Premium calculation in micro health insurance

Data Resource and (Actuarial) Pricing Assumptions

The first step for pricing is the building of a database. Some (actuarial) assumptions are necessary for pricing a health insurance scheme. In pricing yearly renewable products these are morbidity, risk margin, expense and profit. The morbidity is the most important actuarial assumption. The term morbidity in this context is not only referring to the likelihood of injury and illness of the insured. However, it is the total amount of financial loss due to injury and illness that the insured incurs over a certain period. It can be separated into two aspects: frequency (the probability of a claim occurring) and severity (the expected amount of a claim).

To price health insurance products, one can rely on two kinds of statistical data:

- external data and
- internal data.

In general, the external data cannot supply the information needed for premium calculation due to the different bases of observation.

Because of the lack of history or very short history for most (micro) health insurance institutions managing (micro) health insurance business, the internal data are virtually non-existent. Therefore, one has to rely on external data, for example on the morbidity and health cost data from the government (e.g. National Investigation of Health Service) or from the World Health Organisation. It might be appropriate to question the authority of the data, due to the difference between insured and uninsured persons.

In near future the most health insurers in developing countries will not have enough professionals and IT system to accumulate or analyze the real claim record of their health insurance business. One will still have difficulties in deriving assumptions from the own institution’s data, so the responsible person will still have to rely on external data. Another issue is that the persons involved are unfamiliar with the concept of insurance.
Experience has shown that probability of hospitalization and the days of hospital stay are relatively steady, but the medical service cost kept rising. So when estimating the expected amount of claims in the future, the rising medical service cost must be taken into account.

**Financing Model and Calculation Basis**

Health insurance premiums can be calculated in three main ways:

- **Income-related contributions (premiums):** A certain percentage of the income of the insured has to be paid as (premium) contribution for a (standard) benefits package. This is typically the case for social security schemes in most countries.

- **Community rated premiums/contributions:** In community rating, premiums/contributions are adjusted for the average risk of a group, so that each insured pays the same flat rate contribution/premium for a standard benefits package. This is the case for some social health insurance and employer-based insurance plans.

- **Risk-related (contributions) premiums:** Premiums to health insurance vary by expected morbidity risk of the insured person and are calculated according to actuarial principles.

**Pricing Process**

The pricing (rate developing) process in micro health insurance is essentially the same as pricing in other industries. The micro health institution must generate enough revenue to cover the cost of its claims and expenses and maybe in addition contribute to the surplus of the institution. It differs in that the price of a (micro) health insurance product is initially determined on the basis of expected future events and may also be subject to experience rating so that the final price to the contract holder can be determined only after the coverage period has ended.

The premium rate of a micro (private) health insurance scheme should follow the following principles: adequacy, reasonableness, competitiveness and equity. Due to the non-existing data and experience, one could emphasize the principle of adequacy as the most important pricing principle. Therefore a conservative premium rate should be set in order to cover the benefit payment and the administration cost.

At the beginning, micro health insurance products should be based on a group and should be annually renewable. The past claims experience of a group should be
considered in determining future premiums for the group and/or adjusting past premiums after a coverage period has ended.

The approach to group (micro) health insurance rate determination differs depending on whether manual rating or experience rating is used. In the case of manual rating, the premium rate is determined independently of a particular group's claim experience.

In the manual rating process, premium rates are established for broad classes of group (micro) health insurance schemes. Manual rating is used with small groups for which no credible individual loss experience is available. This lack of credibility exists because the size of the group is such that it is impossible to determine whether the experience is due to random chance or is truly reflective of the risk exposure. Manual rating is also used to establish the initial premiums for larger groups that are subject to experience rating, particularly when a group is being underwritten for the first time. In all but the largest groups, experience rating is used to combine manual rates and the actual experience of a given group to determine the final premium. Manual premium rates (also called tabular rates) are applied to a specific group (micro) health insurance case in order to determine the average premium rate for the case that will then be multiplied by the number of benefit units to obtain a premium for the group.

One should introduce a contingency margin into the premium calculation to avoid the situation that the claims significantly exceed the expected value. In practice, this safety loading ranges between 30% to 200% of the risk premium. Nevertheless, the (micro) insurance institution should try to cover health risks at an "acceptable" price.

The setting of the initial premium rate should not be the end of pricing (micro) health insurance. The re-rating process should be repeated yearly or from time to time. The initial rate should be guaranteed for 12 months. One should monitor the development of the claims and identify significant changes in administration or other events that will affect the premiums of the micro health insurance scheme.

