

Mutual Risk Sharing and FinTech: The Case of Xiang Hu Bao

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Motivations

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- **Mutuality principle** (Borch, 1962)
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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)
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 - Insurers' operating expenses account for about **one third** of insurance premiums charged by U.S. insurance companies (data from the NAIC, 1990-2015)

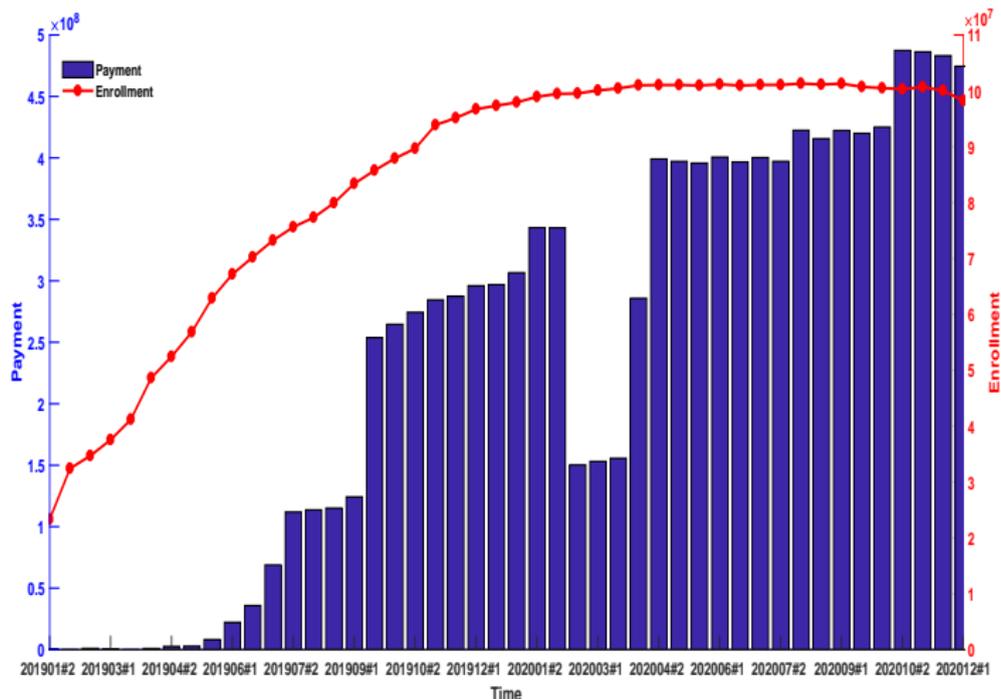
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- FinTech makes **decentralized mutual risk sharing** possible

