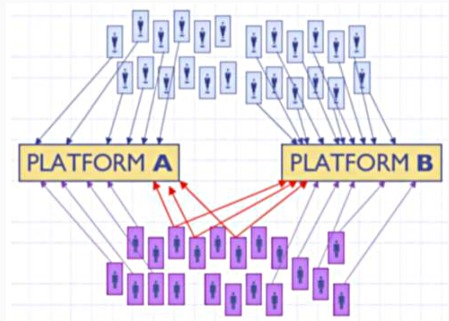


Figure. Simple ad model: Indifference curves for buyers (red line) and sellers (blue line) with fixed prices. Black dots show the equilibria, and the arrows to which equilibria a given starting position would lead.

Single- vs. multihoming

Intuition:

- Platforms have a monopoly access for singlehomers.
- Singlehomers are courted: once captured are monopoly subjects.
- Multihomers are exploited: competition will take rents away.



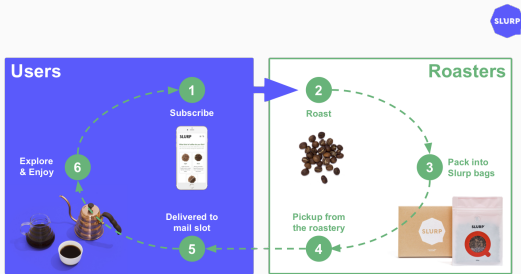
Source: P. Belleflamme.

- Platforms are matchmakers: ads, exchanges, software, transactions.
- Economics within the platform are affected by externalities: both between the groups and within the groups.

- CORE (2018) "The Economy", Unit 21.5.
- Evans, D. and R. Schmalensee (2007) "The Industrial Organization of Markets with Two-Sided Platforms", Competition Policy International.
 - Section III A. Pricing, will be discussed in lecture 10.
 - Topics of Sections V and VI will be touched in lecture 12, but the material here is quite involved and you can skip these sections.

Exercises for Lecture 9

3. Slurp is a Finnish platform connecting coffee drinkers to small roasters (see Figure). Describe:
- What are the inter-group and intra-group externalities? Are they positive, negative or neutral? (Very shortly is enough, see slide 248)
 - What frictions the platform can solve?



4. Draw an example of the potential indifference curves for the users and the roasters in the Slurp platform (i.e. like the red and blue curves in the illustrations of slides 243, 246 or 251). Motivate your drawing shortly.

Strategies of platforms

- Openness
- Pricing
- Competition