CHOOSING AN INSURER

This article is written totally under present Indian condition,but keeping an eye on the future, when there will be number of insurers,and this Modle can be applied to any condition where already number of insurers exists.

Back Ground of Indian Insurance Sector :

Life Insurance in its morden form came to India from England way back in 1818.The First insurance company on indian soil ,namely,the Oriental Life Insurance Company was started in Calcutta mainly by Europeans,to help widows of their community.

The year 1870 heralded the birth of first Indian Insurance Company ,the Bombay Mutual Life Assurance Society,which came into existence to cover Indian lives at normal rates.During the earlier period ,Indian lives were treated as sub-normal and loaded with extra premium of 15 to 20% .

After the failure of a number of insurance companies ,the British Government enacted for the first time the Insurance Act 1870.

During the decade 1945-55 ,as many as 25 insurers went into liquidation and equal number had to transfer their business to other companies.Even amongst companies continuing their business ,as many as 75 were unable to declare any bonus at their last 1953-54 Valuation.

On 19 Jan.1956 Govt. promulgated an Ordinance regarding life insurance .All life insurance companies ,Indian as well as Foreign ,doing business in India came under Government Management and control.On 1st sept.1956 Life Insurance Corporation of India (LIC) came into existence ,as a part of Nationalization which constituted 256 companies.

Since 1956,there are few bodies in addition to LIC which conduct Life Insurance activities in India .They are Postal Life Insurance ,Army Group Insurance Fund, & Naval and Air Force Life Insurance Fund .But the proportion of other life insurance over LIC is negligible.

INTRODUCTION:

It often happens that selection of life is done by life office but it seldom happens that insurers are chosen.Of course how it can be,when there are small number of insurer and in some cases there is a monopoly.

In the expectation of opening of insurance market and setting up of Interim Insurance Regulatory Authority gives the hope there will be competitive insurers in a coming time.

When several insurers work in a given environment,it is often a question for a potential 'would be' policy holder where to go and to whom to get insured.Uptill now this question did not arise due to monopoly and therefore

we do not have any measure of it.

Let us suppose that certain number of insurers are there,does it mean that all insurers are equally good just because Regulatory Authority is allowing to do the business.The answer is of course no.Potential policy holder must have an idea about the quality of insurer and variability between them.

Here an attempt has been made to measure the quality of the insurer and the variability between them ,so that it will be helpful for potential policy holder to choose its insurer according to their requirement.

WARNING:

One thing is clear that this analysis is being done from a point of view of a potential policy holder and Insurance Industry does not have any say in it except to improve their performance which should be reflected in their future data.

This analysis is done from a point of view of life area but can be applied in non-life area using same technique.

MODEL DEVELOPMENT:

We start with a very fundamental question which makes the axis of entire analysis.

WHAT IS THE POLICY HOLDER'S REASONABLE OR MINIMUM EXPECTATION FROM THE INSURER ?

He wants

--- a sound insurer
--- low premium rates
--- higher bonus rates
--- quick settlement of claims and maturity
--- efficient service

We consider one by one

A Sound Insurer :

Since life insurance contract is often of long term in nature ,it is essential to ensure that the financial health of insurer is sound i.e.he should have sufficient fund to meet his future liabilities as on any Valuation date.Valuation can be of many types viz. for Profit Reporting,Taxation,Statutory Solvency Valuation i.e. to demonstrate financial soundness to Regulator.

Judging the financial soundness is a very prime area of concern for Regulatory Authority , but we have taken claim over fund ratio as a measure.say COFR

$$COFR = \frac{\text{claim for the financial year dy death \& maturity including bonus}}{\text{Life fund of previous year}}$$

Let it takes the value 'a' i.e. COFR = a

The parameter which have been defined above says that ,if denominator is large as compared to numerator ,there is a likelihood that in future insurance company will be able to meet his Liabilities.