At the beginning, one can determine the premium by assessing the insured's willingness to pay and comparing this income to the (micro) health institution's capacity to support errors in the claim load.

As the affiliation to micro health insurance schemes is mostly voluntary, the package
must meet clients’ perceived needs and be affordable to them. The budget of the package should consider the level of willingness-to-pay (WTP). A WTP study conducted in India suggested that about 50% of the sample population was willing to pay around 1.35% of the annual household income. It is important to check the average household income of the potential population. The premium should be determined so that it should not exceed e.g. 1.5% of income for 50% of the target population (cf. graphs below and details in course Unit 4.1: Insurance product design).

Figure 01: The evidence of Willingness to pay for health insurance per Household

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1 David Dror, PhD, DBA: “Microinsurance: something new or just less of the old thing?” 27 February 2009

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Net Risk Premiums

According to the equivalence principle, we have to equate the expected (present) value of the income (premiums and other revenues) and the expected (present) value of the benefit payments made by the micro health insurance institution. One should distinguish between net premiums and gross premiums. Net premiums do not allow for expenses whereas the gross premiums do. The annual claim cost, the risk premium, is the product of the frequency of occurrence of claims and the amount of the average claim. The net premium is the risk premium plus safety loading which can cover an unexpected large amount of benefit payments. According to the law of large numbers, the expected value of insurance payments for a single risk during the insurance period (a calendar year) can be estimated as the average claim per capita.

\[ C = \frac{P}{L} \]

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In the case of micro (health) insurance one should expect the policyholder to pay regular premiums during a fixed time span, let’s say w weeks or m months, starting with the issue of the policy and ceasing on the death of the insured person or at the end of agreed premium term. So the net single premium has to be divided by the corresponding expected (present) value of that regular premium payments. One should be aware that the fluctuation of the group of insured persons will influence the income and expenditure. Some of the insured lives will leave the scheme through death or cancellation.

**Premium Loadings and Expenses**

So far, the premiums are calculated to cover the insurance benefits only. But the micro health insurance institution also faces expenses related to its “business”. Hence, the policyholder has to take part in covering these costs. According to the equivalence principle, one should charge an additional amount to cover the expenses induced by his contract.

One can distinguish between the following types of expenses:

- **Administrative costs** include the costs of collecting the premiums, costs of underwriting, costs of issuing policy documents and identification documents to the beneficiaries, costs of enrolling and accrediting/monitoring providers of care, costs of processing and paying claims, government taxes and levies like stamp duty on policies, etc., and also the costs of planning, supervising and managing the (micro) health insurance scheme.

- **Marketing costs** include not only the commissions and incentives paid out to agents, advisors, brokers and other sales functionaries, but also the costs of acquiring and maintaining a sales network, costs incurred on print and visual media, and also, especially in the case of community-based schemes, costs of advocacy and awareness generation in the community.

**Gross Premiums**

Many types of expenses are added together to the net premium and form the necessary amount of a premium that is the final price of the policy, the gross premium.

To simplify the calculation one should apply a simple cost model such as a percentage of gross premiums to micro health insurance business with no
differentiation between the different kinds of costs.

**Other Aspects in Pricing Micro Health Insurance**

1.1. Strategies for collecting premium

As a planner of a (micro) health insurance scheme, one needs to consider various strategies to collect premiums. Some illustrations are given below along with their relative advantages and disadvantages:

Payroll deductions - This could be the easiest method to collect premiums, especially if one is planning to cover people employed in the formal sector. However, such a scheme requires widespread consensus and consent of all the stakeholders, including the employees, the employers, the trade unions/ associations, etc.

Deductions at source via mobile phone companies or for example, while collecting premium from dairy farmers, one can collect the premium at the level of their dairy cooperative society. Thus, the cooperative can deduct an amount of their monthly contribution from the dues of the member farmer, and collectively pass it on to the (micro) health insurance scheme. Similarly, a self-help group can collect contributions on behalf of its members and pass it on to the scheme. This is an efficient way of collecting premium, though one needs to convince all the members to be part of the scheme. Difficulty increases if only some members join the scheme, because then keeping track of the members and their contributions becomes more complicated.

Membership payments - For example, in a manner similar to the above deduction, but not linked with any simultaneous financial activity, members of a trade union can be asked to pay an annual contribution towards enrolment in a (micro) health insurance scheme.

Voluntary payment - This has been the most common method of premium collection in some countries so far. Here the scheme is announced and the people are invited to come and join. Collection depends on the interest of the individual.

Each of the above strategies has its pluses and minuses. One should note that the mandatory nature of payment reduces as one comes down on the above list of strategies, and the cost of administration simultaneously goes up.

