IMPACT OF INSURANCE LIBERALISATION ON SAVINGS: IMPLICATIONS FOR REGULATION OF THE INSURANCE INDUSTRY IN INDIA

Dissertation submitted to Jawaharlal Nehru University
in partial fulfillment of the requirements
for the award of the degree of

MASTER OF PHILOSOPHY

BY

ANINDYA DASGUPTA

CENTRE FOR ECONOMIC STUDIES AND PLANNING
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI
2002

CENTRE FOR ECONOMIC STUDIES & PLANNING
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY

New Campus
NEW DELHI - 110 0[redacted]

July 2002

CERTIFICATE

This is to certify that the dissertation entitled **IMPACT OF INSURANCE LIBERALISATION ON SAVINGS: IMPLICATIONS FOR REGULATION OF THE INSURANCE INDUSTRY IN INDIA** submitted by me in partial fulfilment of the requirements for the award of **MASTER OF PHILOSOPHY** has not been previously submitted for any other degree of this or any other University.

(ANINDYA DASGUPTA)

We recommend that this dissertation be placed before the examiners for evaluation.

PROF. D.N. RAO
(SUPERVISOR)

PROF. C.P. CHANDRASEKHAR
(CHAIRPERSON)

Phone : 6107676, 6167557, Ext. : 2421, 6105197 Cable : JAYENU Telex : 031-73167 JNU Fax : (011) 6165886, 6198234

This work is dedicated to

-- my Mother, Father,

Dada, Mourani

and Anik

CONTENTS

ACKNOWLEDGEMENT

Involvement with research has been an intellectually stimulating experience. At this juncture, I would take some time off to express my gratitude for individuals I've got indebted to during the course of this endeavour. Firstly, I would like to thank my supervisor, Professor D.N. Rao for always being there, setting the direction of this work. He has been an extremely understanding person providing me with abundant time and space to raise my capabilities to the level that research work naturally demands.

I have also benefited from intellectual inputs provided by Samiranda and Jyotirmoy, and source materials sent by Ashish – without which this work might not have been possible. Thanks are also due to Rajaji for word-processing my document.

Some institutions and libraries – the JNU library, the Ratan Tata Library, NIPFP – have helped me collect much of the source materials and thanks are due to them.

Here, I must mention that friends have always been the best of my possessions. Some in JNU – Raja, Galu, Bishu, Arijitda, Indrada, Sankhada, Ranjanda, Pritam, Wanshai, Surajit, Kunduda, Munna, Babu, Samik, Bantuda, Arnab, Sugato, Rhiju, Arka, Ranveer, Irfan, Rajeev, Ayu, Subho, Malini, Lopita, Sunita, Chandu, Amy, Ishani, Doel, Keya, Sona, Bonnie, Kim, Prosenda, Champuda, Abhijitda, Binu, Andy, Prasun, Nilanjan – to mention a few, have turned this liveable place into a loveable one. Without their encouragement, this work would not have been possible.

Finally, I must say that my parents and my brother, Indranil have always put immense faith in me to take on any challenge in life. Everything I create is more their's than mine.

(ANINDYA DASGUPTA)

CHAPTER I

INTRODUCTION

Closely linked to the liberalization of production sectors in India, are the gradual reforms in the financial sector. That necessarily means market forces determine prices, interest rates and allocation of credit. When the price controls are lifted, the illusion of low risk that goes with fixed prices is absent, a regime with steady price volatility comes about, and the infrequent large shocks do not take place. Though steady price volatility is often unpopular for reasons of unfamiliarity in a climate of immature risk management techniques and thus often generates political pressure to oppose reforms, it should be accepted that the movement of prices is the central response to change in a market economy, and it fosters competition. The associated risks have to be dealt with modern tools of risk management like diversification, insurance and derivatives. In India, given the low level of coverage of the insurable population, and of virtual absence of many insurance products viz. in health, old-age pensions, household property and casualty sectors – it may be accepted that market institutions which offer insurance are highly underdeveloped. In such a system, therefore, a large section of the insurable population saves for the rainy day. In a more formal economic sense, this means that they make some precautionary savings to guard against the uncertain occurrences of 'bad states' that involve income losses – in a variety of ways. Given such precautionary savings behaviour, there is no mystery over the existence of an implicit demand for insurance contracts. Most people would like to avoid having to take costly precautions against eventualities that might never arise if supply of insurance in the market is forthcoming at an affordable price. This is one of the major challenges of insurance liberalization in India which began in 1999 with the passage of the IRDA bill creating conditions to break away from a state owned quasi-monopoly regime. If the process is effective, it might

lead to significant changes in people's savings behaviour, whereby higher levels of welfare can be attained. However, whether such an expectation actually materializes would depend, *inter alia,* on the functioning and effectiveness of the regulatory institution, the IRDA – given the responsibilities it assumes in the face of an industry, the nature of which is undergoing significant changes in open markets.

Now, theoretical literature points out that the business of insurance markets are especially vulnerable to market failure, and the case for government intervention has been highlighted. Opinion on the degree to which state intervention would be appropriate, however, varies. For the uninitiated reader, it must be pointed that informational asymmetries create significant barriers to risk trading in the market. These particularly include the 'moral hazard' and the 'adverse selection' problems. Moral hazard relates to a tendency that demonstrates that as an individual's insurance coverage rises, his incentive to take care diminishes. Adverse selection, on the other hand, refers to a problem where good risks drop out of the market as premiums are raised to cover the payouts that must be made to the observationally identical bad risks. Both of these problems affect the conditions for equilibrium in the insurance market. In this work, I would not, however, focus on the problems of equilibria in the insurance market. Rather, a less researched area viz. the interdependence of insurance and savings decisions would be focused on. The transitionary phase in the Indian insurance market provides a rich setting to explore into this area. To examine how the incentive to insure affects the motive of an individual to serve precautionarily, it is necessary to deal with his given risk situation closely. That involves consideration of a number of factors such as the probability of occurrence of the loss situation (i.e. the 'bad state'), how saving affects the

intensity of the 'bad state', choices available to the individual when he goes to the market – to mention a few. The indications obtained are also dependent on the framework used to analyse the individual's problem of making a decision under risk. A survey of the insurance literature clearly indicates that expected utility theory has been the most widely used model of decisions making under uncertainty since its classic statement by Von Neumann and Morgenstern. Now, whether expected utility theory is consistent with individual behaviour is a question that has received considerable attention by economists, marketing scientists and psychologists. Intuitively stimulating alternatives, viz. the prospect theory, has been suggested at times – to make the theory more consistent with observed phenomena. On the other hand, observed behaviour has often been assimilated into the expected utility framework by relaxation of certain restrictive assumptions. Thus, the expected utility theory still serves as a basic model to analyse different aspects of insurance bahaviour.

Objective and Plan of Study:

The preceding discussion already provides an indication to the objective of my study. I focus my work on the interdependence of saving and insurance decisions and particularly analyse the expected changes in individuals' savings behaviour as a result of insurance liberalization. Furthermore, to make liberalization beneficial for the individual in welfare terms, and for the economy as a whole, I highlight the lessons that we can draw from recent experiences of insurance markets in open regimes. The regulatory issues involved here are discussed at length. To make things clear to the reader, I move according to a plan. In the next chapter, I make a comprehensive survey of the literature

that examines the individual's incentive to insure and other aspects of rational insurance purchasing. Theoretical findings under alternate decision paradigms that contrast each other are highlighted. I introduce the Ehrlich and Baker framework to examine the conditions for the introduction of the market insurance option and how insurance reforms (in two stylized forms) in India would affect savings behaviour in the economy. The penultimate chapter (IV) that focuses on the implications for regulation of the insurance industry is divided into two sections. The first one gives a brief picture of the insurance industry as it has evolved, and the problems and prospects are presented. In the second section, I discuss the regulatory issues that are gaining in importance given the changing nature of the global insurance industry. Chapter V summarises my work and serves as a conclusion.

CHAPTER – II

ASPECTS OF RATIONAL INSURANCE PURCHASING

Almost every phase of economic behaviour is directly or indirectly affected by the phenomenon of uncertainty. To mitigate the influence of uncertainty, the economic system has devised means that facilitate the reallocation of risk among individuals and firms. The most apparent and familiar form for shifting risks is the ordinary insurance policy. Under the ordinary insurance contract, risk is traded between the insurer (the seller of the insurance policy) and the insured (the purchaser of the policy). In most simplest of contracts, the insured pays a fixed premium `P' to avoid the small probability `π' of incurring a large loss, L. Ignoring loading charges (administrative costs associated with writing and overseeing the insurance contract), this premium `P' may be set equal to the actuarial value of the loss plus an amount `c' , the compensation to the insurer for assuming the risk, i.e.,

$$P = \pi L + (1-\pi)\, 0 + c = \pi L + c \qquad (1)$$

Such a policy is advantageous to both the insured and the insurer. The insured agent possesses a concave utility function and is therefore eager to pay `P' to dispense with the risk. The insurance company is able to pool independent risks and via the law of large numbers of converts' risky contracts into almost `sure' things. First generation insurance decision analyses can be chiefly divided into two categories – one in which the insurance policy was exogenously specified and the other in which the optimal insurance policy is derived endogenously considering the objective functions of both the insured and the insurer.

The incentive to insure and insurance decisions have been treated extensively by Gould (1969), Jan Mossin (1968) and Vernon Smith (1968). They analysed the problem of rational insurance purchasing from the point of view of an individual facing a specific

risk, given his wealth level and preference structure. In their analysis, the individual is offered an insurance policy specifying the payment to be received from the insurance company if a particular loss occurs. The individual may choose the level of the deductible[1], the level of the maximum limit of coverage, or the fraction of the total risk insured. Since the premium 'P' paid by the individual is directly related to the features chosen, the optimal insurance coverage involves balancing the effects of additional premium against the effects of additional coverage. In this approach, the terms of the policy are assumed to be exogenously specified and are imposed on the insurance purchaser.