Another better measure which can be introduced is :

$$\frac{\text{Total Liability}}{\text{Total Life Fund or Assets}}$$

let its value be 'j'

Again quite intuitively ,smaller the ratio more sound the insurer is .Here ,Total Liability & Total Life Fund which have been arrived at for Valuation to declare bonus or profit.

Another measure which can be introduced is :

For the purpose of Statutory Solvency Valuation ,where one has to demonstrate financial soundness of the company , consider the following :

---- Value of assets as on any Valuation date has been arrived at.

---- all future cash flow(liabilities) is known i.e. maturities,expenses,expected bonus etc.

---- Mortality is same which have been used for profit reporting.

Now if we find yield from following equation of value

Value of Assets = Discounted value of all future cash flow (Liabilities) using rate of interest i & Mortality as mentioned above

It can be seen here that we are equating Assets & Liabilities as our purpose is not to show any surplus.let the yield of the above equation be : i_1 .Now if there are number of insurers in the market ,then one can judge from the value of i_1 of different insurers about their financial strength,as smaller the value of i_1 more sound the insurer is.

Low Premium Rates:

Premiums are calculated from following equation of value:

Present value of premiums = Present value of Benefits + present value of expenses

(Above equation includes rate of interest i & Mortality)
It is clear from above equation that as expenses goes up , the value of Premium will go up i.e. expenses has direct effect on Premium.

Low premium rates are possible when proportion of management expenses in premium is low, thus we have taken next parameter for study is management expenses over premium ratio,say MEOPR.

Let its value be 'b' i.e. MEOPR = b

Higher Bonus Rates :

Bonuses are arrived from surplus and surplus is the difference between Life Fund or Assets and Total Liabilities i.e.

Surplus = Life Fund - Total Liabilities

Surplus depend upon number factors, as it is a difference of two components .To have higher surplus ,Life fund should be higher and Liabilities should be low .

To have higher Life Fund .prudent investment is essential in different sector of economy.

Thus yield on the Life Fund should be higher ,which will make impact on the surplus.If 'i' is the yield on the life fund ,then we shall consider h = (1-i) as an indicator i.e.lower the value of 'h' better for policy holder.

Now to have higher surplus ,total liabilities should be less ,which is one of the function of expenses,lapses,surrenders,early claims etc.Expenses we have already considered .

Here,the further indicators can be

$$\text{Lapse Ratio} = \frac{\text{Lapse- Revival}}{\text{exiting policies or (total sum assured)}}$$

$$\text{Surrender Ratio} = \frac{\text{Number of policies surrendered during the year.}}{\text{Total number of policies at the end of year + numerator}}$$

$$\text{Early Claim Ratio} = \frac{\text{Claims which has arrived during the last two years of issue of policy}}{\text{Total number of existing policies + numerator}}$$

Quick settlement of claims and maturity :

After sales service is a sensitive topic from the point of view of clients.The prime object of life insurance is not mobilisation of savings of the community but providing succour to clients and their heirs when the contingency insured against arises.If risk is not to be covered insurance is meaningless .So , how fast are the claims settled is an important matter from the point of insured,thus parameter of study is Ratio of outstanding claim to claim payable ,ROCTCP i.e.Claim outstanding at the beginning of the year plus claims intimated during the year.

Let its value be 'c' i.e. ROCTCP = c

Efficient Service :

In the world of free flowing information one wants a very efficient service, as life contract is often of long term in nature. To determine this we have considered two variables:

a) Opinion of policy holder about the insurer.This will give view from outside.

