



2022 Cambridge - McKinsey Risk Prize Bio-sketch and Photo Page



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Title of Submission: De-risking for Huimin Bao Insurance

I am a current candidate for the

postgraduate degree:

MBA

Bio-sketch (Approximately 150 words)

Shan Liu is a qualified actuary (Fellow of Society of Actuaries) with 6 years experiences as an actuary working in actuarial consulting firm, insurance companies and insuretech in U.S., Canada and China. She is the first actuary hired by Tencent and helped establish the Actuarial Center of Tencent from zero. Her experiences include insurance product development, pricing, valuation, reinsurance, and risk management for insurance companies.



2022 Cambridge - McKinsey Risk Prize Declaration Form

Student Name: Shan Liu

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Title of Submission: De-risking for Huimin Bao Insurance

Number of words of submission: 2814

I am a current candidate for the postgraduate degree:

Master of Business Administration

Academic Institution/Department: Judge Business School

Declaration

I confirm that this piece of work is my own and does not violate the University of Cambridge Judge Business School's guidelines on Plagiarism.

I agree that my submission will be available as an internal document for members of both Cambridge Judge Business School and McKinsey & Co's Global Risk Practice.

If my submission either wins or receives an honourable mention for the Risk Prize,
then I agree that my submission can be made public on a Cambridge Judge Business School and/or McKinsey & Co websites.

This submission on risk management does not exceed 10 pages.

Signed (Electronic Signature)



Please include this declaration form before the cover page of your paper submission.

¹ If the Risk Summit is a virtual event, I will join live online

Abstract

Huimin Bao Insurance is probably the group insurance product with the largest number of participants. This insurance product involves insurance companies, government, technology company and millions of residents, forming an ecosystem. As the actuary who designed and conducted pricing for Huimin Bao Insurance, I observed risks of this ecosystem from and formulated potential solutions to tackle the risks.

Background

Zibo is a fourth-tier city in northern China, near the hometown of Confucius. In November 2020, it made headlines in China's major social media with the news that an extremely affordable health insurance specifically designed based on residents of Zibo's health risks – Huimin Bao Insurance Zibo Version was launched and went viral almost overnight. Backed by local government, underwritten by commercial insurance companies and distributed by Tencent's insurance platform, Huimin Bao Insurance allow all the residents in Zibo to enroll for an annual premium of 100 Chinese Yuan (£12 equivalent) to obtain medical insurance coverage up to 1M Chinese Yuan (£120K equivalent) regardless the enrollees age, gender, existing conditions, and illness history, etc. Within three months of its launch, 1.3 million residents had enrolled in the product, taking more than a quarter of the city's population. Subsequently, cities like Beijing, Shanghai joined the wave of Huimin Bao Insurance, and it was estimated that 140 million people participated in Huimin Insurance by 2021 (Guangming Net, 2022).

The national social healthcare scheme in China is similar to the universal healthcare in UK where national social insurance fund covers participants' medical and pharmaceutical costs. However, given the fact that 1.36 billion people participated China's national social insurance scheme (Statista, 2021), the average of the reimbursement rate is around 50% with low benefit limits (Meng and Tang, 2010). Therefore, the out-of-pocket costs of some



severe disease such as cancers are high enough to ruin a family's financial fortress. Private insurance stepped in to cover the out-of-pocket costs and more expensive treatments and services not covered by the national social insurance, but high premiums and strict underwriting requirements forestall majority people's access to private health insurance. Research by Reinsurance News pointed out that penetration rate of private insurance in China is lower than 6% (Baker, 2020). Under this social context, Huimin Bao Insurance emerged to fill the coverage gap by providing complementary coverages to people can't obtain sufficient coverages from national social insurance while have no access to private health insurance.

The nature of Huimin Bao Insurance is group health insurance plan. Each plan covers all participating residents in a city and is specifically designed and priced. The project involves multiple stakeholders including local government as initiators, technology giants as distribution channels, and residents as insureds and premiums contributors, and commercial insurance companies as final risk takers. Because of the dynamic interactions among the stakeholders, if insurance companies' risks can not be managed and mitigated properly, the risks will be transferred to other counterparties and eventually impact the ecosystem of Huimin Bao Insurance. Therefore, how commercial insurance companies manage risks absorbed from Huimin Bao Insurance is vital for the success and sustainability of this project.

Risk Analysis

How insurance companies manage their risks include two parts: prior-sales risk selections and post-sales risk monitoring. Before issuing the insurance policies, insurance companies conduct serious underwriting process to evaluate the risks of insureds. For those risky insureds, insurance companies either charge them high premiums or reject issuing policies to them. After issuing the policies, insurance companies provide risk-mitigation services to policyholders to postpone the occurrence of accidents or reduce the severity of accidents so that insurance companies' claims liability can be postponed or reduced as well. For insurance companies underwriting Huimin Bao Insurance, prior-sales risk selections can not



be used because city governments require that all citizens should be eligible to enroll with the same premiums regardless of their health status which indicates the risks of insureds. Therefore, compared with other products, Huimin Bao Insurance absorbs more risks for insurance companies underwriting it. These risks include but not limited to anti-selection risk, insurance risk, operational risk, and liquidity risk, etc.

