Motivations

- A cornerstone of insurance is pooling/diversification
- **Mutuality principle** (Borch, 1962)
  - In a frictionless market, it is optimal for participants to pool idiosyncratic risks and mutually share risks
  - Market risks are allocated among participants based on risk tolerance
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  - Mutual risk sharing is missing
  - **insurance companies** play a central role in managing risks, setting premiums for policyholders with a goal to maximize their value (Marshall, 1974)
    - Opaque; high operating and regulatory compliance costs ⇒ high premium
    - Insurers’ operating expenses account for about **one third** of insurance premiums charged by U.S. insurance companies (data from the NAIC, 1990-2015)
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- FinTech makes **decentralized mutual risk sharing** possible
“Mutual aid” platforms: Emerging Fintech firms can use online platforms to reach traditionally un-insured customers and process business efficiently

- Xiang Hu Bao (XHB) is the largest so far
  - Launched in Oct 2018
  - Provides indemnity payments to members who meet basic health and risk criteria
  - Spectacularly successful:
    - XHB already had nearly 100 million members one year after its launch

- Competitors halted consecutively: Waterdrop Mutual Aid (3/26/2021), Qingsong Mutual Aid (3/24/2021): XHB is about 4 times larger than the two combined
XHB Aggregate Enrollment and Claim Payments
Fact 1: Much lower cost of $XHB$, compared to traditional critical illness insurance (CII)
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- **Fact 2:** Strikingly lower incidence rate of *XHB*, compared to traditional critical illness insurance (CII)
  - Its incidence rate is only 1/7 to 1/6 to that of traditional illness
Outline for the Rest

- Institutional Details
- An Illustrative Model
- Data Sets
- Empirical Evidence
- Speculative Discussion about XHB’s Prospects
Institutional Details


- XHB hosts two major plans currently:
  
  ① Critical illness plan (CIP)
    - Member age: young and middle-aged participants between 30 days and 59 years old
    - Coverage: 100 critical illnesses
    - Indemnity levels
      - 0-39: CNY300,000
      - 40-59: CNY100,000
    - Reduced plans since Jun. 1, 2020
    - 0-39: CNY100,000 (Reduced)
    - 40-59: CNY50,000 (Reduced)

  ② Senior cancer plan (SCP)
    - Member age: senior participants from 60 to 70 years old
    - Coverage: critical malignant tumor only
    - Indemnity level: CNY100,000
Panel A: Procedure to Enroll in XHB

- File an application
- i. Medical history verification;
  ii. Credit check
- Pass
  i. 90-day waiting period
  ii. Pay Premium
- If critical ill in trial period
- Membership denied;
  Premium refunded
- Fail
- Become a member qualified for XHB payment
Panel B: Claim Process

File a claim → Claim investigation

- Fail, appeal → Panel vote
- Fail → Claim rejected
- Pass
  - 3-day Public notification on 7th & 21st
  - Fail, not appeal
  - Fail, appeal

Payment on 14th & 28th
Fintech in XHB
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  - Applying textual and graphic analysis in evaluating claim materials
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- *XHB*’s signature is to apply artificial intelligence to process claims
  - Standardize claim procedure
  - Applying textual and graphic analysis in evaluating claim materials
  - Applying AI in task assignment
Mutual Aid vs. Traditional Critical Illness Insurance (CII): Similarity

- Both provide **fixed indemnity payments** once the member (or policyholder) for covered critical illnesses.
  - Differs from typical health insurance, which reimburses the **actual costs** of covered health care.
- The set of covered critical illnesses are the same.
Mutual Aid vs. CII: Somewhat Similar

- **Fixed indemnity amount:**
  - XHB: CNY300,000 for participants under 40 years of age, and CNY100,000 for participants aged between 40 and 59 for covered critical illness; The members do not have choices over the indemnity amount.
  - Most of the traditional CII plans have an indemnity level of CNY300,000, though policyholders have more flexible choices;

- **Age restrictions:**
  - XHB’s critical illness plan only covers up to 59;
  - Traditional CII: Do not restrict the coverage age at 59, up to 105.
Mutual Aid vs. Traditional CII: Key Difference

- XHB does not collect premiums *ex ante* from its members, instead equally allocates the aggregate indemnities payouts plus an 8% administrative fee among its active members at each claims payment period.