A brief outline of Mossin's findings:

Mossin explores the decision problem for an individual with a given risk situation and wealth endowment, whether he should buy some insurance coverage and, if so, by how much. He uses the absolute risk aversion (in Arrow-Pratt sense) as defined as

$$R_a(Y) = \frac{-u''(Y)}{u'(Y)}, \qquad (2)$$

where u is a utility function representing preferences over alternative levels of wealth (or net worth) 'Y'. The risk aversion function is clearly uniquely determined by this preference ordering and contains all essential information about the utility function. Arrow also advanced the hypothesis of R_a as a decreasing function of wealth. Now, Mossin primarily explores the wealth effect on the propensity to take insurance coverage on a piece of property of value L which is subject to damage of one sort or another. He has used a state preference approach in an expected utility framework. The piece of

property is either completely damaged (the loss amounting to L) with a probability of damage π, or suffers no damage at all. He also considers that the individual owns other assets worth A.

Maximum acceptable premium:

Now, the first problem he explores is the maximum acceptable premium 'P', the individual is willing to pay for purchasing a policy that provides full coverage. The condition readily appears as:

$$\pi(u)\,(A) + (1-\pi)\,u\,(A+L) = u\,(A+L-P) \qquad (3)$$

When general risk aversion is assumed ($u'' < O$), it becomes clear that the maximum premium exceeds the actuarial value of the loss ($P > \pi L$). Differentiating equation (3), applying elementary mathematical manipulations and using the monotonically decreasing function R_a, he proves proposition (1) that "If the individual has decreasing risk aversion, then the maximum acceptable premium is lower the larger his wealth".

Optimal coverage at given premium:

Now, allowing the insurer to charge a given premium rate 'p', the individual is allowed to specify the desired amount of coverage C, where $O \leq C \leq L$ (over-insurance i.e. gambling with another source is ruled out under ordinary insurance practice). In this situation, both the premium paid, and the compensation from the company in case of damage will also be in proportion to c. Now if a partial damage of size X occurs, individual's final wealth will be a random variable,

$$Y = A + L - X + C/L\,X - p.C \qquad (4)$$

and the problem is to maximize E(U(Y)) subject to the condition $O \leq C \leq L$. While the second derivative ensures a unique maximum point, proposition (II) is obtained from the first order optimization condition. It says that "if the premium is actuarially unfavourable [i.e. $p\ L > E(x)$], then it will never be optimal to take full coverage". Thus, under conditions of risk aversion, and with an unfavourable premium, the condition $C \leq L$ will not be binding. While explaining the discrepancy between the optimal and full coverage, Mossin further explores the wealth effect in his model and proves proposition (III) that "if the individual has decreasing risk aversion, then the optimal coverage is lower the larger his wealth".

Rational insurance purchasing in a policy option with a deductible clause:

A contract with a deductible fixes a certain amount D (the amount deductible) such that in the event of a damage, the insured agent covers the first D units or part thereof himself, while the company covers any excess. Such arrangements characterize many insurance products in medical insurance and auto collision policies. Certain aspects of this problem have been investigated by Pashigan, Schkade and Menefee. Deductible clause in insurance policies exist due to multiple reasons viz. the non-negativity constraint on the transfer from the insurer to the insured, the variable insurance cost and containing post-purchase changes in attitudes towards risk by the insured like those captured under the moral hazard problem. Mossin investigates the problem of purchase of an optimal deductible amount. He assumes that the premium will depend upon the amount of deductible chosen; specifically such that

$$P(D) = (1 + \lambda)\, E(w),$$

where w is the random compensation that the company pays, E(w) is the net premium and $\lambda E(w)$ the loading.

Further, if the amount of damage variable 'X' is assumed to be continuous with a density f(x), then the expected utility of final wealth for the individual is:

$$E[U(Y)] = \int_{0}^{D} U(A - p - x)f(x)dx + U(A - p - D)\int_{D}^{\infty} f(x)dx \qquad (5)$$

The optimal D is the one which maximizes this expression.

The optimization exercise provides the result that some finite, positive amount deductible will always be optimal, because at D = 0, the first derivative is:

$$\frac{dE[U(Y)]}{dD}\Big|_{D=0} = \lambda U'[A - (1+\lambda)E(X)] \qquad (5b)$$

which is positive for any positive loading factor, λ. Assuming that the optimal amount of deductible D, is finite, Mossin proves his proposition (IV) "If the individual has decreasing risk aversion, the optimal amount deductible is larger the larger his wealth". Thus, Gould, Mossin and Smith discussed in length the incentive to insure using the decreasing risk aversion function as a tool within the expected utility decision framework.

The Arrow-Borch-Raviv framework:

Another stream of first generation original research on the economics of insurance was conducted by Arrow (1971) and Borch (1968). Borch (1968) was the first to take the more general approach of deriving the optimal insurance policy form endogenously. He

sought to characterize a Pareto optimal risk sharing arrangement in a situation where several risk averters were to bear a stochastic loss. This framework was then used by Arrow (1971) to obtain Pareto optimal policies in two distinct cases: (i) if the insurance seller is risk averse, the insured prefers a policy that involves some element of co-insurance (i.e. the coverage, C will be some fraction of the loss X, or, $C/X < 1$); and (ii) if the premium is based on the actuarial value of the policy plus a proportional loading (i.e. the insurer is risk neutral) and the insurance compensation is restricted to be non-negative, the insurance policy will extend full coverage of losses above a deductible, D. Arrow (1973) extended this result to the case of state dependent utility functions. In this case, the optimality of a deductible which depends upon the state was proved. Robert Wilson also dealt with the endogenous determination of optimal risk sharing arrangements, focusing on the incentive problem and the existence of surrogate functions. Arrow's results were developed more fully by Artur Raviv (1979). They assert that policies with deductibles are preferred by risk-averse insurers over actuarially equivalent co-insurance policies. The reverse ranking applies for insurers. A brief outline of this more general form of deriving the optimal insurance policy endogenously would perhaps be useful for the reader. The form of the Pareto optimal insurance contract here is identified under general assumptions regarding the risk preferences of both the insurer and the insured. The necessary and sufficient conditions leading to deductibles and co-insurance are investigated. The cost of insurance is explicitly recognized and shown to be the driving force behind deductible results.

In the Arrow-Borch-Raviv framework, the insurance buyer faces a risk of loss x, where x is a random variable with probability density function f(x). It is assumed $f(x) >$

0 for $0 \leq x \leq T$. The insurance policy I(x) is referred to as coverage function where I(x) is transferred from the insurer to the insured if loss 'x' obtains.

$$\text{I(x) satisfies:} \quad 0 \leq I(x) \leq x \quad \forall\, x \tag{6}$$

This constraint reflects the assumption that an insurance compensation is necessarily non-negative and cannot exceed the size of loss. The premium paid by the insured is P. This framework importantly assumes that the provision of insurance is costly due to administrative or other expenses and this cost is a deadweight loss relative to the insurer and the insured. It is assumed that the cost consists of fixed and variable components where the latter depends on the size of the insurance payment; $c_1(I)$ denotes the cost when the insurance payment is I with

$$c_1(0) = a \geq 0,$$

$$c_1'(.) \geq 0\,; \quad c_1''(.) \geq 0 \tag{7}$$

This insurer is assumed to maximize the expected value of his utility which is a concave function of wealth; v(w) denotes the utility function of the insurer with $v'(w) > 0$ and $v''(w) \leq 0$, for all w. The insurer is assumed to be risk averse. If w_o is the initial wealth of the insurer, a necessary condition for the insurer to offer a policy is:

$$E\{v[w_o + P - I(x) - c_1(I(x))]\} \geq v(w_o) \tag{8}$$

Now, for a risk neutral insurer (for whom $v''(.) = 0$), equation (8) becomes $P \geq E[I(x) + c_1(I(x))]$, and if costs are proportional to the insurance payment (i.e. fixed percentage loading, λ), then the constraint on the policies offered is:

$$P \geq (1+\lambda)\, E[I(x)] \tag{8'}$$

Similarly, on the insurance demand side, assuming an expected utility maximizing insured agent, a necessary condition for purchasing the coverage I(x) for a premium P is obtained as:

$$E\,[U\,\{A\text{-}P\text{-}x + I\,(x)\}] \geq E\,\{U\,(A\text{-}x)\} \qquad (9)$$

where A is the initial asset position of the individual.

Now, when both the equations (8) and (9) are satisfied, we get a non-empty set of insurance contracts that are acceptable to both the parties to the contract. From this set, a Pareto optimal insurance policy will be chosen. To find the Pareto optimal insurance

$$\underset{P,\,I(x)}{\text{Max}} \quad \bar{U}\,(P,\,I) \equiv \int_{o}^{T} U\,[A - P - x + I(x)]\,f(x)\,dx \qquad (11)$$

contract, the optimum values of premium P and the function I(.) are obtained in the Borch-Arrow-Raviv framework, by maximizing the insured's expected utility of final wealth subject to the constraint that the insurer's expected utility is constant. Therefore, the problem becomes:

subject to (6) and

$$(10) \qquad \bar{v}\,(P,I) \equiv \int_{o}^{T} v[w_o + P - I(x) - c_1(I(x))]f(x)dx \geq k$$

where k is a constant and $k \geq v\,(w_o)$.