1. Anti-selection Risk

Anti-selection is the one of the most common risks in insurance contracts. In health insurance filed, anti-selection is defined as “an increase in the chance for a person to take out an insurance contract because they believe their health risk is higher than what the insurance company has allowed for in the premium amount” (Price, 2021). In the context of Huimin Bao Insurance, anti-selection risk can be explained by that fact that people who suffer from higher health risks are more likely to enroll in Huimin Bao Insurance plan because they need health insurance to share their medical bills but can not obtain commercial health insurance from anywhere else.

Million Medical Insurance is the most popular private health insurance product in China with an annual growth rate of 25%-40% and projection premium scale of £25 billion in the year of 2025 (Li, 2021). But it has strict underwriting requirements that people above 60 years old or with any pre-existing conditions can not be insured because they are defined as risky people and are filtered out by insurance companies by prior-sales risk selections. These people are more like to enroll in Huimin Bao Insurance. Taking Shanghai version of Huimin Bao as an example, 41% of the participants are in the age group of 51-80 (Yang, 2021). Anti-selection of this cohort could increase the total risks of the pool.

2. Insurance Risk

From the actuary’s perspective, insurance risk is also called pricing risk. It’s definition is that premiums charged by insurance companies are not sufficient to cover claims. Insurance risk especially obvious for Huimin Bao Insurance. Insurance companies adopt risk pricing methodology to set up premiums for their products where likelihood and size of claims are



reflected in the pricing models. However, for Huimin Bao Insurance, the product features and the premiums are already determined by the city governments from the perspective of rebating to residents but not the risks. Still taking Shanghai version of Huimin Bao Insurance as an example, in the first year of launching, the total premiums collected from enrollees were 850 million Chinese Yuan ((£100 million equivalent), but the claims payment reached to 128 million Chinese Yuan (£15 million equivalent) in the first two months when the policy took effective (Wang Yi, 2021). Assume claim developments are stable from month to month, it can be estimated that the annual claims payment can reach to £90 million ($£15/2 * 12 = £90$). As the insurance distribution channel, Tencent charged insurance companies 40% of premiums in the initial year as commissions by following insurance industry's game rules (ZIPPIA, 2021). Thus, even without considering other operational expenses, the estimated profits for insurance companies underwriting Shanghai version Huimin Bao Insurance is -£30 million obtained from the following calculation:

- Total Premiums: £100 million
- Commissions paid to Tencent: $£100 \text{ million} * 40\% = £40 \text{ million}$
- Estimated Claims = £90 million
- Estimated profits = total premiums – commissions – estimated claims = $£100 - £40 - £90$

Considering other operational expenses, the loss of insurance companies caused by Huimin Bao Insurance may be even larger.

3. Operational Risk

According to International Association of Insurance Supervisors (IAIS), operational risks defined as “the risk of adverse change in the value of capital resources resulting from operational events such as inadequacy or failure of internal systems, personnel, procedures, or controls, as well as external events” (NAIC, 2021). Since Huimin Bao Insurance involves multiple stakeholders and multi-dimensional interactions, shortfall and inadequacy in management can potentially exert negative impact on insurance companies.



Residents enroll in the plan, pay premiums and file claims via Tencent who subsequently submit enrollees and claims data to underwriting insurance companies. Any errors and inaccuracy in data transmission and management, any gap in communication and information sharing among stakeholders could result in financial losses of insurance companies.

4. Liquidity Risk

Liquidity risk is defined as the risk that business cannot meet their short-term debt liability (Kenton, 2021). Specifically for insurance companies, liquidity risk appears when large claims amount needs to be paid out in a short period of time and insurance companies didn't have sufficient financial sources to pay for the claims. Liquidity risk becomes significant during the Covid-19 period.

Like most countries in the world, most hospitals in China are still postponing the unnecessary and non-emergent surgeries and treatment of some patients, saving medical resources to fight with the pandemic. In addition, the frequent regional locking down in China can also cause mental health problems. It is quite likely that after the pandemic, health insurance companies will see a sudden increase in claims request (Rolfe, 2021). Therefore, for Huimin Bao Insurance are quietly likely to receive large volumes of claim requests when pandemic is cooling down.