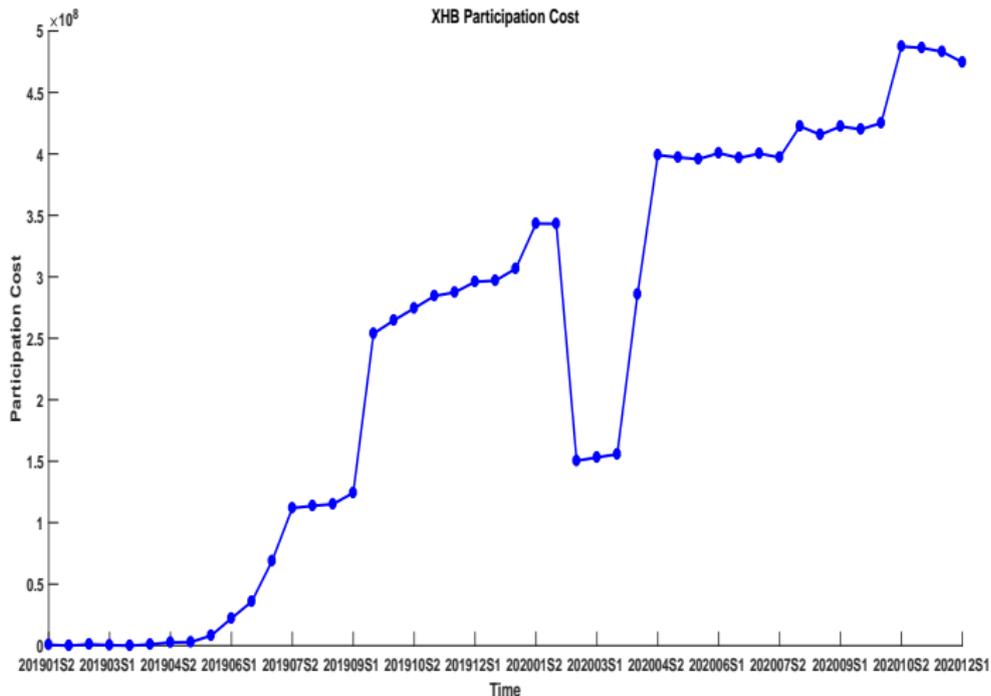
Mutual Risk Sharing and Fintech

- “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



XHB Cost Per Member: Biweekly



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 - Its incidence rate is only 1/7 to 1/6 to that of traditional illness

Outline for the Rest

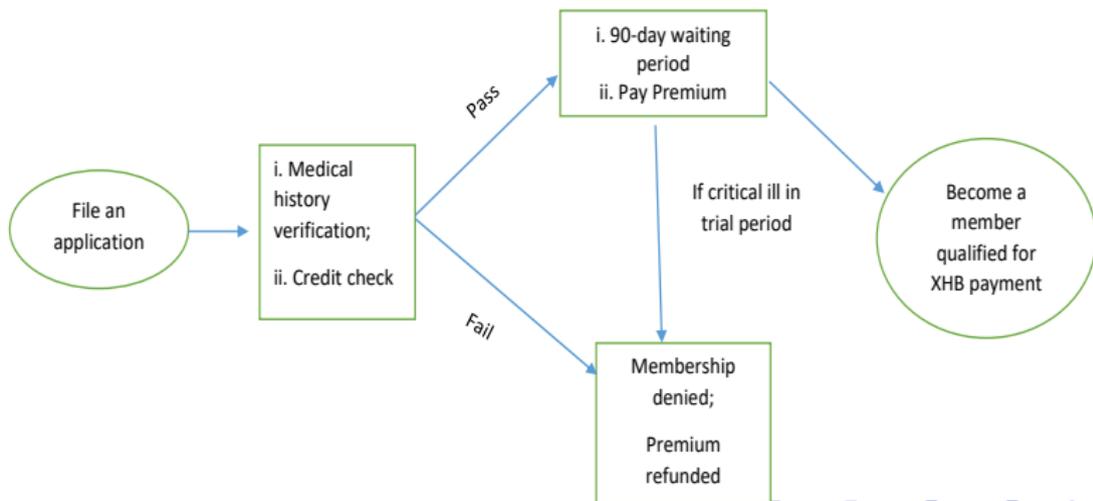
- Institutional Details
- An Illustrative Model
- Data Sets
- Empirical Evidence
- Speculative Discussion about XHB's Prospects