This problem is solved in two steps. First, the premium P is assumed fixed and the form of the optimal insurance coverage is found as a function of P. Second, the optimal 'P' is chosen, thus completing the solution to the problem. The results show that a Pareto optimal insurance contract involves a deductible and coinsurance of losses above the deductible. The deductible is shown to be strictly positive if and only if the insurance

cost depended on the insurance payment. Coinsurance results from either insurer risk aversion or the cost function non-linearity. Any upper limit on insurance coverage is shown to be Pareto suboptimal. However, their prevalence (in major medical, liability and property insurance clauses) are shown to be in the interest of the regulated insurer. These results are obtained for single as well as multiple losses.

Alternative decision rules: Razin:

While these above mentioned streams of analysis explored the insurance purchase decision extensively, actual purchase behaviour often differed from what theory would predict. This stimulated search for alternative decision frameworks. It was soon discovered that the expected utility approach to decision making of individuals and productive firms faced certain conceptual difficulties. Thus economists started exploring the implications for insurance coverage of simple rules for decision making under uncertainty, which did not require the specification of a utility function and therefore, would be more impersonal in nature. One such decision framework was the maximin criterion that concentrates on worst outcomes. Now, one of the implications of the expected utility approach is the Bernoulli principle that asserts that risk-averse individuals will choose to insure fully when the insurance premium equals the expected value of the loss (denoted 'actuarially fair' insurance). Results obtained from alternative decision frameworks often challenged such proposition. For example, Assaf Razin (1976) demonstrated that when the decision making unit is guided by the minimax regret criterion,[ii] it is always optimal to purchase insurance with a positive amount deductible. Such a result may be more consistent with firms' insurance policies in the real world, as

they seem to be more risk-taking oriented. A brief representation of Razin's model would help the reader:

He considers that a representative firm's wealth in the initial period is A+L (where the notations have their usual meanings, as shown in Mossin's treatment viz. 'L' is the insurable property at risk and A represents other assets). If the firm chooses not to insure its property, its final wealth Y, would be a stochastic variable.

$$Y = \begin{cases} A \text{ with probability } \pi \\ A + L \text{ with probability } 1 - \pi \end{cases}$$

The amount paid by the insurer in the event of loss is $w = L - D$, where D is the amount deductible; thus the expected value of compensation received is:

$$E(w) = \pi (L\text{-}D).$$

Exactly like Mossin's treatment, Razin assumes that the premium will depend upon the amount of deductible chosen, specifically such that

$$P(D) = (1 + \lambda)E(w)$$

where the notations again carry their usual meanings viz. E(w) is the net premium and $\lambda E(w)$ is the loading.

It is important in this decision framework to know how the regret criterion works. Razin basically borrows Savage's regret criterion. Regret R, given the state of the world, is equal to the amount of wealth obtained from the best strategy for that state of the world less the amount of wealth obtained from a given insurance policy. Thus, regret in the event of a loss is given by R_L, where

$$R_L = [A + L - P(O)] - [A + L - P(D) - D] \qquad (12)$$

The first bracketed term on the R.H.S. of equation (12) denotes terminal wealth obtained from insurance with zero amount deductible; the second term denotes terminal wealth obtained from a policy with some given amount of deductible, D.

Similarly, regret in the event that the property suffers no damage, R_N is given by

$$R_N = [A + L] - [A + L - P(D)] \qquad (13)$$

The bracketed terms in the equation (13) similarly stands for terminal wealth with the firm in the event of no insurance (amount deductible equals loss), and no damage when insurance is purchased, respectively.

Using the relation $P(D) = (1 + \lambda)\, E(w)$ in equations (12) and (13), they are further simplified:

$$R_L = D\,(1 - (1 + \lambda)\,\pi)\,; \quad R_N = (1 + \lambda)\,\pi\,(L - D) \qquad (14)$$

Now since the premium cannot exceed the value insured, the loading factor must satisfy

$$1 - (1 + \lambda)\,\pi > 0 \qquad (15)$$

Therefore, the problem of the firm is to choose D so that v_1 is (16) is minimized.

$$V_1 = \text{Max}\ (R_L, R_N) \qquad (16)^*$$

[This criterion reflects somewhat pessimistic attitudes in the fact that it concentrates on the worst outcomes].

To find the optimal amount of deductible, it is important to note that when $D = 0$, then $R_L = 0$ and $R_N\ e(1+\lambda)\,\pi\,L$. Therefore $v_1 = R_N$. Since from (14), R_N is negatively

related to D, the firm tends to increase D so that $D > 0$. On the other hand, if $D = L$ (no insurance case), then $R_N = 0$, $R_L = L(1 - (1+\lambda)\pi)$ and therefore, $v_1 = R_L$ Since from (14), R_L is positively related to D, the firm tends to decrease D so that $D < L$.

This argument simply implies that the optimal amount of deductible, D^* must be such that

$$R_N(D^*) = R_L(D^*).$$

Substituting (14) in the above relation, one can get

$$D^* = (1+\lambda)\pi L \qquad (17)$$

[Razin also clarifies his analysis by means of a simple diagram].

Comparing Results:

Contrasting Razin's analysis using Savage's regret criterion with the more widely used expected utility framework in the insurance literature, there are two major different implications of the two alternative criteria for the optimal amount of deductible:

First, consider the case where insurance is actuarially fair. In this case, the loading factor λ vanishes. Under the minimax policy (equation 17), the amount of deductible is positive. In fact, it is equal to the expected value of losses. We get,

$$D^* = \pi L \qquad (17a)$$

Recalling Mossin's treatment in the expected utility framework, from equation (5b), when insurance is actuarially fair, the amount of deductible, D^* is zero. Here

$$\frac{dE[U(Y)]}{dD}\Big|_{D=0} = 0 \qquad (5b)$$

Even if, as a practical matter, the loading factor λ is positive, it is expected under competition to be small relative to the probability of loss, π. In this case, the implications of the analysis for $\lambda = 0$ can be regarded as a reasonable approximation. Namely, the fraction of the amount deductible in the total loss, D/L is expected to be significant under the minimax regret criterion and non-significant under the expected utility approach.

A second important difference between the two alternative criteria relates to the effect of wealth `A' on the insurance coverage. Under the minimax regret criterion, changes in `A' will `not' affect the amount deductible. Therefore, this criterion implies that large firms (or wealthy people), as compared to small firms (not so prosperous people) do not adopt significantly different insurance policies with respect to specific items such as houses, durables and the like. On the other hand, under the expected utility approach insurance coverage depends on `A', the endowment of other assets. As shown by Mossin (Proposition IV), the effect of A on D depends upon whether the Arrow-Pratt measure of risk aversion R_a is a decreasing or increasing function of wealth. E.g. "if the individual has decreasing risk aversion, the optimal amount deductible is larger, the larger his wealth".

Under both criteria, however, the amount of deductible is expected to be positively related to the loading factor λ, the probability of loss π and to the value of the loss L.

Decision Analysis: the Prospect Theory:

While alternative decision frameworks thus began pointing to different results on the aspects of rational insurance purchase behaviour, economists began searching for a consistent decision paradigm that would more accurately explain observed insurance phenomena. Thus, second generation insurance research often deviated far away to frame new decision frameworks, and then explore the individual's incentive to insure within new paradigms. Though expected utility theory still dominated insurance literature and the analysis of decision making under risk, second generation research pointed out that choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of the utility theory. One such innovative alternative to the expected utility model was the prospect theory as developed by Daniel Kahneman and Amos Tversky (1979).

Prospect theory suggests that in particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called the 'certainty' effect, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses. Therefore, attitudes of an individual towards risk, unlike that in utility theory, is conditioned by the kind of choices that an individual faces. Thus, expected utility model cannot serve as an adequate descriptive model. Prospect theory, as an alternative, further suggests that people generally discard components that are shared by all prospects under consideration. This tendency, called the 'isolation effect', leads to inconsistent preferences when the same choice is presented in different forms. The theory, alternatively, assigns values to gains and losses rather than to final assets, and replaces probabilities by decision weights. The

value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains. Decision weights are generally lower than the corresponding probabilities, except in the range of low probabilities. Thus, overweighting of low probabilities may contribute to the attractiveness of both insurance and gambling. Typically within the area of insurance behaviour, Kahneman and Tversky throws up questions that utility theory cannot satisfactorily answer. For example, the prevalence of the purchase of insurance against both large and small losses has been regarded by many as a strong evidence for the concavity of the utility function for money. Why otherwise would people spend so much money to purchase insurance policies at a price that exceeds the expected actuarial cost? However, as Tversky suggests, an examination of the relative attractiveness of various forms of insurance does not support the notion that the utility function of money is concave everywhere. E.g. people often prefer insurance programmes that offer limited coverage with low or zero deductible over comparable policies that offer maximal coverage with higher deductibles – contrary to risk aversion (see e.g. Fuchs). Another type of insurance programme in which people's choices/responses are inconsistent with the concavity hypothesis is what Tversky and Kahnemann terms as 'probabilistic insurance'. To illustrate what it is, they discuss a problem: Suppose the premium charged for full coverage of a damage eg. fire or theft of a piece of property, is found by the individual to be barely worth its cost and so, he is indifferent about buying a policy. Now, an alternative programme offers him to pay half the regular premium, i.e. P/2. In case of damage, there is a 50 per cent chance that you pay the other half of the premium and the insurer covers all the losses; and there is a 50 per cent chance that you get back your insurance payment and suffer all the losses.

Empirical investigations proved that probabilistic insurance is generally unattractive. Apparently, reducing the probability of loss from π to $\pi/2$ is less valuable than reducing the probability of loss from $\pi/2$ to 0. However, Tversky and Kahneman prove a proposition that expected utility theory (with a concave U) implies that probabilistic insurance is superior to regular insurance. This is a rather puzzling consequence of the risk aversion hypothesis of utility theory, because probabilistic insurance appears intuitively riskier than regular insurance, which entirely eliminates the element of risk. Evidently, the intuitive notion of risk is not adequately captured by the assumed concavity of the utility function for wealth.