If n people are asked to give their opinion,we shall keep only two option whether Satisfied or Not satisfied , and our parameter will be Satisfaction Ratio ,SR ,defined as

$$SR = \frac{\text{Not satisfied from insurer}}{\text{Total no. of people surveyed}}$$

Let its value be 'd' i.e. SR = d

b) the second variable is, Frustration level within the insurance office.This will give an inside view, and its measure will be Frustration Ratio,FR, defind as

$$FR = \frac{\text{No.of people not satisfied within organization which have been surveyed}}{\text{Total no. of people surveyed}}$$

Let its value be 'e' i.e. FR = e

OTHER PARAMETERS :

Other criteria can be
a) Annual procurement of business or New business

b) Quality of business in terms of its prisistency ,for this purpose there should relationship between business in force and new business i.e. first year s premiums income and renewal premium income.

All the parameters which haven chosen has a lot of saying in building up an insurer .If an insurer is not sound ,perhaps Regulator will not allow to do the business .Higher premium rates will result into low New Business .In the competitive market higher Bonus rates is one of the prime attraction and in order to sustain the pressure ,there should be competitive Bonus rates.

No body is going to take the policy if insurer takes years to settle the claim .

What we mean to say is that the parameters which has been taken up dipicts the position of an insurer and its value is quit sensitive in terms of overall position of insurer.

ASSUMPTION : ALL PARAMETER HAS EQUAL WEIGHTS

Though there is some inter relationship between parameters mentioned above ,but we have assumed it to be independent for the sake of simplicity, otherwise model would have been very complex.

Thus our parameters are (a,b,c,d,e,).All the parameters are set in such a way that minimum the ratio, better for the policy holder.

For generalization .consider a general case i.e.there are 'm' parameters,say

$$(a_1, a_2, a_3, \ldots\ldots, a_m)$$

The general case have been considered so that more parameters can be considered than what we have taken.

Let us further suppose that there are 'n' insurers in the given environment and the value of the parameters for i'th insurer is

$$a_1 = a_{1i}, \quad a_2 = a_{2i} \quad \ldots\ldots\ldots\ldots \quad a_m = a_{mi}$$

for all i=1,2,3,....n

Now consider m dimensional space and each insurer has a set of point $(a_{1i}, a_{2i}, \ldots\ldots\ldots, a_{mi})$ for all i=1,2,...n

representing their position in m dimensional space .

The distance from origin of ith insurer is

$$d_i = (a_{1i}^2 + a_{2i}^2 + a_{3i}^2 + \ldots\ldots + a_{mi}^2)^{1/2} \quad \text{for all } i=1,2...n$$

Since the parameter are set in such a way that minimum the ratio ,better it is for policy holder,thus the insurer having the minimum distance from origin is best from a point of view of policy holder, the distance of n insurers will be

$$d_1, d_2, d_3, \ldots\ldots\ldots d_n$$

and they can be ranked in order of minimum magnitude.

Variability Between Insurer :

Now we are interested in the study of variability between insurers,the variability between ith and jth insurer is the distance between them which is

$$V_{ij} = [(a_{1i} - a_{1j})^2 + (a_{2i} - a_{2j})^2 + \ldots\ldots + (a_{mi} - a_{mj})^2]^{1/2}$$

when $i \neq j$ & $i = 1,2,\ldots\ldots n$, $j = 1,2,\ldots n$

the larger the distance ,greater the variability between the insurer and vice versa.

If all the n insurers are quite close to each other, we expect the value of V_{ij} for all i & j will revolve around a particular ij point.

This will give a crude variability between insurers.

Now, we look at it from another angle.Since,we are interested in knowing the compactness of n points in m dimensional space,this is equivalent to studying the compactness of $d'_i s$ for all i=1,2,...n , (with the assumption that permutation and combination of same co ordinates is not possible for different insurer) the distances of n points from origin.

Let $d'_i s$ follows Normal distribution with population Mean as μ_d and variance σ^2_d ,then 95% confidence interval of μ_d is

$$\bar{d} + 1.96 \frac{s_d}{n^{1/2}}$$

where $\bar{d}$ is sample mean and s_d is sample standard deviation

<u>One question which arises here is if d_i does not follow Normal Distribution ?</u>

It actually depends upon type of environment is given.If large number of insurers are working in a well developed economy for very long period ,then, it is expected that value of d_i will cluster around a particular point and Normal Distribution will be quite safe assumption.