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

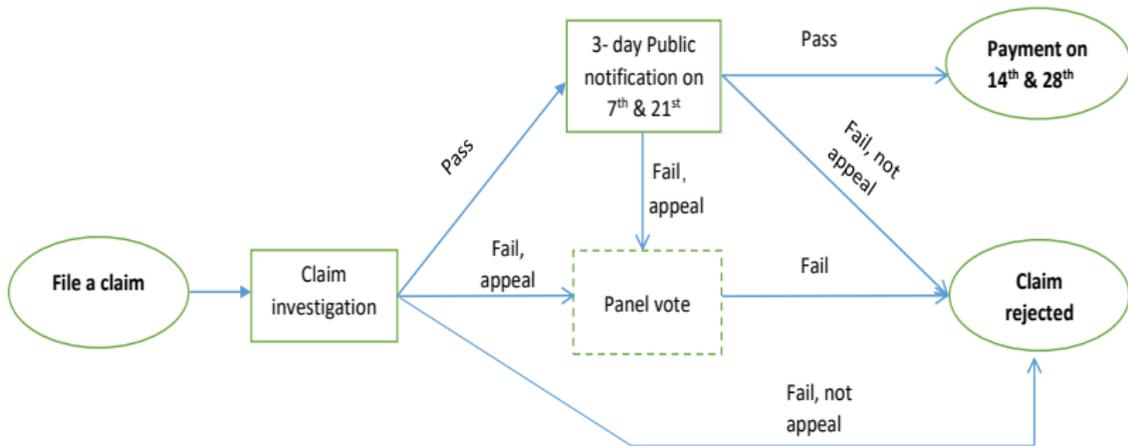
Enrollment Process

Panel A: Procedure to Enroll in XHB

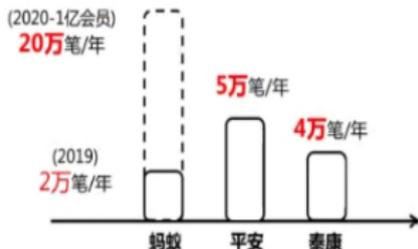


Claim Process

Panel B: Claim Process



Fintech in XHB



Fintech in *XHB* (2)

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 - 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

Model

- Denote p_X as the average incidence rate of the covered critical illnesses for *XHB* members, K as the indemnity amount, λ_X as *XHB's* loading factor (currently, 8%). Then, the per member cost sharing, denoted by π_X , as:

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

- Similarly, the premium for the traditional CII π_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 λ_I is the loading factor for traditional insurance.

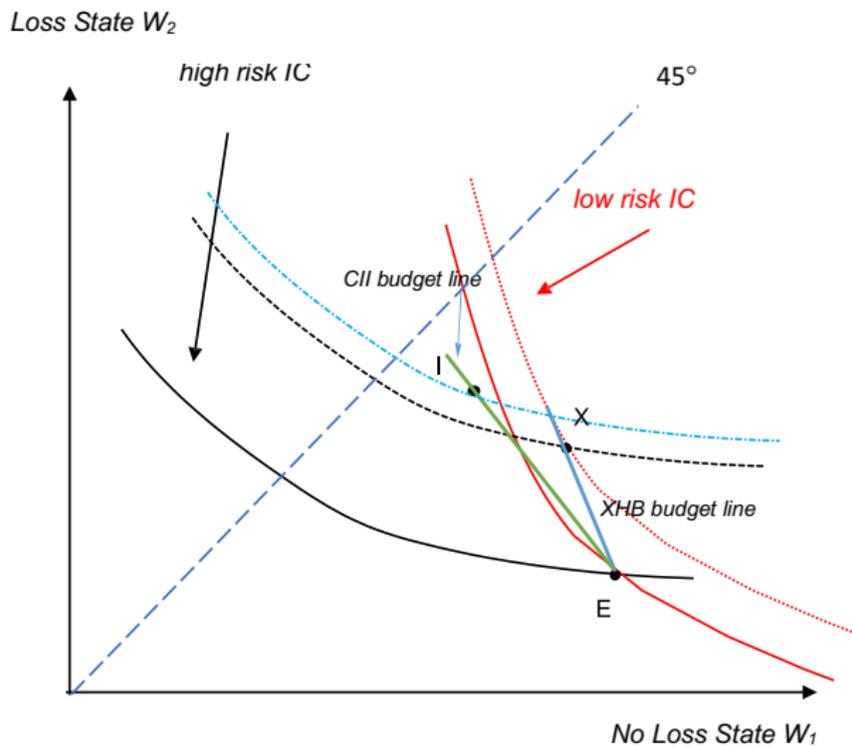
- $\Delta\pi = \pi_X - \pi_I$ can be decomposed as:

$$\Delta\pi = \underbrace{[p_X - p_I]K(1 + \lambda_X)}_{\text{IR difference}} + \underbrace{p_I K(\lambda_X - \lambda_I)}_{\text{Loading difference}}$$

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



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

■ 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.