Though prospect theory set up a new device to analyse risky decisions, the weighting function and assigning of values had its problems. Much of its insurance purchase behaviour predictions did not fall in line with reality. For example, although prospect theory predicts both insurance and gambling for small probabilities, observations of service and medical insurance purchasing show that purchase of insurance often extends to medium range of probabilities, and that small probabilities of disaster are sometimes entirely ignored. Use of the prospect analysis in subsequent insurance literature has been scarce.

Now, given such multiple decision frameworks, certain propositions in insurance economics came to stay. One was the first generation Arrow-Mossin-Smith result that gives a zero loading factor, full coverage is optimal. However, with a positive loading, the insured prefers a policy with a positive amount deductible. Again, using a binomial distribution for losses and Savage's to minimax regret criterion as an alternative o the expected utility framework, Razin obtained a stronger result: It is always optimal to

purchase insurance with a positive amount deductible even if the loading factor is zero, i.e. even if the insurance premium is actuarially fair. However, these results seem to be contradicted by everyday observations; individuals rarely insist on positive deductibles in their insurance purchasing behaviour. As Karl Borch noted: "If a traveler insures his baggage at all, we will expect him to take insurance for its full value". To provide theoretical support to such observed behaviour, Eric P. Briys and Henri Louberge (1985) suggest that individuals will behave according to the Hurwicz criterion.

Insurance analysis and Hurwicz criterion:

They propose that theory can be reconciled with observed behaviour if we assume that individuals do not use all available information. Under the Hurwicz criterion, their choice under uncertainty will be based on a subjective weighting of the results obtained in the best and the worst state. The weighing factor α_1 $(0 \leq \alpha \leq 1)$ reflects their degree of pessimism:

- if $\alpha = 1$, the individual is extremely pessimistic and the Hurwicz criterion is identical to the minimax rule.
- if $\alpha = 0$, the individual is extremely optimistic and behaves as if he or she used the maximax rule.

The Hurwicz criterion is clearly not very attractive from a normative point of view, but it may have some intuitive appeal in a descriptive theory of decisions under conditions of bounded rationality (see Herbert Simon). In the insurance purchasing context, it implies that deductibles are often suboptimal, which conforms to everyday observation. It is also interesting to note that the Hurwicz criterion does not rule out

optimality of deductibles; they may be optimal in certain situations even if the insurance premium is actuarially fair.

If the property in question, of value L is subject to a random loss X $\{0 < X \leq L\}$, with density f(X) and cumulative probability

$$\pi = \int_0^L f(x)\, dx,$$

the no-loss state occurs with probability $1-\pi$. Individual, like earlier assumptions (by Mossin, Razin, et al) has other assets worth 'A'. Now the individual faces three alternative actions: (a) No insurance, (b) Full insurance, and (c) Partial insurance., i.e. (a) D = L, (b) D = 0, (c) $0 < D < L$, where 'D' is the amount of deductible, and premium paid P(D) is a function of the amount deductible. Thus, the individual's decision problem becomes:

$$\underset{D}{\text{Max}}\ H = \alpha\,[A + L - P(D) - D] + (1 - \alpha)\,[A + L - P(D)]$$

subject to $0 \leq D \leq L$.

Assuming that the premium is based on expected insurance payments and incorporates a loading factor λ, we have,

$$P(D) = (1+\lambda) \int_D^L (X - D)\, f(x)\, dx.$$

The decision problem may be thus restated as :

$$\underset{D}{\text{Max}}\ A + L - (1 - \alpha) \int_D^L (X - D)\, f(x)\, dx - \alpha D \qquad (18)$$

subject to $0 \leq D \leq L$.

First and second order conditions for a maximum yield respectively,

$$(1+\lambda)\int_{D}^{L} f(x)\,dx = \alpha \qquad (18a)$$

$$-(1+\lambda)\,f(D) < 0 \qquad (18b)$$

From 18(a), it can be seen that the optimizing individual will choose an optimal amount deductible D^* which adjusts the probability of the insurer paying an indemnity --inflated by the loading factor -- to the value of the Hurwicz coefficient. The no-insurance choice ($D = L$) is not optimal, except for the maximax individual. But the full insurance choice ($D = 0$) is optimal whenever $(1 + \lambda)\,\pi < \alpha$. Thus, in many instances, full insurance will be preferred by the decision-maker, in spite of the presence of a loading factor. On the other hand, if $\lambda = 0$, i.e. if the insurance premium is actuarially fair, the optimality of a positive deductible cannot be ruled out.

These results stand in sharp contrast to the traditional results obtained in the expected utility framework by Arrow, Mossin, etc. with similar models of a single insurable risk. The preference for full insurance depends upon the relationship between three parameters: The pessimism, i.e. the risk-aversion of the decision maker; on the one hand and the probability of a loss and the consideration of the loading factor on the other hand. Briys and Louberge extend their analysis to consider where only two states of nature (`good' and `bad') matter. In this analysis, either full or no-insurance choice prevails depending upon the relative strengths of the Hurwicz criterion `α' and $(1 + \lambda)\,\pi$. Thus, using the Hurwicz criterion in a two state framework always yield corner solutions while, as shown by Razin, deductibles are always optimal when Savage's regret criterion

is used. The intuitive explanation for the Briys-Louberge result is that the degree of pessimism, `α' may be interpreted as the subjective probability of damage evaluated by the individual which is then compared to the "inflated" probability $(1 + \lambda)\,\pi$ computed by the insurer. If the individual is more optimistic than the insurance company, (i.e., if $\alpha < (1+\lambda)\pi$, the individual does not take any insurance. If the converse holds, full insurance is taken.

It may now be interesting to compare the results obtained by using different decision frameworks. This is done in Table I. We can see that if $\alpha = 1$ (i.e. minimax rule case), the individual takes full insurance, except when the loading factor exceeds (1-P)/P, where it is optimal to remain non-insured. If $\alpha = 0$ (i.e. maximax rule prevails), the non-insurance choice is always optimal. In the realistic hypothesis of a positive loading factor, the Hurwicz rule under a given objective condition (especially when the probability of a loss is low), and the minimax rule are the only frameworks which can explain an individual's preference for full insurance.

These results seem to conform more to observed behaviours in the market for personal insurance lines (automobile, theft, etc.) than the traditional results obtained in expected utility framework. In these markets, deductibles do exist, but the reason for their existence cannot be traced back to the insureds' preferences. They are imposed by the insurers for different reasons, such as their efforts to mitigate moral hazard when the level of individual care cannot be observed (see Shavell).

Table I: Optimal Insurance Coverage Under Alternative Decision Frameworks

Decision Framework	Value of the loading factor	
	$\lambda = 0$	$\lambda > 0$
Expected Utility	Full insurance	Deductible
Savage Regret (2 state model)	Deductible	Deductible
Hurwicz Rule	Full insurance, or Deductible	Full insurance, or Deductible
Minimax Rule	Full insurance	Full insurance, or Deductible
Maximax Rule	No insurance	No insurance

Assimilation under expected utility approach:

(A): Incomplete markets:

Now, a basic reason why one stream of second generation insurance literature had experimented with alternative decision paradigms is the fact that insurance literature contains many cases of observed insurance-buying patterns that do not rest comfortably within the expected-utility framework. These included the failure to purchase subsidized insurance, a propensity for high levels of insurance at actuarially unfavourable terms, preferences for insuring small probable losses rather than large improbable losses, the coexistence of insurance and gambling, and the simultaneous insurance of some risks and retention of others. While explanations for these forms of behaviour have been offered, these sometimes require the assumption of risk aversion be rejected for at least part of the domain of the utility function. In spite of its shortcomings, the expected-utility

hypothesis still dominated the discourse in second generation insurance literature. For instance, Neil Doverty and Harris Schlesinger (1983) sought to assimilate the above patterns of observed behaviour into the expected-utility framework by setting the problem within the context of an incomplete market. Again, David Mayers and Clifford Smith (1983) sought to reverse the traditional predictions within the expected-utility paradigm by analyzing the individual's demand for insurance as a special case of general portfolio hedging activity.

Doherty and Schlesinger (1983) indicated that existing first-generation theorems concerning the optimal level of insurance and the optimal form of an insurance contract hold only under restrictive market and risk assumptions. They found that the simple but obvious premise of interdependence of insurance and portfolio decisions has hardly found space in the economic literature concerning optimal insurance purchases. Doherty and Schlesinger have defined the insurance market as incomplete if contingent claims (insurance policies) cannot be written to cover all possible loss situations. The existence of a substantial element of non-diversible risk and other forms of social risk explain a natural existence of an incomplete market. Though Kihlstrom, Romer and Williams (1981), Ross (1981), Nachman (1982) and Pratt (1982) had studied this type of market, they have all assumed that insurable losses and uninsurable background risks are independently distributed random variables. Doherty-Schlesinger's study of the optimal insurance purchase strategy of a risk-averse individual differs from these earlier papers in its treatment. Therefore, a brief outline is in calling:

They consider the simplest example of an incomplete market in which there are two possible losses (one insurable and the other non-insurable), each with a two-state

marginal distribution; that is, each loss either occurs or does not. This leads to four naturally exclusive states of nature:

(1) No loss,

(2) Insurable loss only,

(3) Non-insurable loss only, and

(4) Insurable and non-insurable loss.

