ON A FORM OF AUTOMOBILE LIABILITY INSURANCE WITH A PREPAID DISCOUNT

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1. Recently two types of insurance policy covering automobile liability* have become available. With this kind of policy, the insured party receives a prepaid discount on the annual premium; however, he must make an additional payment to the insurer on first report of an accident.

We shall examine only one of these two types of policy, since the second is very similar to the first.

On stipulation of the contract, the insured party pays a premium equal to 78 percent of that currently in force for complete coverage, depending on the various limits. However, at the same time at which the insured reports his first accident in the course of the year (and only in this case), he must make an additional payment equal to 35 percent of the premium due in the case of complete coverage. This additional payment, considered as a deposit, is repaid to the insured party if the accident has no follow up within four months; however, it may be requested again by the insurer if the case is subsequently reopened and leads to payment of damages. This additional payment will thus become a part of the premium only in the case of payment of damages for the first accident reported.

In this way, the premium paid by the insured is equal to 78 percent or to 113 percent of the current premium, depending on whether or not the insured reports accidents.

2. Let us consider an insurance policy for complete coverage, excepting limits, and let us assume that

P = insurance premium
M = quota necessary to cover purchase and administrative expenses and profits
S = pure premium, i.e., the quota necessary to cover accident payments.

Therefore, premium P can be expressed as $P = M + S$.

In Italy, if the insurance premium is equal to 100, the part covering pure premium S is equal to 75 lire.

* In Italy termed R.C.A., or "Responsabilità Civile Auto".

On this basis let us now analyze the prepaid discount policy and the integration of the premium at first report of an accident.

We shall indicate by

q : the probability that the insured has no accident during the insurance period

p_1: the probability that the insured has at least one accident but reports none

p_2: the probability that the insured has at least one reported accident.

Obviously $q + p_1 + p_2 = 1$.

We shall further indicate by:

S_1 the average cost of unreported accidents for each insured party
S_2 the average cost of reported accidents for each insured party.

Therefore

$$S_1 + S_2 = S = 75.$$

We note that the accidents leading to average accident S_1 are not only those whose probability is p_1, but also some cases included in probability p_2, because the insured party might not report a first accident and subsequently report another more serious accident.

We shall indicate by M_1 the margin for expenses and profits relative to the prepaid discount policy. This can be expressed by:

$$1)\ M_1 = 78\,(p_1 + q) + 113p_2 - S_2$$

and thus, considering that

$$S_2 = 75 - S_1$$

we have

$$2)\ M_1 = 3 + 35p_2 + S_1.$$

If we overlook the differences in expenses between a normal policy and a prepaid discount one (in fact, in the former consideration must be given to possibly greater administrative costs due to considering all accidents and in the latter to the possibly greater administrative costs due to considering the double payment of the premium), from a technical point of view, an insurer will benefit by offering a prepaid discount policy rather than a complete coverage policy if the margin for expenses and profit of the discounted policy is greater than the margin for a complete coverage policy, i.e., if

$$M_1 \geqslant M = 25.$$

Let us now determine the value of M_1 based on A.N.I.A.* statistics for automobile accidents.

In order to determine margin M_1 it is necessary to make several hypotheses concerning the behavior of the insured parties in the presence of accidents that may or may not be reported. In fact, probabilities p_1 and p_2 depend on the insured party's greater or lesser inclination to report minor accidents.

Let us calculate this margin on the basis of the following hypotheses:

a) All insured parties stipulate prepaid discount policies and report all accidents regardless of their amount. In this case, probability p_2 will be equal to the probability that the insured has at least one accident, and this probability will be slightly less than the frequency of accidents (in fact, some insured parties may cause and report several accidents during the period considered).

This frequency, on the basis of A.N.I.A. automobile statistics, was equal to 33.35% in 1972 and 32.37% in 1973.

These values include settled and unsettled accident cases over the year, and thus include also accident cases that may prove to have no follow up in subsequent years.

Value S_1 is equal to zero, since, for the hypotheses made, all accidents are reported.