- Traditional CII collects premium payment upfront, and pays out indemnity from the premiums.

- XHB’s 8% administrative cost charge is much lower than the typical 50% or higher administrative costs for CII products.
An Illustrative Model
Denote $p_X$ as the average incidence rate of the covered critical illnesses for XHB members, $K$ as the indemnity amount, $\lambda_X$ as XHB's loading factor (currently, 8%). Then, the per member cost sharing, denoted by $\pi_X$, as:

$$\pi_X = p_X K (1 + \lambda_X)$$

Similarly, the premium for the traditional CII $\pi_I$ with the same indemnity coverage $K$ is:

$$\pi_I = p_I K (1 + \lambda_I)$$

where $p_I$ is the average incidence rate and $\lambda_I$ is the loading factor for traditional insurance.

$\Delta \pi = \pi_X - \pi_I$ can be decomposed as:

$$\Delta \pi = [p_X - p_I] K (1 + \lambda_X) + p_I K (\lambda_X - \lambda_I)$$

IR difference

Loading difference
Possible Channels

- Fintech lowers administrative costs: $\lambda_X < \lambda_I$: enrollment costs and claim processing
- Ex-post vs. ex-ante pricing
  - Sharing claim costs versus fixed pricing
- Alipay users are healthier than the general population
  - Credit scores, incomes, mobile users, etc are sources of advantageous selection, at least in the short term;
  - Below, we will show that the indemnity level restrictions can result in advantageous selection in XHB’s competition against CII;
Rothschild-Stiglitz Framework: *MP* vs. Insurance in State Space

Loss State $W_2$

- High risk IC

No Loss State $W_1$

- Low risk IC

CII budget line

XHB budget line

45°
Separating Equilibrium: MA vs. Insurance

Choice between Mutual Aid versus Insurance

Given different coverages of mutual aid and insurance, individuals with high risk (private information) choose \( I \) and individuals with low risk choose \( X \).
Data Sets
XHB Data Sets

- **Enrollment data:**
  - *XHB’s total number of participants* in each two-week period from January 2019 to June 2021.
  - For two periods (2020 January #1 and 2020 November #1): number of enrolled participants by six age groups: 0-9; 10-19; 20-29; 30-39; 40-49; and 50-59.

- **Claims Data:** manually collected from *XHB’s* public announcement bulletin, detailed information of each approved claim during the period from January 2019 to December 2020.
  - Payment date, claimant’s name, city of residence, age, gender;
  - Covered critical illness (including identifiers for mild critical illnesses), indemnity amount, and number of participants who share the costs.

- **Survey of online mutual aid products conducted by Ant Financial in 2019:** sample size 58,721
Our data for participation and claims of CII come from the 2020 Historical Critical Illness Incidence Rate Table report published by the China Association of Actuaries (CAA).

The table reports the incidence rates separately for, by age and by gender:
- 6 leading critical illnesses;
- 25 leading critical illnesses.

Incidence rate is calculated based on the payouts of a group of most popular critical illness insurance policies:
- Excludes the first year policies;
- Only the first payment is included to construct the insurance incidence rate table (CII often allows multiple payments).
- Thus comparable to the incidence rates observed for XHB members in concept.
Enrollment Distribution across Ages: XHB vs. CII

Enrollment Distribution: XHB vs Insurance

Population Distribution

Total Enrollment

Age Range

0~9 10~19 20~29 30~39 40~49 50~59
Incidence Rates across Ages: XHB vs. CII

Panel A: Incidence Rate: XHB VS Insurance (6 Leading Illnesses)

Panel B: Incidence Rate: XHB VS Insurance (25 Leading Illnesses)
Survey Evidence

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XHB’s Future Prospects: Speculative Discussions
Evolution of the Number of Xianghubao’s Active Members and Claimants, By Claim Period
Considerations

- Regulatory challenges?
- Are \( XHB \) advantages permanent?
- \( XHB \) efficiency partly comes from CII’s inefficiency
- Participants may not have perfect information of their own risk types
Conclusions

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  - Pooling risk in a large pool
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- More efficient risk sharing arrangement than traditional insurance.
Thank You!