If few new insurers enter in a well developed market ,then he has to struggle very hard to keep pace with other insurer and most likely it will be on the right tail of the distribution.

Now, if a large number of insurers enter into a monopoly market where two third is a very experienced insurer and one third is a new one ,in such case the distribution will be PLATYKURTIC (i.e. much flatter than Normal curve) and skewed to right ,but with the progress of time ,this may become Normal i.e those on the right tail will start joining the cluster.But if there is a large difference in technical skill between one set of insurer and other,then distribution will be skewed,and it will be positive if proportion of skilled insurers is high and vice versa.

But in order to ascertain the exact nature of distribution ,distribution of d_i can be fitted and checked provided there are large number of insurers as in case of pre 1956 period of India where 256 insurers were there,and then one can find 95% confidence interval.

Now our interest is in those d_i's which does not lie in the above confidence interval.This can be said as,we are interested in testing representative sample of population, and a sample containing larger deviation which are not representative of the population i.e.we want those d_i's which lie out side confidence interval are outlier can be rejected or not.

CHAUVENET'S CRITERION FOR REJECTION OF OUTLIER

Let n be the size of sample and

x_m = Greatest or Smallest Value in the sample

s = Sample Standard deviation

$\bar{x}$ = Sample Mean

An outlier is rejected if calculated value of following Statistics

$$\frac{|x_m - \bar{x}|}{s}$$

exceeds the table value.(such tables are available in certain books).For testing outliers one may adopt NAIR'S or DIXON-TYPE TEST.

Once we are in a position to reject the outlier,it immediately implies, that particular insurer will not be in the cluster of points in m dimensional space and the distance of this insurer from origin will be maximum or minimum and most probably it will be ranked last or first in the list n insurers.
It is because, if the outlier has maximum distance from origin and ranked last in the list of insurers , then it means that this outlier is on the right tail of the distribution.Similarly,the one with minimum distance and ranked first ,will be on left tail of the distribution.

The relation between V_{ij}'s and outlier is that .if distance between any two insures are large as comoared to other distances i.e. V_{ij}'s ,then we expect that one of the insurer will either be outlier or be on the boundary of confidence interval.

APPLICATION OF THE MODEL :

As we have already said that not many insurers are there in life area in India at present .We have taken data of (Life Insurance Corporation of India ,LICI) for the year 1991-92,1992-93,1993-94 given in table diary of the year 1994,1995. Let us consider these three years data as it is coming from three different insurers,say LIC1, LIC2, LIC3 and we would like to study the standing of three organization and variability between them.

LIC 1:

COFR = a = 0.076

MEOPR = b = 0.2227

ROCTCP = c =0.055

Since survey is not conducted ,therefore , we are not using SR & FR

LIC 2:

COFR = a = 0.079

MEOPR = b = 0.2289

ROCTCP = c = 0.0527

LIC 3:

CDFR = a = 0.082

MEDFR = b = 0.2183

ROCTCF = c = 0.0486

Co ordinates of three insurers are LIC 1 (0.076,0.2227,.055) LIC 2 (0.079,0.2289,0.0527) LIC 3 (0.082,0.2183,0.0486) in three dimensional space.

First we would like to see the standing of three insurers by finding the distances of points from origin,which is

$$d_i = (a_i^2 + a_i^2 + a_i^2)^{1/2}$$

It gives $d_1 = 0.2416532$, $d_2 = 0.2478174$, $d_3 = 0.2382033$

Clearly, the standing of three organization is

LIC 3 ,LIC 1, LIC 2 ..... (A)

Now we would like to find the variability between

(LIC 1 , LIC 2), (LIC 1 , LIC 3), (LIC 2 ,LIC 3)

these will be V_{12} , V_{13} , V_{23}

V_{12} = 0.0072615

V_{13} = 0.0090142

V_{23} = 0.011/545

It can be easily seen that (LIC 1 & LIC 2) is closest followed by (LIC 1 & LIC 3) and (LIC 2 & LIC 3) is farthest,which confirms (A) that LIC 3 and LIC 2 are distant apart.