Letting I and N denote the magnitudes of the insurable and non-insurable losses, respectively, and letting π_I and π_N denote their respective probabilities of occurrence, we see that the individual's wealth prospect is as follows:

State	Wealth (without insurance)	Probability
1	A	$\pi_1 = 1 - \pi_N - \pi_2 + \pi_1 \pi_N \mid I$
2	A-I	$\pi_2 = \pi_1 - \pi_1 \pi_N \mid I$
3	A-N	$\pi_3 = \pi_N - \pi_1 \pi_N \mid I$
4	A-I-N	$\pi_4 = \pi_1 \pi_N \mid I$

where A is the no-loss level of final wealth and $\pi_N|I$ denotes the conditional probability of a noninsurable loss, given an insurable loss.

The decision-maker as stated earlier is risk-averse. Insurance may be written on event I but not on N. In this simplified model, Doherty and Schlesinger considers only coinsurance in which the insurer carries a proportion α_1 of the loss, leaving the insured to bear $(1-\alpha_1)$ I. Premium is defined in relation to the insurer's estimate of probability of loss. With the common assumption of proportionate loading, the premium for insurance level α_1 is :

$P = \alpha_1 \pi_I . I (1+\lambda)$, where λ is the loading factor, $\lambda \geq 0$.

If the individual purchases an insurance contract with coinsurance rate α_1, expected utility may be written as:

$$EU = \pi_1 U [A - \alpha_1 \pi_I I (1+\lambda)]$$

$$+ \pi_2 U [A - \alpha_1 \pi_I I (1+\lambda) - I (1-\alpha_1)]$$

$$+ \pi_3 U [A - \alpha_1 \pi_I I (1+\lambda) - N]$$

$$+ \pi_4 U [A - \alpha_1 \pi_I I (1+\lambda) - I (1-\alpha_1) - N] \qquad (19)$$

The first order condition for maximizing is easily derived and the second order condition is easily verified. If full coverage is purchased i.e. $\alpha_1 = 1$, then, wealth in states 1 and 2 will be identical, and also be equal in states 3 and 4. Therefore $U_1' = U_2'$ and $U_3' = U_4'$ where U_i denotes the marginal utility in state i. We may evaluate $dEU/d\alpha_1$ at full coverage, $\alpha = 1$. Now, if insurance prices are actuarially fair, i.e. $\lambda = 0$, then the traditional result of Bernoulli principle that full coverage is optimal will only hold true when insurable and non-insurable losses are independently distributed, i.e. when $\pi_N = \pi_{N|I}$. Otherwise, the traditional result is violated. If the two kinds of losses are positively correlated, i.e. $\pi_N < \pi_{N|I}$ and $N > 0$, a simple mathematical evaluation exercise shows that overinsurance viz. $\alpha_1 > 1$ will be optimal. This result is intuitively apparent. Since no direct insurance can be written on N, if N and I are positively correlated, carrying more than full coverage on I provides partial coverage against N as well. Again, if there is negative correlation between N and I (when $\lambda = 0$), the correlation itself acts as a natural wedge against uncertainty. Therefore, less than full coverage is

optimal in this situation. However, results would alter if a realistic positive loading is allowed for, i.e. when $\lambda > 0$, the Mossin-Smith proposition which states that less than full coverage, $\alpha_I < 1$, is optimal is seen to hold wherever the correlation between I and N is non-positive. When the correlation is positive, this proposition does not hold in general, although it need not be violated either. Table 2 summarises Doherty-Schlesinger's findings:

Table 2

Insurance Purchase Decision in an Incomplete Market: Summary of Doherty-Schlesinger Results

Relation between I and N	Loading	Optimal Coverage
Independence	$\lambda = 0$	$\alpha_I = 1$
Positive correlation	$\lambda = 0$	$\alpha_I > 1$
Negative correlation	$\lambda = 0$	$\alpha_I < 1$
Independence	$\lambda > 0$	$\alpha_I < 1$
Positive correlation	$\lambda > 0$	ambiguous
Negative correlation	$\lambda > 0$	$\alpha_I < 1$

Doherty and Schlesinger extend their analysis to consider losses of different sizes, each having its own-correlation with uninsurable wealth. They refute the Arrow (1963) result that a risk-averse insured will prefer a policy with a deductible to an actuarially equivalent coinsurance policy, under the condition that small insurable losses and non-insurable losses are positively correlated while large insurable losses and non-insurable

losses are negatively correlated. The Arrow proposition, however, does hold when insurable and non-insurable losses are independent. Thus within the expected utility framework, Doherty and Schlesinger appreciably accommodates observed insurance behaviour. It is shown that in incomplete insurance markets, utility maximizing decisions rest on the correlations between the assets within the individual's portfolio. Depending on the signs and magnitudes of these correlations, we may find individuals insuring some risks fully and retaining others, "All or nothing" buying strategies become more common than previously supposed, and these may seem to defy the actuarial terms on which the insurance premium is calculated

(B) Interdependence with portfolio decisions:

Similar to the above treatment was another contemporary paper published by Mayers and Smith (1983). They demonstrate that when payoffs of the insurance policy are correlated with the payoffs to the individual's other assets, the demand for insurance contracts is generally not a separable portfolio decision. Arrow (1963), Mossin (1968), Pauly (1968), Smith (1968), Gould (1969), Ehrlich and Becher (1972), Razin (1976), Raviv (1979) and Shavell (1979) had all earlier posed the insurance contract as the only available asset for hedging risk. They suggest that the insurance contracts are but a subset of an array of available alternatives that the capital market offers in contractual forms convenient for risk reduction. A necessary condition for a specific demand for insurance is therefore that costs of eliminating risks through portfolio diversification exceed the costs of hedging them with insurance. Mayers and Smith considers two classes of insurable events viz., health and liability events. An individual's net non-

marketable asset return at the end of period is $\hat{N}_i = \hat{Y}_i - \hat{l}_i - \hat{h}_i$, where $\hat{l}_i, \hat{h}_i$ are losses generated by liability and health events respectively.

If α_i and $\square_I$ be the individual's insurance choice variables, then $\alpha_i \hat{\ell}_i$ *and* $\eta_i \hat{h}_i$ would be actual payouts received from respective policies (we may note: α_i , $\square_I \leq 1$). Thus, individual's end of period wealth is

$$\hat{R}_i = X_i' \hat{R} + \hat{N}_i + \alpha_i \hat{l}_i + \eta_i \hat{h}_i - rd_i \qquad (20)$$

where X_i is a column vector $(X_{i1}, X_{i2}, \ldots, X_{iN})$; X_{ij} is the fraction of firm j's share held by individual i, $\hat{R}$ is a column vector $(\hat{R}_1, \hat{R}_2, \ldots \hat{R}_N)'$, $\hat{R}_j$ is the end-of-period value of firm j's shares, 'r' is one plus the one-period riskless rate of return, and d_i is the net debt of individual 'i'. They assume that individual's preferences are a positive function of expected end of period wealth $\hat{R}_1$, and a negative function of its variance σ^2 $(\hat{R}_1)$.

$$U^i = U^i[\hat{R}_i, \sigma^2(\hat{R}_i)]$$

i.e.

$$\text{where } \frac{\partial U^i}{\partial \hat{R}} \equiv U^i_e > 0 \text{ and } \frac{\partial U^i}{\partial \sigma^2(\hat{R}_i)} \equiv U^i_v < 0$$

The individual's portfolio/insurance problem is to choose X_i, α_i, η_i and d_i to maximize his preference function:

$$\underset{X_1, \alpha_1, \eta_1, d_1}{\text{Max}} \; U^1 = U^1[\hat{R}_1, \sigma^2(\hat{R}_1)]$$

subject to the budget constraint.

$$w_i = X_i' P + \alpha_i P_{li} + \eta_i P_{hi} - d_i \qquad (21)$$

where P is a column vector $(P_1, P_2,\ldots,P_N)'$, P_j is the current total market value of firm j's shares, P_{li} and P_{hi} are the premiums for the full coverage under health and liability policies. The solution to this portfolio problem provides a demand equation for each type of insurance policy as well as the individual's demand function for risky marketable assets. Smith and Mayers suggest that sufficient conditions for insurance decisions to be separable and independent of other portfolio decisions are: (1) there is no moral hazard or adverse selection and (2) the payoffs to the insurance policy are orthogonal to those of all marketable securities, the consumer's gross human capital, and the payoffs to other insurance policies. Mayers and Smith argue that the separability condition is not generally met because of significant interdependence of claims across different insurance policies. Furthermore, these generalizations potentially reverse the standard Mossin's wealth effect viz. that wealthier individuals will demand less insurance. At this juncture, one should also note that the Mayers-Smith analysis of demand for insurance to some extent approximates Doherty-Schlesinger's findings for an incomplete market. Thus, even in cases where insurance markets are complete, the price of purchasing insurance directly on an individual risk must be viewed against the alternatives of purposely over-insuring or under-insuring other risky assets.

Considerations of contract non-performance:

In the preceding paragraphs, we presented a short survey of the problem of rational insurance purchasing as presented in the original and second generation literature. Though different decision frameworks have been worked with, the expected utility hypothesis has dominated the literature. However, standard expected-utility based analyses have been conducted under the implicit assumption that insurance policies are performing contracts. A new direction for research has been provided by the Doherty-Schlesinger (1990) paper that examines the problem of contract non-performance. The insurer default risk alters the insurance product as it worsens the insured's worst state and consequently alters the demand for insurance. They demonstrate that a non-zero probability of default renders most of the insurance results invalid, with exceptions. For example, if default, when it occurs is always total, less than full insurance coverage is always purchased at a 'fair price'. Again, if default is partial, there are cases where more-than-full coverage is purchased at 'fair price'. Other standard results that fall include insurance as an inferior good when preferences exhibit decreasing absolute risk aversion (DARA) [Mossin, 1968]. However, the Doherty-Schlesinger (1990) paper finds that an increase in probability of insolvency does not necessarily lessen the demand for insurance. This paper stands as a good starting point for examining the demand for insurance under conditions of possible default risk.

