The Data Privacy Paradox and Digital Demand

By Long Chen, Yadong Huang,
Shumiao Ouyang, and Wei Xiong

Discussant:

Liad Wagman

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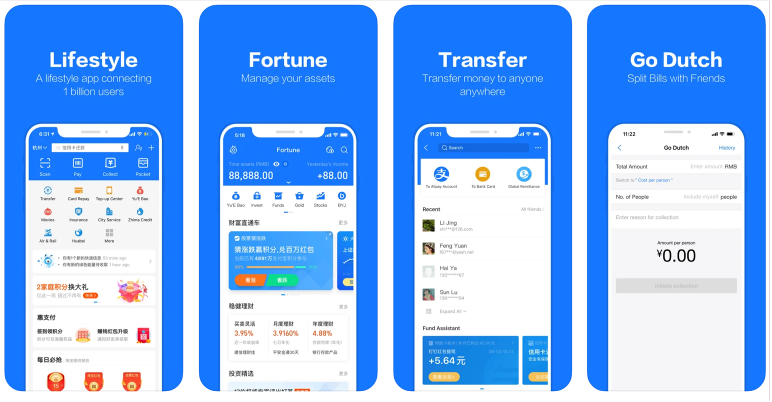
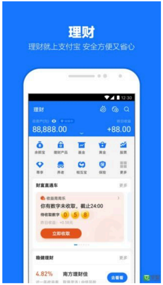
AliPay - iOS

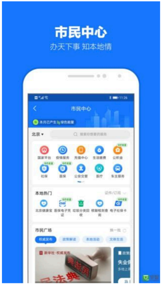
Apple App Store: “Alipay is a super app designed to offer a bouquet of services... Trusted by more than 1.2 billion global users, Alipay’s offerings span from allowing its users to make payments (send, receive, and spend money with ease), manage finances, choose a suitable insurance scheme, hail a cab or even order in from a favorite restaurant, etc.”

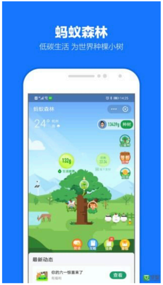


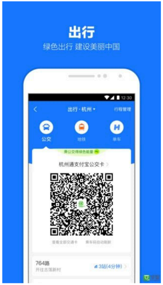
AliPay - Android/Anzhi Market

Anzhi Market – Android App Store (translated): "AliPay is a fusion of payment, wealth management, life services, government services, insurance, public welfare, etc... In addition to providing convenient basic functions such as payment, transfer, and collection, it can also quickly complete credit card repayment, charge phone bills, and pay water, electricity and coal! It can reach hundreds of people in one step through intelligent voice robots. This kind of life service, not only can enjoy discounts on consumption, but also manage money easily, accumulate credit, and make life easier!"









AliPay Mini-Programs

- Over 2 million mini-programs as of June 2020
- Used by 49% of users as of July 2019
- Data permissions include gender, phone number, national ID number, credit score, among others; cannot use a mini-program without granting its requested permissions
- Authorizations are for a finite time, then need to be re-authorized; authorizations can be withdrawn at any time
- AliPay, the platform, itself has privacy settings; the default is ‘low privacy’ (visible posts, more easily searchable, etc)

Privacy Paradox

- Survey respondents' self-stated privacy concerns are not associated with a lower number of privacy-invasive actions (data-sharing authorizations with mini-programs)

- Solove (2021) Critique: The behavior examined in privacy paradox studies involves people making decisions about risk in very specific contexts while their self-reported privacy concerns are much more general in nature

- This paper: The survey asks about data sharing with mini-programs, and users are matched with their actions regarding the management of access to their data

Survey and Data

- July 2020 survey, 10,875 respondents (used mini-programs)

- Survey places respondents into discrete buckets (“very concerned,” “concerned,” and “unconcerned”)

- Alternative sample: 100,000 AliPay users drawn randomly, where privacy concerns are based on prior AliPay privacy choices (perhaps could use a more continuous measure based on the extent to which data is shared)

- Coupled with data on user characteristics (age, experience on AliPay) and users’ July 2019 - July 2020 AliPay actions (visits to mini programs, data authorizations, cancellations, measures of mini-program engagement)

Findings and Mechanism

- Analysis suggests positive correlation between users' privacy concerns and users' use of mini-programs
- Continues to hold with the alternative user sample
- Authors assert that "... consumers' privacy concerns may grow with their data accumulated with digital service providers ..."
- Cannot rule out "present bias," where users may overweight present benefits relative to future privacy costs (survey takes place after user actions; unclear what role this temporal difference plays)

Comments

1. AliPay Setting
2. Model and Mechanism
3. Fragmentation Concerns
4. Potential Extensions and Implications

Comments: AliPay Setting

- Outside options to using AliPay and mini-programs
- Are all authorizations for the same time period (e.g., could more active users bump into more re-authorization requests because they use certain mini-programs)? Is a non re-authorization counted the same as a revocation?
- Can mini-programs collect AliPay info in the background or is it one-time collection? Does revoking authorization delete data? What information do users have about controls? (Need to know in order to link to privacy)
- What are the potential privacy harms — malicious third parties (e.g., credit theft) or govt access? Which info are users most concerned about leaking and is that something to which mini programs may adjust?