To summarise, in collection of contributions from members of the scheme, it is far more cost effective if the deduction is made from the wages/pay of the member by the employer and is collectively paid into the scheme, than collection from individual members. Alternatively, if the members of the scheme are already grouped together in some form or the other, and premium for the group as a whole is paid by the whole
group as a body, the transaction costs are minimised. The premium could also be drawn from any payment normally due by the member (like a milk or poultry cooperative deducting premiums from the payables to the member). Effective strategies to minimise collection costs of premiums, could thus be reduction in the total number of transactions taking place (e.g. by grouping of members and collective payment of premium), increased automation (vis-à-vis manual procedures), bundling of insurance premium payment with other transactions (like payment of wages or periodic payments of other dues), etc.

1.2. Measures to reduce administrative costs  
Other than the above mechanisms of premium collection, there are mechanisms to reduce the administrative costs of the premium. These are listed below.

1.2.1. Initial, non-recurring costs and Identification documents  
An important component of the administrative costs are the initial, one-off costs including those of examining an insurance enrolment proposal and any pre-insurance examination required, costs of issuing the policy document and the costs of issuing identification documents, etc. The last mentioned is an important aspect, which needs due attention. The extent of security and foolproof technologies to be deployed in the identification document will depend on the size and nature of the scheme and the costs involved. A small, local insurance scheme with a limited number of providers who would normally recognise the beneficiaries will have different identification needs than a large insurance scheme offering a large, geographically spread-out network of providers. The options include the policy document itself, or the policy with another valid identification card (voter card, etc.) in which the insurer incurs no additional costs, or laminated photo-and-signature cards, and perhaps even smart cards which could include greater details about the beneficiary and the plan in the chip embedded in the card. The latest technique used is the smart - a debit card with a micro chip that contains the insured’s details including details of the family, the utilisation of medical benefits, the medical history and the balance left for utilisation. This card can be used in any of the empanelled hospitals across states and cities.

1.2.2. Recurring Costs  
The other set of costs, recurring costs, include the cost of collection of the contributions/ premiums. As is obvious, these costs must be minimised as they eat into the funds of the insurer and serve no useful purpose. Automated collection at
source, for example, from salaries/wages/payables, as discussed above, is a low-cost method of collection. However, when it is being planned to enrol the unorganised sector in a big way by the health plan, alternative mechanisms for collection will need to be evolved which are effective and cost-efficient. One option could be collection of contributions by community volunteers who are accountable, locally available, and who also travel in the course of their work to their supervisory offices for regular meetings (where collected premiums could be handed over). Community (micro) health insurance schemes often use the voluntary effort of their community representatives to market the (micro) health insurance product, collect premiums and to detect fraud. This minimises their administrative costs considerably while retaining the accountability of people involved in the process. However, it must be remembered that the actual costs (including the cost of time devoted by the manpower involved) of collecting, compiling and processing small contributions can even be higher than the amount of the contribution itself, and so the aim should be that the size of each individual transaction in terms of money is increased through grouping of individuals, grouping of premiums, etc. This would ensure that a larger share of the collected corpus is available for service provision, and is not lost in administrative costs.

1.2.3. Enrolment Unit

The unit of enrolment in (micro) health insurance policies could be the individual, the family, or larger groups, for example, self-help groups, groups comprising all members of specific communities or all employees of an enterprise. Voluntary schemes are more likely to have the unit of enrolment as the individual member, while mandatory schemes are in a better position to take advantage of larger group sizes. As the size of the unit of enrolment increases, the pooling of risks improves, and administrative costs to service the same number of persons go down. However, in certain plans (for example, family floater plans), individuals covered within a single unit of enrolment may share the sum insured, whereby if one individual over-utilises health services, it affects the service available for the remaining individuals within the unit.

In India for example, people are accustomed to the individual being insured as the enrolment unit. However, this has many drawbacks, including increased risk of adverse selection - those who are sick will tend to enrol at a higher rate than those who are healthy. This will lead to the scheme becoming financially unsustainable.
Adverse selection can be reduced with larger units of enrolment, e.g. the family, the organisation. Thus, if the plan insists that individuals cannot be enrolled and the entire family/self-help group/organisation should be enrolled, this will ensure that both the healthy and the sick will be members of the scheme. This increases the risk pooling considerably, and hence there is cross-subsidy as reduction in administrative costs, which reduces the premium.

