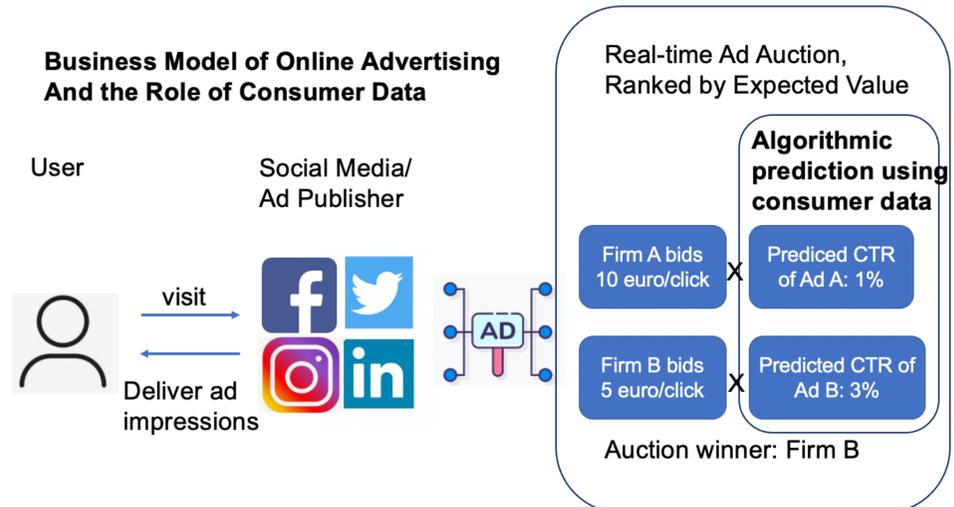


The Value of Privacy in Online Advertising

Yufei SHEN, Hi!Paris PhD student at HEC Paris, yufei.shen@hec.edu
Thesis advisor: Prof. Xitong Li

Privacy matters for online advertising.

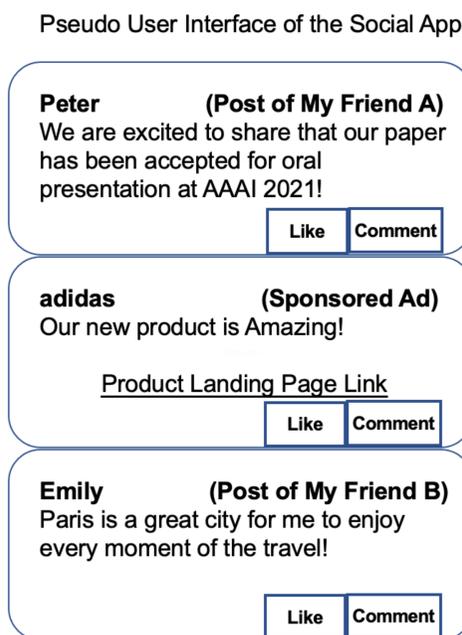
- The fast growth of the online advertising industry relies on the massive collection of consumer personal data used for personalized ad targeting, which has caused widespread concern for privacy intrusion.
- GDPR requires that firms need to get consumers' consent before using their data.
- Data regulators are eagerly trying to find the optimal balance between personalized targeting and privacy protection.



- Thus, the first-order question to data regulators is: what is the value of consumer privacy in online advertising?
- In this paper, we aim to estimate the value of privacy to the **platform, consumers, and advertisers.**

How to quantify the value of consumer privacy?

- Research Context: a leading social media and ad publisher in Asia
- Panel data sample: ~ 1 million consumers over 50 days
- Treatment Variable: user's privacy control status
 - = 1, if the user i opted out of ad targeting on day t
 - = 0, otherwise (by default).
- Once opting out, the user will see same amount of (but non-personalized) ads.



- Identification Strategy: difference-in-differences (DiD) + user fixed effects
- Model Specification

$$Y_{it} = \beta_0 + \beta_1 Treated_i * Post_{it} + A_i + B_t + \epsilon_{it}$$
- A user's decision to adopt a privacy-protection technology might be affected by the user's general tolerance for ads or privacy concerns (Todri 2021).
- User-level fixed effect can control for the user's taste for privacy during our short sample period.

Privacy protection might hurt the platform and SMEs.

- First, if the user opted out of ad targeting, the publisher's revenue generated from impressions displayed to the user would significantly decrease (-22.64%)
- Second, if opting out of ad targeting, the user's CTR on ads would slightly increase, although the magnitude is not large (+1.6%).
- Third, if opting out of ad targeting, the user would be more likely to see ads from "larger" firms, which have spent higher advertising expenditures (+13.67%) on this social media platform.

Table 2: Impact of opting out of ad targeting on publisher's revenue

| | Dependent Variable: Cost |
|-----------------------------|--------------------------|
| Treated*Post | -0.296*** (0.0005) |
| Constant | ### |
| Individual Fixed Effect | YES |
| Day Fixed Effect | YES |
| Within-group R ² | 0.0002 |

Notes: ***, p < 0.001;
###, business confidential information will be disclosed after we get permission.

Table 5. Impact of opting out of ad targeting on user's CTR

| | Dependent Variable: CTR |
|-----------------------------|-------------------------|
| Treated*Post | 0.0005 *** (.0001) |
| Constant | 0.0013*** (0.0000) |
| Individual Fixed Effect | YES |
| Day Fixed Effect | YES |
| Within-group R ² | 0.0002 |

Table 6. Impact of opting out of ad targeting on advertisers' competition

| | Dependent Variable: Avg_advertiser_cost |
|-----------------------------|---|
| Treated*Post | 38.211 *** (0.267) |
| Constant | ### |
| Individual Fixed Effect | YES |
| Day Fixed Effect | YES |
| Within-group R ² | 0.0694 |

Notes: ***, p < 0.001;
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- In summary, if consumers do not allow the platform to use their personal data, the efficiency of the advertising market would decrease. More importantly, small- and medium-sized enterprises (SMEs) would hurt more.