The life insurance purchase decision:

Before discussing further on recent directions for research, I would briefly talk about another aspect of insurance purchasing where the volume of literature seems to be growing. This relates to an individual's purchase of life insurance. Apart from the fact life insurance policies are longer term contracts and often attached with a savings component, the investigation of the individual's demand for life insurance as distinct from the incentive to insure property, health, etc. is necessary because here the parameters that affect the expected utility function (or the preference pattern in general), are different. For example, the utility of bequests enters into the individual's objective function apart from utility from consumption. Nearly all theoretical work on the demand for life insurance (see, e.g. Stanley Fischer, 1973; C.A. Pissarides, 1980; Edi Karni, 1985, 1986) takes Menahem Yaari (1965) as a starting point. Yaari shows, in the context of a life cycle model with uncertain life time, that an individual increases expected utility by purchasing fair life insurance or a fair 'annuity'.[iii] In Yaari's framework, a consumer purchases life insurance to increase his expected life time utility:

$$E[U(T)] = \int_0^T \alpha_2(t)g[c(t)]dt + \beta(T)\psi[S(T)] \qquad (21)$$

where T is the consumer's life time, a random variable; $\psi[S(T)]$ is the instantaneous utility of bequests; $g[c(t)]$ is the instantaneous utility from consumption; and α_2 and β are discount factors. In terms of equation (21), functions in the demand for life insurance mainly depend on exogenous shifts in the consumer's utility function. Stanley Fischer (1973) extends Yaari's model to emphasize on the comparative statics and dynamics of life insurance demand functions. He uses a weighting function on bequests

which plays a crucial role in the results obtained. In the earlier part of his model without labour income (the individual is supposed to have an initial endowment of wealth, similar to the treatment in the study of property insurance literature), the individual may buy insurance which is heavily loaded against him if the weighting function is sufficiently large; on the other hand, he may well reject fair or even favourable insurance if the weighting on the bequest function is small. An increase in the probability of death is more likely to increase current consumption the lower the weighting attached to bequest function. An increase in the weighting attached to the bequest function unambiguously reduces current consumption and increases insurance purchases. The demand for insurance as a proportion of the portfolio (that includes bonds) is found to be invariant with respect to the interest rate provided the loading is constant. He finds that an individual who receives labour income is more likely to purchase insurance than an insurance who lives off the proceeds of his wealth. The solutions in the Fischer's model indicate that an individual who lives off the proceeds of his wealth is unlikely ever to purchase life insurance while an individual who receives labour income is likely to purchase life insurance early in his life. The importance of labour income in the life insurance purchase decision is also intuitively apparent. Another important extension of Yaari's life insurance framework is Frank D. Lewis' (1989) paper where he includes the preferences of other household members explicitly. This allows to shift the perspective from the consumer, who is the insured, to the spouse and offspring who are the beneficiaries. The observation that an insured's purchase of life insurance generally represents a transaction made on behalf of his beneficiaries provides for useful insights. For example, the preferences and constraints of the insured's beneficiaries largely

determine his demand for life insurance. Lewis' model, unlike earlier ones, does not explicitly rely on the primary wage earner having a bequest motive.

In Lewis' model, there are two types of beneficiaries – a spouse and children. The spouse has a bequest motive and a capital stock at the time of the wage earner's death. The offspring has neither. Lewis finds that the amount of insurance which must be carried on the life of the primary wage earner to maximize the life time utility of any one child is given by the equation:

$$(1 - L_\lambda \pi_i) f_i^* = \max \left\{ \left[\frac{1 - L_\lambda \pi_i}{L_\lambda (1 - \pi_i)} \right]^{1/\delta} C_i^* - b_i, 0 \right\} \qquad (22)$$

where,

L_λ = the life insurance policy loading factor

π_i = probability of the primary wage earner's death during age 'i' of the child

f_i^* = the face value of the optimal life insurance policy

δ = a measure of the child's degree of relative risk aversion

C_i^* = the present value of the child's consumption stream given that the wage earner survives until the child is no longer dependent, and

b_i = the child's bequest receipt.

Lewis shows that when the child does not receive a bequest and the probability of death of the wage earner is small, equation (22) is approximated by:

$$f_i^* = \left(\frac{1}{L_\lambda} \right)^{1/\delta} C_i^* \qquad (22a)$$

Equation (22a) suggests that for any child, the optimal level of life insurance on the wage earner is inversely related to the life insurance loading fee and directly related to the child's degree of risk aversion and the present value of consumption of the child if the wage earner survives until the child is mature.

The amount of life insurance that must be carried on the wage earner's life to maximize the life time utility of the spouse is given by:

$$(1-L_\lambda \pi_i) f_i^* = \max \left\{ \left[\frac{1-L_\lambda \pi_i}{L_\lambda (1-\pi_i)} \right]^{1/\delta} C_i^* - k_i + \frac{B}{(1+\sigma)^{\tau-i}}, 0 \right\} \qquad (23)$$

where k_i is the human capital of the spouse at age 'i'. The spouse is assumed to live with certainty until age 'τ' at which time the spouse is constrained to leave a bequest of size B. The discount rate is 'r'. All other terms in equation (23) have been previously defined. Assuming that all family members have the same degree of risk aversion, the family's optimal purchase of life insurance on the wage earner's life is determined by summing the optimal amount of life insurance on the wage earner's life as desired by each family member. This amount, 'F' is given by the equation:

$$(1-L_\lambda \pi) F = \max \left\{ \left[\frac{1-L_\lambda \pi}{L_\lambda (1-\pi)} \right]^{1/\delta} TC - w, 0 \right\} \qquad (23a)$$

where TC is the present value of consumption from the current period to the age of each offspring at which he or she leaves the household and to age τ of the spouse, assuming that the wage earner survives. 'w' is the household wealth, net of the spouse's bequest.

Equation (23a) indicates that life insurance consumption increases with the wage earner's probability of death and the present value of the family member's consumption, assuming that the wage earner survives. Life insurance consumption also increases with the family's degree of risk aversion. Life insurance consumption is negatively related to the policy loading charge and the family's wealth.

Summary and recent papers:

The preceding part of this chapter has discussed at length almost the entire gamut of the economic literature that focuses on the problems and incentives for the insurance purchase decisions. However, many of the traditional results as obtained by Mossin, Arrow et al have been found to be violated in the empirical observation of insurance markets. For instance, consumers seem to show a propensity for lower deductibles than standard theory would suggest. As we have seen in our literature survey that decision-frameworks as alternative to the dominant expected-utility approach have tried to explain such observed discrepancies. On the other hand, economists such as Mayers and Smith (1983), Doherty and Schlesinger (1983) have tried to accommodate the problems within the expected utility framework. We have also studied separately the characterization of life insurance demand as developed by Menahem and Yaari (1965) and its stimulating extensions viz. by Stanley Fischer (1973) and Frank D. Lewis (1989). In the arena of property insurance, we find that considerations of contract non-performance and default risk provide new directions for research. Recent papers have also sought to analyse the effect of "risk subdividing" on insurance demand. For instance, L. Eeckhoudt, Bauwens and Briys (1991) show that when total property at risk is scattered only on a small

number of pieces (with independent risks), risk retention becomes very attractive relatively to market insurance with a positive loading. However, relative attractiveness of deductibles and co-insurance policies have not been analysed under the possibility of any partial loss. Further research in this area would be challenging. Another interesting recent paper by Ben-Arab, Briys and Schlesinger (1996) models consumption and insurance decisions in a continuous time, finite-horizon setting. They bring in habit formation by allowing the consumer to acquire a 'taste for good life' by making current preferences for consumption dependent upon the individual's past consumption. The optimal consumption path is smoother and the optimal level of insurance greater in this setting than they are in identical models without habit formation. Moreover, the optimal insurance level increases over the planning horizon, approaching full coverage in the limit. These results help to explain the observed phenomenon of individuals' over-purchasing insurance, such as a propensity for low deductibles. Now, in spite of the existence of a voluminous insurance purchase literature that I have made a short survey of, it seems that theorization of insurance buying behaviour is far from complete. Evidence suggests that minor changes in the formulation of the decision problem can have marked effects on the attractiveness of insurance. A comprehensive theory of insurance behaviour should consider, in addition to pure attitudes toward uncertainty and money, such factors as the value of security, social norms of prudence, the aversiveness to a large number of small payments over time, information and misinformation regarding possibilities and outcomes, and many others. It is interesting to note that though insurance purchase decision is very closely associated with making changes to an individual's savings decision, not the least in its precautionary aspect, formal models

exclusively dealing with these two decisions is rather scarce. At the cost of digressing from the survey purpose of this chapter, I would like to point out that the context of Indian insurance sector liberalization, provides a rich setting to explore changes in savings behaviour of individual economic agents. The issues at hand provide a ready setting to investigate the impact of insurance reforms (that *inter alia*, would expand the range of available products) on savings behaviour, particularly on its precautionary aspect. Following a comprehensive study of the literature on aspects of rational insurance purchasing in Chapter I, I would entirely devote the next one into exploring the issues of association of insurance purchase and savings behaviour, in the Indian context.

END NOTES:

[i] A deductible amount 'D' in an insurance contract I(x), (where x is the amount of loss) is such that the insured covers the first D units of the loss x, while the company covers any excess. E.g. Common in auto collision insurance and various forms of medical insurance.

[ii] See Luce and Raiffa (1957) for a description of the minimax regret criterion.