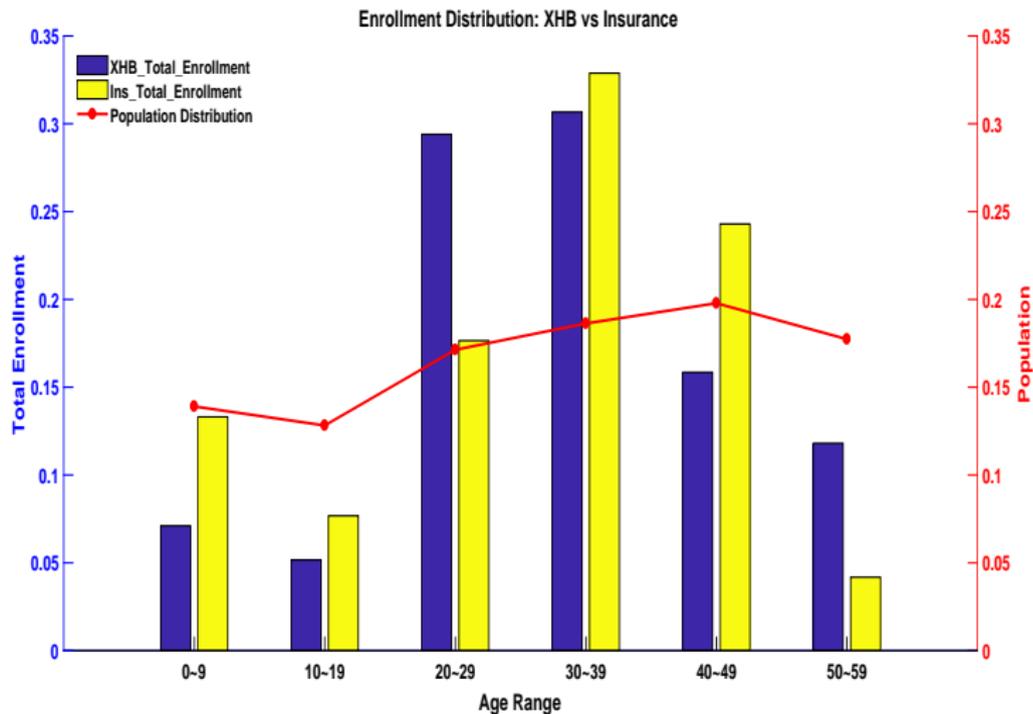
- Payment date, claimant's name, city of residence, age, gender;
- Covered critical illness (including identifiers for mild critical illnesses), indemnity amount, and number of participants who share the costs.

■ Survey of online mutual aid products conducted by Ant Financial in 2019: sample size 58,721

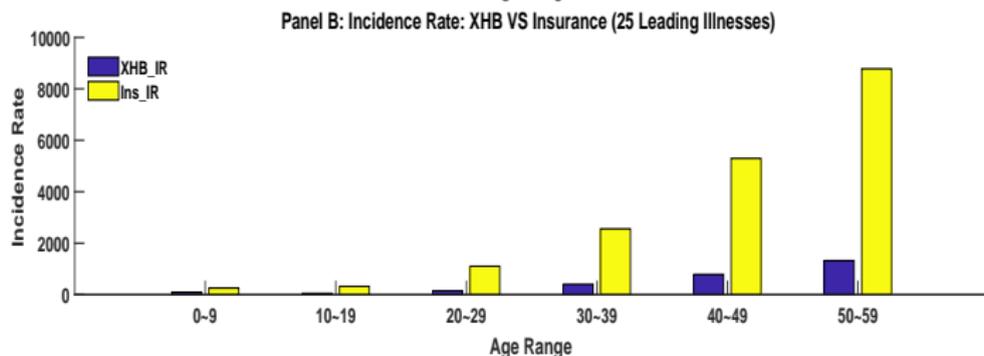
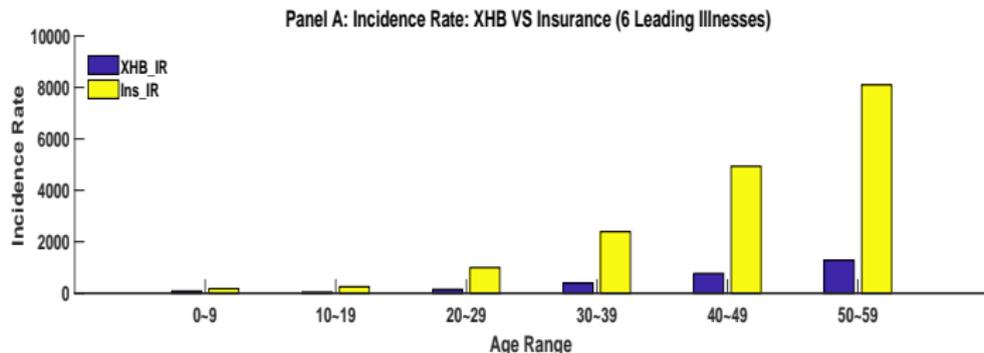
CAA Incidence Rate Data, 2020