Then the margin for expenses and insurer's profits, on the basis of hypothesis (a) and relative to 1973 data, is

$$M_1 \leqslant 3 + 35 \cdot 0.3237 = 14.33$$

which proves to be less than margin $M = 25$ which the insurer obtains in the case of a normal policy.

Hence the insurer, on the basis of these hypotheses and from a technical point of view, would have no interest in offering prepaid discount policies.

b) Let us now hypothesize that all insured parties stipulate prepaid discount policies, but that they report accidents only if they have already reported at least one other previous accident, or, if not, if the first accident represents a presumable value greater than 70,000 lire, which value, being exclusive of the technical expenses of verification and settlement, would become approximately 100,000 lire should the insurer have to pay damages.

In this case, p_2 will prove to be slightly less than the frequency

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* A.N.I.A.: Associazione Nazionale tra le Imprese Assicuratrici (National Association of Insurance Companies).

of accidents greater or equal to 100,000 lire, which, on the basis of A.N.I.A. statistics, proved to be 26.01% in 1972 and 28.63% in 1973.

Average cost S_1 of unreported accidents, i.e., of those accidents causing damages of less than 100,000 not preceded by accidents causing damages greater than or equal to 100,000 lire, is obviously slightly less (the difference can be overlooked) than the average cost of accidents having a value of less than 100,000 lire. This average cost, on the basis of A.N.I.A. statistics, for each 75 lire of pure premium, was equal to 16.69 lire in 1972 and 15.11 lire in 1973.

In this case, on the basis of A.N.I.A. statistics for 1973, margin M_1 for the insurer will be

$$M_1 \leqslant 3 + 35 - 0.2863 + 15.11 = 28.13.$$

Consequently, the insurer might benefit technically be offering prepaid discount policies, since it is probable that $M_1 \geqslant M = 25$.

The insured having the possibility of choosing between complete coverage policies and prepaid discount policies, we note that those who select the latter are those who expect to have fewer accidents than the majority of automobile drivers, i.e., those for whom probability p_2 should be lower than the probability deduced from the A.N.I.A. statistics.

It is obvious that in this case margin M_1 obtained by the company is still lower than that which it would obtain if all insured parties held prepaid discount policies.

We note moreover that, if all insured parties decide to report accidents having a value of less than the additional payment, which is 35% of the premium, then the hypotheses for case (b) refer only to those insured parties who pay a premium for the entire insurance coverage greater than 200,000 lire, and this group includes only a minority of insured parties.

Unfortunately, it has not been possible to study cases of the type given in hypotheses (b) where the limit of 70,000 lire for unreported accidents is lowered. In fact, in the A.N.I.A. statistics of accident number by value, the first class considered is that of accidents having a value of up to 100,000 lire.

The considerations set forth so far refer to a case in which all the insurance companies offer exclusively the conditional discount policy in place of the normal policy. We can note that, should all the companies offer a choice between a conditional discount policy and a normal policy, there would be a selection of the insured parties choosing the discount policy.

These insured parties would obviously be those who expected to gain by this type of policy, i.e., those who expect to cause on an average fewer accidents in the course of the year than the majority of automobile drivers. Consequently, for these drivers, the value of probability p_2^* of having at least one reported accident is less than corresponding value p_2 for the majority of the insured. From this, substituting in (2) value p_2^* for value p_2, we obtain a margin $M_1^* < M_1$.

Moreover, with the transfer of the "good" insured parties from a normal policy to a discounted policy, there is a prior selection of the insured who continue to use a normal policy; and therefore pure premium S may not be sufficient to cover the accidents of the normal policies, and thus margin M would have to be lowered as well.

In a case where a single company (or a limited number of companies) offered the conditional discount policy as an alternative to the normal policy, while the conditions we have just described for a case where all companies offered both types of policy would still hold, we can note that there would be a request for discount policies also on the part of "good" insured parties who previously held normal policies with other companies; and thus the company (or companies) offering the prepaid discount policy would show an increase in business.