[iii] While a life insurance policy promises to pay a specified amount in the event of the insured's untimely death, an annuity promises to pay him allowances so long as he lives and therefore protects in the event of unexpected longevity.

CHAPTER – III

IMPACT OF INTRODUCING INSURANCE OPTION ON SAVINGS BEHAVIOUR

A primary aim of any aspect of financial liberalization is the removal or at least reduction of credit market distortions and imperfections. The insurance liberalization programme is another step towards that aim. While the previous chapter discussed at length the different aspects of the insurance purchase behaviour, this one would investigate how the introduction of insurance option would alter existing patterns of optimal savings decisions. To start with, the framework of State preference approach to behaviour under uncertainty would be used. Here, the basic needs underlying the purchase of insurance will be identified with consumption opportunities contingent upon the occurrence of various mutually exclusive and jointly exhaustive 'states of the world'. Market insurance in this approach redistributes income and, consequently, consumption opportunities, towards less well-endowed states.

Before setting up a theoretical framework to explore the issues at hand that the process of insurance reforms inevitably generates, it is necessary to characterize the pre-reform insurance scenario in India in a simplistic manner. The product range available had failed to penetrate much or, provide coverage against many insurable risks viz. health products, old age pensions, household property and casualty insurance – that are commonly available elsewhere – were virtually non-existent. Thus, we may characterize the pre-reform Indian economy as a 'savings-only' economy. Now, one of the most pressing needs that drive an economy towards financial liberalization is the necessity to increase savings and improve its allocation for the promotion of long-term growth. The Mckinnon and Shaw (1973) paper theoretically subscribes to a view that financial liberalization would lead to greater mobilization of savings for economic development and growth. Therefore, an important issue is to study the effect of each aspect of

financial reforms on savings, both short term and long term. In fact, one of the stated objectives of the Indian insurance reforms is to increase savings mobilization. Whether it actually does so however, remains an empirical question and the immediate post-reform relevant data may not be the ideal one to explore into this empirical issue. Again, taking up the same issue in a theoretical framework poses certain basic problems. To any initiated student of the discipline of economics, it may be obvious that isolation of a single savings motive from a plethora of functions that sum up savings behaviour is in itself complicated, as commonly believed.

Savings behaviour is a function of preferences, technology and demographics of the economy. That being given, the optimal savings amount can be worked out subject to the constraints posed by a host of distortions like fiscal incentives for promotion of long-term savings, absence of risk sharing instruments, compulsory provident fund contributions, under-development of credit markets, etc. Furthermore, relative availability of social spending affects incentive to save across countries. This social insurance basket comprises of old age pensions, unemployment benefits, health insurance, disability benefits, food stamps, etc. Table 1 gives some evidence on social insurance spending and GDS for a few OECD countries. In the OECD countries, gross public spending on social insurance takes up half of total government budgets and accounts for anywhere between a sixth and third of GDP. Ehrlich and Zhong (1998) working with a sample of 49 countries over 29 years (1960-89) found pension benefits having a significant depressing effect on savings. Even Hubbard, Skinner and Zeldes (1995) demonstrate empirically that social insurance programmes with means tests based on assets, discourage savings by households with low expected life time income.

Table 1 : Social Insurance and Savings in some OECD countries

Country	Gross Domestic Savings (% of GDP)				Total Social Expenditure (% of GDP)			
	1980	1985	1990	1993	1980	1985	1990	1993
Denmark	20	22	25	24	27.92	26.84	28.81	31.72
Germany	..	..	..	22	27.81	28.29	26.77	31.54
Netherlands	22	25	27	25	30.04	30.73	33.09	34.09
Sweden	19	21	22	17	31.69	32.91	34.02	40.59
United Kingdom	19	18	17	14	20.41	24.13	23.21	27.21
United States	19	17	15	15	17.38	19.35	21.29	23.32

Source: OECD (1998)

Now comes the question of precautionary savings. Deaton (1992) points out that under permanent income hypothesis, which essentially claims that consumption is nothing but an annuitised value of current human and financial wealth, precautionary savings have no role. Again, in the life cycle consumption model, where assets are accumulated in the beginning and run down later, with no liquidity constraints and no uncertainty, the precautionary motive to save is inconsistent with any life cycle consumption plan. Here saving only occurs to achieve consumption smoothing. But where credit markets are underdeveloped and liquidity constraints appear in an individual's life time, precautionary savings may be observed. Again, as pointed out by Leland (1968), an increase in the uncertainty of future income, through, say a mean preserving spread (see Stiglitz and Rothschild (1976)), a risk averse person with convex marginal utility will increase his savings. This too is precautionary swings. Even in life

cycle models where liquidity constraints do not exist, if there is a possibility of income uncertainty that can take income to zero, consumers with extreme risk aversion to zero income will save on a precautionary basis (see Caroll (1991)). Now, talking about the Indian context, the provision of social insurance is virtually non-existent. However, households are faced with a plethora of uncertainties that may result in a prospective income loss. There have been no state or non-state actors which contractually reduces or removes the size of loss when the 'bad state' occurs. The absence of any provision of support in the bad states of the world leaves the uncertainty facing households unaltered and therefore, induces the latter to have a significantly large precautionary component in their savings basket. Getting back to the theoretical literature, we find that even in a model of permanent income when old age pensions are accumulated in illiquid assets which are non-collaterisable, agents will have precautionary savings. Talking about the precautionary savings component, Skinner (1998) suggests that the latter accounts for 56 per cent of total life cycle savings in the USA. However, there are no reliable estimates of the share of precautionary savings in total savings for India. Now, in our stylized discussion of insurance reform which is equivalent to a transition from 'savings only' economy to one where both the saving and insurance options are open to an agent, we may assume that the pre-reform economy, agents save as a proxy for self insurance. In the discussion that follows, I set out to prove a proposition that optimal savings would unambiguously fall as a result of insurance reform. In Section I of this chapter, I present the Ehrlich and Becker framework of market insurance and discuss the effects of changes in terms of trade on optimal insurance decisions. Subsequently, in Section II, I discuss the pre-reform scenario of self insurance. The final and more original part concerns a

simultaneous determination of the full insurance decision – and conditions for the introduction of market insurance option. The resultant impact on saving under alternative modeling of insurance reforms is discussed at length.

I. Market Insurance:

We assume for simplicity that an individual (the representative agent) is faced with only two states of the world (0,1) with probabilities (1-p) and `p' respectively. The reader should note that I use different notations in this chapter vis-à-vis the earlier one.

State `0' is the `good state'.

State `1' is the `bad state'.

Real income endowment in each state is given with certainty by $\hat{I}_0$ and $\hat{I}_1$ respectively. If state 1 occurs, the prospective loss $\hat{L}$ is:

$$\hat{L} = \hat{I}_0 - \hat{I}_1.$$

If income in state 0 can be exchanged for income in state 1 at a fixed rate, we have

$$-\frac{dI_0}{dI_1} = \pi \qquad (1)$$

then `$\pi$' can be called the `price of insurance'. Now, the amount of insurance purchased in state 1 can be defined as the difference between the actual (I_1) and endowed ($\hat{I}_1$) incomes:

Let us denote this as `M' where

$$M = I_1 - \hat{I}_1 \qquad (2)$$

[*The insurance contract offered by an insurer is of the following type:*

- *buy any coverage (net) M ($\leq \hat{L}$) at a price π per unit in 'good state'*
- *receive the coverage M in case of 'bad state'.]*

Here, insurance bought is actually in terms of 'coverage minus premium', or the net addition to income in state 1.

The expenditure on insurance measured in terms of state 0's income is:

$$B = \hat{I}_o - I_o = \pi \, . \, M \qquad (3)$$

Substituting (2) in (3), we have

$$\hat{I}_o - I_o = \pi (I_1 - \hat{I}_1) \qquad (4)$$

Reh (4) is the opportunity boundary or the line AB (if gambling is also allowed) in Fig. 1. Furthermore, for analytical simplicity, we assume a single aggregate numeraire commodity in each state (the price of which is assumed to be unity).

It is assumed that the individual chooses the optimal income in states 0 and 1 by maximizing the expected utility of income prospect.

$$U^* = (1\text{-}p)\, U(I_o) + p\, U(I_1) \qquad (5)$$

subject to the constraint given by the opportunity boundary (Reh 4).

Therefore the related lagrange expression looks like:

$$L = (1-p)U(I_o) + pU(I_1) + \lambda[\hat{I}_o - I_o - \pi(I_1 - \hat{I}_1)] \qquad (6)$$

Therefore the first order optimality conditions are:

$$\frac{\partial L}{\partial I_o} = (1-p)U_o' - \lambda = 0 \qquad (6a)$$

$$\frac{\partial L}{\partial I_1} = pU_1' - \pi\lambda = 0 \qquad (6b)$$

Thus, the optimization exercise generates the first order maximization condition (that the second order condition for existence of a unique maximum is satisfied is shown later).

$$\pi = \frac{pU_1'}{(1-p)U_0'} \tag{7}$$

where $\frac{pU_1'}{(1-p)U_0'}$ is the slope of the indifference curve (defined along $du^* = 0$) and π is the slope of the budget line. In equilibrium, they must be the same (see point P in Fig. 1).