1.2.4. Collection Periods
The scheme can be planned such that it has an open-ended or a close-ended contribution period. In the close-ended form, there will be a pre-defined collection period during which all the eligible members will be required to pay their premiums. In the other option, which is open-ended, the members are free to enrol at any point of time, all through the year or at any point in the tenure of the scheme. Open-ended schemes can also increase the risk of adverse selection. For example, people will enrol when they perceive illness or other potential medical costs (e.g. pregnancy). Also with regard the administration it could be harder to keep track of enrolment and renewal, and to remind the members about renewals on time. Thus, a close-ended plan allows people to join during a fixed period only and its follow-up and administration is much easier. However, this collection period should be planned in a manner which coincides with the period of high finances, e.g. in a predominantly agricultural community, it could be at the time when the crop is ready, or in an industrial set-up, it could coincide with the period when annual bonuses are paid out. Hence, one has to weigh the pros and cons of these options, too, before finalising a method.

1.2.5. Waiting Periods
Waiting periods are usually introduced as a cost-containment mechanism to minimise adverse selection, as these discourage sick people from joining at the time of illness and encourage healthy individuals to join before they need medical care. For example, certain benefits could be denied for one month (or longer) after enrolling in the scheme. While this is indeed an effective tool to minimise adverse selection, it also can be a difficult concept to explain to the community. (“I have paid the money, so why can I not get the benefits.”) Waiting periods are usually imposed at the time of first joining the plan and are not applied on renewals when renewals are being made on time.
1.3. Addressing Sustainability

The careful setting of the premium and assessing other sources of financing the plan, vis-à-vis the costs of the benefit package, are important considerations towards ensuring sustainability of the scheme. While undertaking this iteration between affordability and the benefit package that shall be offered, care needs to be taken to put in place certain reserves to meet unexpected costs. This is all the more important where the costs are being estimated with limited data, as the actual experience of the plan could be far different from these estimates.

Moreover, a long-term plan for the scheme, especially where the plan is being initially rolled out with a substantial component of subsidies or donor funds, needs to be considered. Often, the subsidies and donor funds will be available only for a limited duration, and the scheme may be expected to take on all or most of the costs of the scheme in due course. Planning for the long-term sources of funds for the scheme and determining the extent of costs that could be afforded by the beneficiaries to sustain the scheme could thus be important at the design stage itself.

In order to protect the scheme from catastrophic costs, opting for reinsurance (or any other risk transfer mechanism) could also be one of the mechanisms for protecting the scheme from sudden depletion. An operating reserve to meet fluctuations in cash flows and unexpected scheme costs, as mentioned above, is also an important tool to ensure liquidity, though building up a technical reserve, as is maintained by pension funds to meet higher future costs, may not be required for a (micro) health insurance plan. Finally, maintaining a constant eye on cost data, and not delaying inevitable (but sometimes quite difficult) financing decisions based on this data, in terms of adjusting premiums or benefits under the scheme, will also play an important role in maintaining the viability of the scheme and its continued availability to the beneficiaries.

1.4. Balancing Benefit Packages and Financial Resources

The available financial resources are a major determinant of the range of benefits that can be offered under a (micro) health insurance plan. Such financial resources could be the contributions or premiums paid by the members of the scheme, any subsidies provided by government or donor funds available to the scheme and any gains or returns on these above-mentioned funds. In certain scheme designs, co-payments and user charges could also be designed in a way that these are not just
cost-containment mechanisms but also important sources of finance for the scheme. The benefit package on offer by a (micro) health insurance programme can be chosen from a range of possible services that could be offered to its intended beneficiaries. To illustrate a few, the choice ranges from consultation of traditional healer, primary care and preventive care services to specialist consultations, varying levels of inpatient care, maternity benefits, day surgery, medicines, laboratory and radiological examinations, dental care, ocular care, ambulance services, physician home visits, financial support for incidental expenses during illness in the form of a per diem or otherwise, and even support for loss of pay during periods of illness. Obviously, the planners of the scheme will need to choose the best fit and decide their own benefit package.

This best fit, of course, will depend on a multitude of factors other than the financing angle, including the perceived need of the community, the available health infrastructure, the alternative sources of healthcare for the community, available technology, available array of provider payment mechanisms, healthcare costs, rates of morbidity and utilisation of services, availability and costs of reinsurance and so on. However, the bottom-line will be what health priorities the scheme can afford to provide within the resources it can muster. This will require an iterative process of balancing desired benefits within affordable costs, the outcome of which should yield the best fit the planners had sought out to achieve. Again, the best fit is a dynamic process and can again be moved in either direction depending on scheme experience, changed aspirations and needs of the beneficiaries and changes in availability of finances, among others.