Now we are interested in finding the outlier if any,thus the 95% confidence interval of μ_d is

(0.2370464,0.2480693)

d_1 , d_2 , d_3 lie in the confidence interval and we are not required to test for outlier here.But it is interesting to that d_3 is on the left tail and d_2 on right tail.

We conclude that d_i's give the position of three insurers and variability between them is within limit.It will be seen later how ranks of d_i's and variability V_{ij} helps in Choosing the insurers.

Regarding the reliability of the above result , it can be noted that the actual Gross yield on the life fund is,for LIC3 :12.43% ,

LIC1 :11..95 , LIC2 :11.56 for three years which proves that above result which we have calculated is consistent and relied upon.

Now let us suppose that we increase the number of parameters from 3 to 5 i.e. adding two more parameters h=(1-i) and

j = (Liability)/Assets as defined earlier.

Now consider the co ordinates of
LIC1 (0.076,0.2227,0.055,0.8805,0.9392)
LIC2 (0.079,0.2289,0.0527,0.8844,0.9422)
LIC3 (0.082,0.2183,0.0486,0.8757,0.9436)

Calculated distances are

$d_1 = 1.3098753$

$d_2 = 1.3157955$

$d_3 = 1.3091876$

It can be seen that ranks are d_3 ,d_1 ,d_2
i.e.(LIC3,LIC1,LIC2)

Variation between the Parameters are :

$V_{12} = 0.0087715$

$V_{13} = 0.0117779$

$V_{23} = 0.0146908$

Though, the order of rank and variation is same ,it can be noted that with the addition of extra components,the variability between the insurers has increased i.e. earlier we had a very compact packing which has now loosened up.

Consider the matrix of parameter values for each insurers.insurers are arranged in descending order.

	a	b	c	h	j
d_3 = LIC3	0.082	0.2183	0.0486	0.8757	0.9436
d_1 = LIC1	0.076	0.2227	0.055	0.8805	0.9392
d_2 = LIC2	0.079	0.2289	0.0527	0.8844	0.9422

It can be seen from above that every insurer has its own merit in some or other areas.NOW,ONE OF THE MOST CRITICAL QUESTION IS ,HOW INSURABLE POPULATION WILL ABLE TO CHOSE HIS INSURER.
It is true that the insurer which are being ranked ,they give an overall position but still those insurer which are in the middle of the list ,have an edge over other competitor and may attract certain section of society.It can be seen that LIC3 is ranked 1st ,but in terms of soundness it can be seen from the value of 'a & j' that LIC1 & LIC2 stands better.

So,it remains to be answered that how the insurable population will chose his insurer.

For choosing the insurer we have to look into the Economy of the given population , as it will dictate the choice of the parameter .

In the given economy different section of society will have different weights for different parameters.For example,if the economy (Like in India) is divided into three section viz.Upper,Middle and Poor class ,then different section will have different WEIGHTS for different parameters.

Say Upper class will have following taste

- ------ they are not bothered about Premiums rates
- ------ they are very particular about efficient service
- ------ they are ready to take risk
- ------ there may be several other factors which can come out through opinion poll.

Middle class will have :

- ------ they want premiums should be in range
- ----- they may afford middle level service
- ---- they may not afford to take risk
- ----- plus several other factors which can come out through opinion poll.

Poor Class will have :

- ----- they want premiums should be low.
- ---- they are not much bothered about service.
- ----- they are not at all ready to take risk
- ---- plus several other factors which can come out through opinion poll.