5. Other Risks

The dynamic and interactions of all stakeholders in Huimin Bao Insurance form an ecosystem. If the insurance companies' risks can not be managed properly, would impact other stakeholders in the ecosystem. When Huimin Bao Insurance cause huge losses to the insurance companies underwriting it, insurers can walk away and leave the ecosystem. If this happens, both city government and Tencent suffer reputation risks since enrollees might only know the project was initiated by the government and Tencent. Enrollees with claim records would be considered as people with pre-existing conditions and would not be able to obtain other private health insurance coverages according to the current



underwriting requirements of China's commercial health insurance companies. Thus, if the risks that insurance companies absorbed from enrollees cannot be managed properly, the risks eventually will return to enrollees and spread out to other stakeholders.

Risk Management Solutions

1. Reinsurance

As the most traditional media for insurance companies to manage risks, reinsurance enables insurers transfer part or all of their risks to reinsurers. Some commonly used reinsurance in health insurance areas include yearly-renewable-term, coinsurance and stoploss, etc. With the involvement of reinsurance, insurance companies get reimbursement from reinsurers for each claim they paid to the enrollees. Reinsurance is extremely helpful when insurance companies are facing liquidity risk.

2. Monitoring the coverages

Even through the coverage for Huimin Bao Insurance are proposed and requested by the government, the coverages still can be modified slightly by insurers with the purpose of reducing risks. For example, each disease may have several types of treatment with different prices and treatments providing more comfortable experiences are more expensive. Insurance companies can monitor the coverages of Huimin Bao Insurance by limiting the reimbursement to the treatment with the lowest costs.

In addition, Huimin Bao Insurance can bundle with other insurance products with lower loss ratio so that the aggregate loss ratio of the bundle products can be lower. Loss ratio is defined as claims paid divided by earned premiums. It was mentioned above that the Shanghai version Huimin Bao earned premiums of £100 million and estimated claims payment reaches to £90 million. Thus, the loss ratio of is 90% (£90 million/£100 million). Drug insurance's premium is 20RMB and loss ratio is around 15% (conclusion obtained from my work experience). If Huimin Bao Insurance and a drug insurance are bundled, the aggregated loss ratio become:

$$(100*90\%+20*15\%)/(100+20)=77.5\%$$



Loss ratio of Huimin Bao Insurance would greatly reduced from 90% to 77.5% if bundled with drug insurance.

3. Risk Pooling

In health group insurance, risk pooling is often used to mitigate the risks of the pool by bringing more young people and healthier people to the pool. This method can apply to Huimin Bao Insurance as well. The distribution channel of Huimin Bao Insurance Tencent is the largest technology company in China, sales strategies can be developed by leveraging the data advantage of Tencent as a technology company to identify young and healthier people and introduce Huimin Bao Insurance to them. Firstly, Tencent can develop a family discount program. The enrollment process of Huimin Bao Insurance plan is completed via an App developed by Tencent which requires a certain level of knowledge to use smart phone. According to Statista (2019) data, smartphone users above age 45 only accounted for 15% of total smartphone users in China, indicating that elderly enrollees complete their purchase and enrollment by their younger family members. To encourage more young people to participate, insurance companies can provide a discount to families that have at least one young people enroll in Huimin Bao Insurance along with elderly people.

In addition, Tencent's main focusing area is gaming, where over 90% of users are below 45 years old (Tencent Cloud, 2019). Tencent can push advertisements regarding Huimin Bao Insurance to these users via their gaming portal with some discounts as part of the users reward program. The enrollment of young people will dilute the risks of the group caused by anti-selection and insurance risks.

4. Risk mitigation services

In U.S. where employers sponsor private health insurance, wellness incentive programs are always used by self-insured employers to lead their employees live a healthy life so that doctor visits can be reduced and therefore claims payment can be reduced as well. Similar programs can be developed by Tencent and apply to Huimin Bao Insurance by leveraging Tencent's data assets.



Tencent has already collected sufficient data to identify users with critical and chronic illness and the computational power is strong enough to track the health-related behavior of these users. Therefore, Tencent can identify relevant users and invite them to participate in the wellness incentive program. For example, by adding a feature to the App where people enroll in Huimin Bao Insurance, Tencent can ask identified users to upload their health indicators such as blood pressure and blood sugar and use advanced AI to monitor and track the participants' health status. If any indicator goes abnormal, the AI model can capture it and connect the patients to doctors in Tencent's online doctors' system.

Belonging to Tencent Healthcare, this online doctors' system has over 20,000 doctors from top-ranked public hospitals providing consultation to Tencent users. The timely intervention and treatment of disease will lead to control of the disease at an early stage when it is relatively less severe and can be cured with simpler and cheaper treatments. This eventually will reduce the medical costs and therefore insurance claims payment.

5. Other Services

According to research by Boston Consulting Group (Bender & Gielen & Schreiber & Schwemer & Urban, 2020), insurance industry is one of the least digital matured industries. Most insurance companies still lack organized data base to manage their policies and claims. As a technology company, Tencent has the capability to build the data warehouse and properly manage it. Therefore, Tencent can help insurance companies build data systems to automate some works can be done by AI but are still manually handled. The automation can greatly reduced the operational risks.



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