- 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



Incidence Rates across Ages: *XHB* vs. *CII*

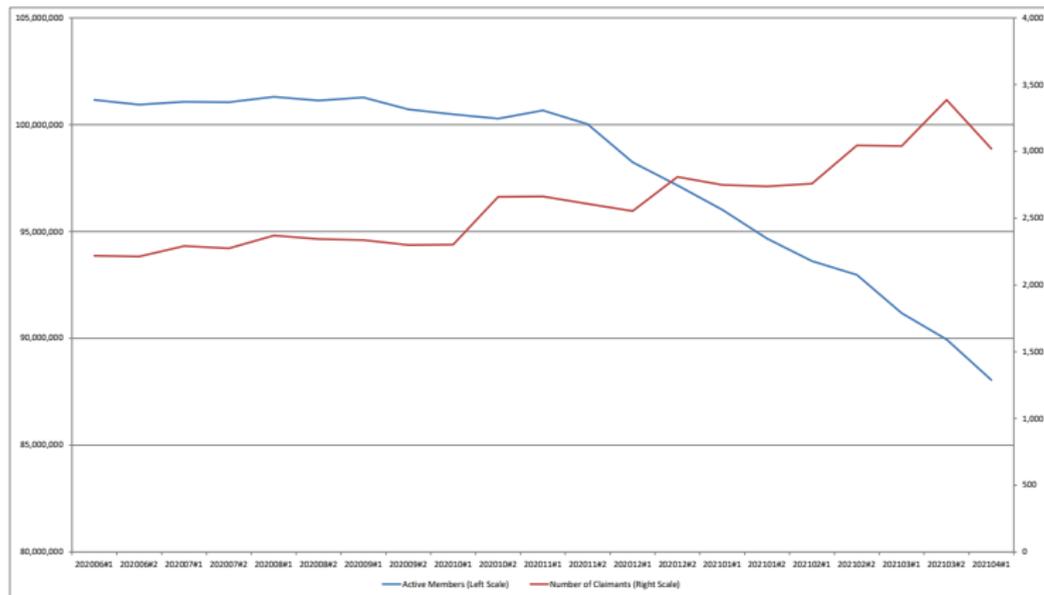


Survey Evidence

	(1)	(2)	(3)
	All ages	< 40 years	≥40 years
Age	-0.0001 (-0.06)	0.01*** (6.81)	-0.01** (-2.50)
Female	0.01 (0.39)	-0.004 (-0.18)	0.06 (1.47)
Ins	-0.29*** (-16.56)	-0.28*** (-14.07)	-0.34*** (-9.47)
CityTier	-0.01 (-1.02)	-0.01*** (-2.77)	0.03*** (3.02)
Inc2	0.28*** (14.40)	0.30*** (13.26)	0.15*** (3.68)
Inc3	0.37*** (14.32)	0.38*** (12.83)	0.21*** (3.92)
Inc4	0.43*** (9.27)	0.46*** (8.47)	0.22** (2.38)
Inc5	0.24*** (2.67)	0.17 (1.63)	0.42** (2.22)
N	58,722	45,031	13,691
R ²	0.0130	0.0155	0.0094

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

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- Mutual risk sharing such XHB are different from traditional insurance;
 - Ex-post cost sharing
 - Low coverage
- More efficient risk sharing arrangement than traditional insurance.

Thank You!