CRITERIA FOR CHOOSING INSURER

Consider a matrix called CHOOSING MATRIX where parameter values are are arranged in descending order i.e. best values are in first row ,next in second row ,followed upto last row.

Steps for choosing is as follows :

Step 1 :

Choose the value parameter from choosing matrix.

Step 2:

Identify the insurer, from which, chosen value of parameter has come.Remove any outlier which is on the right tail i.e maximum distance from origin, immediately if any.

Step 3:

Once insurers are identified ,there are number of possibilities :

a) All parameter values are coming from different insurers.

b) Some parameter values are coming from common insurers.

c) It is possible that in the choice ,only one value is from particular insurer and rest of the values are from some common insurers.

Note : It should be remembered that choice of parameter values indicates the weights or preference for particular type of satisfaction for each parameter

d) Various permutation and combination of choice of parameter is possible which is not be possible to discuss here all.

Step 4: This is a follow up of step 3

Now if all parameter values are coming from different insurer,then best possible option is to pick the one which are on the top of the rank among the chosen insurers.

Now , if we have common insurer for a chosen value of parameter ,for example,

Let us assume that there are 13 parameters and say 10 insurers.

Chosen Value of parameters are

Parameter Values :	Insurer Name from which: parameter value has come
a,b,c,	Ins.1
d,e	Ins.2
f,g,h	Ins.7
i,m	Ins.8
k,l,m	Ins.5

Since choice indicates the weights ,it can be seen that Ins.1,Ins.7 and Ins.5 have 3 parameters each.Now see the distance of each of three insurers(i.e. ranks) and also the variability between these three insurers.Choose the one which has higher rank and minimum variability i.e. we have to chose between Ins.1,7,& 5.Obvious choice can be the one which are on top of the list among three,but variability between Ins.1,7,&5 should also be seen as it will reflect the deviation between them and if deviation is high ,the one with higher rank can be chosen.

So the rule can be

1) Identify the insurer who has maximum number of parameters in the choice.
2) Chose the one which has minimum distance.
3) Further identify other insurers which are in the vicinity.
4) Choose on the basis of rank and variability.

Now consider the **CHOOSING MATRIX** for example where parameter values are arranged as described i.e.best values of parameter are arranged in first row ,followed by next in second row and so on.

Here under the value of parameter ,name of insurer is given but in real situation,name of insurer will not be shown as it can give biasdness.

a	b	c	h	j
0.076 (LIC1)	0.2183 (LIC3)	0.0486 (LIC3)	0.8757 (LIC3)	0.9392 (LIC3)
0.079 (LIC2)	0.2227 (LIC1)	0.0527 (LIC2)	0.8805 (LIC1)	0.9422 (LIC2)
0.082 (LIC3)	0.2289 (LIC2)	0.055 (LIC1)	0.8844 (LIC2)	0.9436 (LIC1)

Step:1

Let us suppose that an individual opts for best value i.e. first row

Step 2:

since here options are very limited with only total of three insurers.In this choice ,the option is between LIC1 & LIC3and no outlier is there ,then from the list of ranked insurers ,he can opt for insurer LIC3 but if the variability between insurers V is small ,option of LIC1 can be thought of.Here the best option is LIC3.

Let us suppose that another person opts for second row.Here parameter values 'b & h ' are coming from LIC1 and 'a,c,j ' are coming from LIC2.Here it indicates that weights of the individual is for 'a,c,& j' which are clearly reflects that his choice is LIC2 where as its rank is last.Here it can be said that LIC1 is ranked higher but looking at weights and small variability between LIC1 & LIC2 (V) LIC2 is a right choice.

12

Now further suppose that another individual opts for the third row.Here

'c & i'is from LIC1
'b & h'is from LIC2
' a ' is from LIC3

Clearly,our choice is between LIC1 & LIC2 ,since both insurers have two parameters each.Since LIC1 is ranked higher than LIC2 and variability between them is small,therefore, LIC1 is a right choice.