Comments: AliPay Setting – Cont.

- What is the distribution of mini-programs in terms of their data intensity for active vs less active users, and for privacy conscious vs less privacy conscious users? (Game apps?)

- What does the AliPay mini-program store look like?
  - Do mini programs within AliPay compete on privacy?
  - How are permissions highlighted for mini programs?
  - How are mini-programs sorted within AliPay — by category, function, are they all free-to-install, etc?
  - Can mini-programs use 3rd party SDKs and APIs? Does AliPay place constraints? What info do users have?
  - Can users shop around for a mini-program that requires fewer permissions within a category (e.g., bill pay)?
  - Does AliPay remove any mini-programs? Based on what?

- Do mini-program permissions change over time? Requires re-authorization? React to users not authorizing?

Comments: Model and Mechanism

- The positive correlation between users' levels of activity and actions restricting data sharing suggest a number of mechanisms on the cost side, including:
    - Increase in level of salience, sophistication, or understanding regarding data flows/management
    - Concerns about greater breadth of data shared (e.g., more sensitive data; more data-intensive mini-programs)
    - Concerns about greater accumulation of data shared
- Unclear which mechanisms are at play and to what extent
- Suggests a learning-by-doing model – could be explored?
- What role might income play (e.g., if more active users tend to have higher/lower incomes)? Interface with potential harms or device/mini-program choice?

Comments: Fragmentation

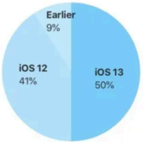
- What role do device and operating system fragmentation play (e.g., more active users could more frequently upgrade their device or their OS)? Tablet vs smartphone?

- Time fixed effects may not capture users updating their OS or their AliPay app or their devices, and consequently not capture potentially different saliency of controls or privacy to different users over time

- Could privacy conscious users be more likely to use certain devices (e.g., iPhones) with easier interfaces to adjust permissions? Do mini-programs differ across devices?

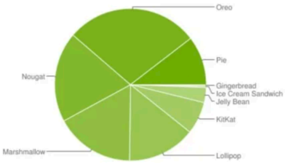
Fragmentation By/Within Operating Systems

50% of all devices use iOS 13.



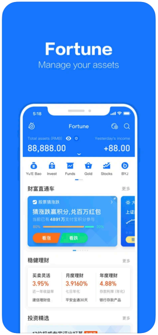
As measured by the App Store on
October 15, 2019.

?% of all devices use Android 10.



Data collected during a 7-day period ending on May 7, 2019.
Any versions with less than 0.1% distribution are not shown.

iOS



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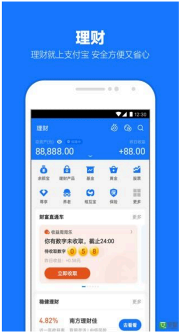
Android (Anzhi)



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Comments: Fragmentation – Cont.

- Do new devices reset permissions (would that count as cancellation if not re-authorized)?
- Is it possible to control for app version, OS version, mini-program version?
- Is fragmentation an issue (could it affect the type of mini-programs or AliPay version available)? Android is notorious for fragmentation & is most popular OS in China

Potential Extensions and Implications

- If 1st time a user (i) cancels a mini program's access or (i) alters AliPay's privacy settings is taken as a "treatment," can they be compared to other users (e.g., of the same privacy-sensitivity group) who have not cancelled (e.g., can use propensity scores to match)?
  - Effect of sophistication on subsequent user behavior
- If device data is available, do switchers from Android to iOS or vice versa behave differently than non switchers?
- Explore other ways to use panel data
- How to map privacy concerns within an app to privacy concerns within a broader OS or device ecosystem?

Potential Extensions and Implications – Cont.

- Back-of-the-Envelope Calculations, considering extremes:
  1. All users are high-concern + previous cancellation users
  2. All users are low-concern + no prior cancellation users.

  Impact on AliPay engagement relative to status quo?

  - Seems to be against platform's interest to make the privacy choice or the cancellation choice more salient
  - Ok to assume platform is static (w.r.t. mini-programs, device × interface, app updates, etc)?

- Did the platform change this saliency over time? (A year can be a long time, with the app, mini programs, operating system, and/or mobile devices possibly updated)

Summary

- An excellent paper with an amazing dataset
- My comments can largely be addressed with:
  - Some more background information
  - More controls if available
  - More caveats regarding data limitations or other potential explanations
- Opportunities to extend analysis as far as the model, exploiting user or other variations over time, event studies, and examining platform incentives