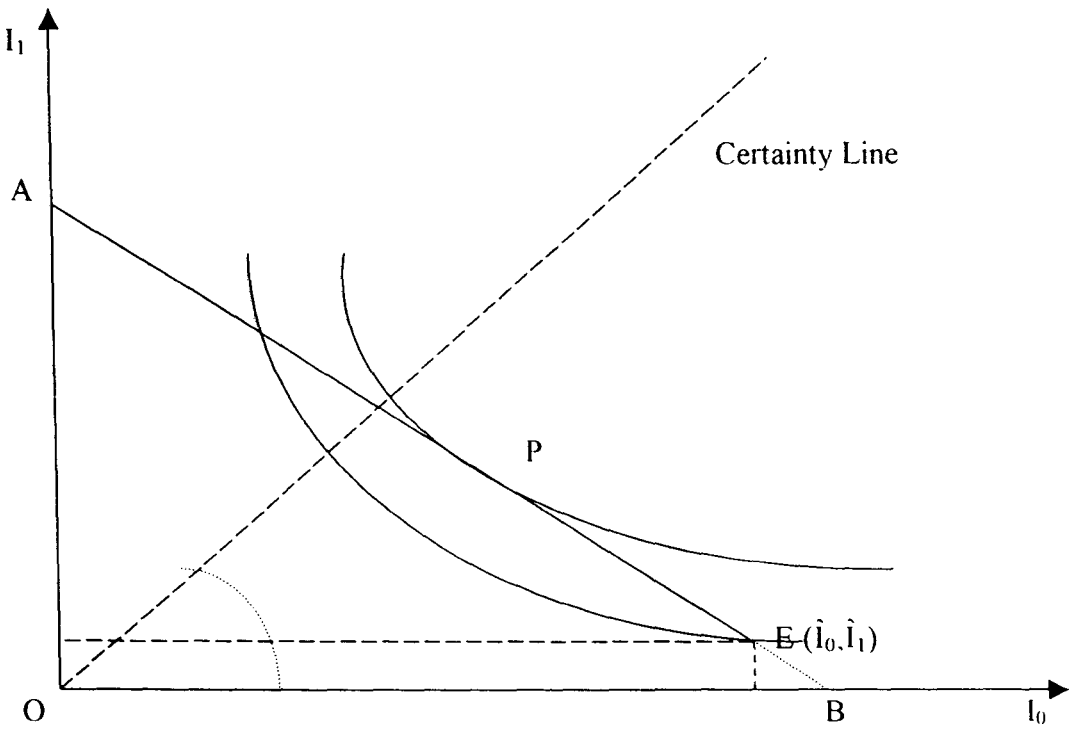

Figure 1: Market Insurance Option

In Figure 1, all the points in the positive quadrant represent income combinations in the two states. We take income in state 0, i.e. in the good state along the horizontal axis while income in bad state, i.e. state 1 is taken along the vertical axis. The point E ($\hat{I}_o$, $\hat{I}_1$) represents the initial income endowment point prior to purchase of any insurance. The line AB represents the opportunity boundary. All points along the 45° line represent equal income combinations in the two states, i.e. a case of full insurance wherein incomes become state independent. Thus, this 45° line is also referred to as the 'certainty line'.

Now, an actuarially fair exchange is an exchange of p/(1-p) units of income in state 0 for an additional unit of income in state 1 where p/(1-p) is the odds that state i would occur. One can completely separate tastes from environmental factors by dividing p/(1-p) through in equation (7) to obtain

$$\pi = \frac{(1-p)}{p}.\pi = \frac{U_1'}{U_o'} \qquad (8)$$

Further, $\bar{\pi}$, the price of insurance deflated by the actuarially 'fair' price, p/(1-p), is a measure of the 'real' price of insurance because a fair price is costless[1] to the individual. Now if π had been (p/1-p) i.e. actuarially fair, equation (8) would have reduced to

$$1 = \frac{U_1'}{U_o'}, \text{ i.e.}$$

incomes would be equalized in both states of the world if the marginal utility of income were always diminishing. This is 'full insurance' [P would have lied on the certainty line then] in the sense that a person would be indifferent as to which state occurred. Indeed,

---

[1] For a detailed discussion, see Ehrlich and Becker (1972).

his income in each state would equal his expected income; therefore, fair insurance can be regarded as costless to him.

Equation (8) thus implies that, in equilibrium, the real price of insurance equals the ratio of the marginal utility of I_1 to that of I_o, the ordinary result in consumer theory.

The second order condition requires that the indifference curve be convex to the origin at the equilibrium point, or

$$D = - p U_1'' - \pi^2 (1-p) U'' > 0 \qquad (9)$$

The strictly diminishing marginal utility of income would be a sufficient condition for the purpose.

Now, we can look into some immediate implications of equation (8). We find that some positive amount of insurance is demanded ($M > 0$), i.e. some I_o would be traded for I_1, if the slope of the indifference curve is less than the price of insurance at the endowment point E:

$$\bar{\pi} > \frac{U'(\hat{I}_1)}{U'(\hat{I}_o)}.$$

If the opposite were true, the equilibrium point P would like to the right or E along EB, i.e. 'gambling' would be demanded, provided similar terms of trade apply in redistribution of income toward state 0.

Therefore, inferences about attitude towards risk cannot be made independently of existing market opportunities: a person may appear to be a 'risk avoider' under one combination of prices and potential losses and a 'risk taker' another. However, existence

of gambling markets may be ruled out (in which case the opportunity boundary reduces to AE in Fig. 1).

Thus, I have shown how the presence of market insurance option can potentially alter the welfare level of the consumer. Now, before exploring the Indian insurance scenario and savings optimality, we consider a few other issues. For one, insurance reforms in India also means letting more players into the insurance provider market and ushering in competition. A direct consequence of this competitive scenario may be the fall in the market price of insurance. Therefore, we shall look into the terms of trade effect of insurance reforms, keeping the probability of loss (p) and initial endowment ($\hat{I}_o$, $\hat{I}_1$) unchanged. Now, the effect of an exogenous price fall of insurance on the demand for I_1 (p & $\hat{I}o$, $\hat{I}_1$ remaining same) can be found by differentiating the first order condition (equation 7) with respect to ($-\pi$).

$$-\frac{\partial I_1}{\partial \pi} = -\frac{1}{D}\left[-(1-p)U_o' + (I_1 - \hat{I}_1)\pi(1-p)U_o''\right] \qquad (10)$$

Recalling equation (9), we have:

$$D = -\,p\,U_1'' - \pi^2(1-p)\,U_o'' > 0$$

Now, if $I_1 > \hat{I}_1$, i.e. some positive amount of insurance is already bought in the first place, and if Diminishing Marginal Utility of income is assumed, then

$$-\frac{\partial I_1}{\partial \pi} > 0.$$

i.e. a fall in the relative cost of income in state 1 (i.e. the cost of net addition to income in the bad state) increases the demand for income in this state.

Now, $M = I_1 - \hat{I}_1$ [from equation 7]

Because $\hat{I}_1$ remains unchanged, we have

$$-\frac{\partial M}{\partial \pi} = -\frac{\partial I_1}{\partial \pi} > 0.$$

i.e. the amount of insurance purchased also increases, with a fall in its market price. However, because the per unit cost of insurance falls, whether higher purchase of insurance means larger amount of expenditure spent on insurance remains ambiguous. That is, higher amount of insurance purchased does not necessarily imply higher expenditure on insurance.

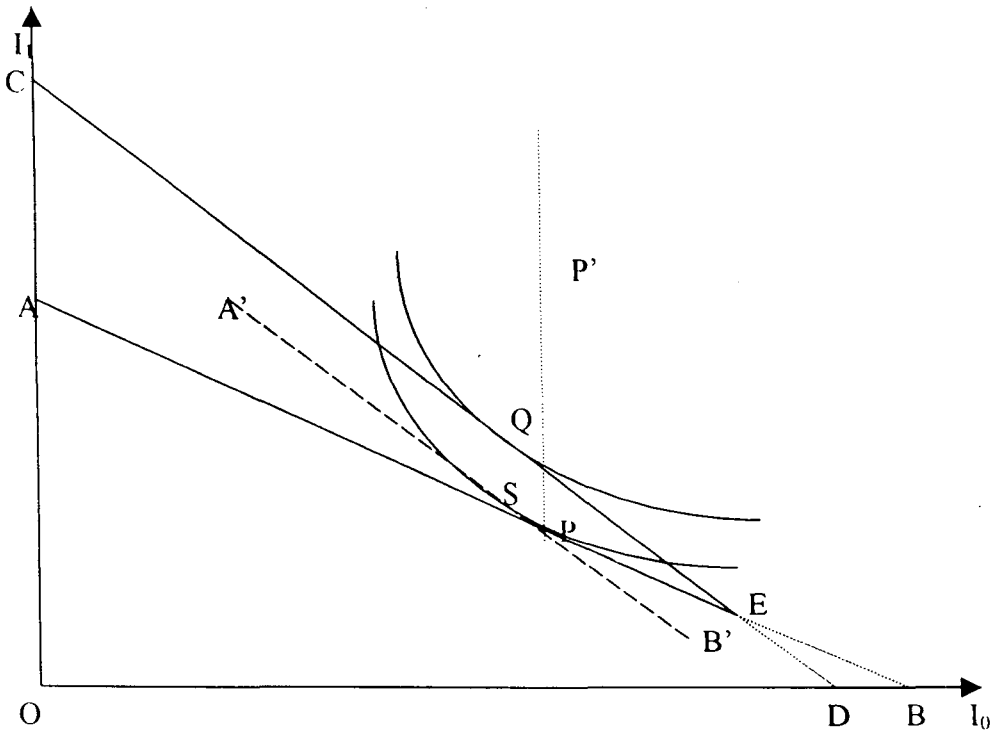

Figure 2: Price effect of fall in insurance price on Income and insurance demand

Thus, effect on income in the good state remains ambiguous. Hence,

$$\frac{\partial I_o}{\partial \pi} = -\frac{1}{D}[(1-p)U_o'\pi + (I_1 - \hat{I}_1)pU_1''] \qquad (11)$$

may be positive, zero or negative. The amount spent on insurance will only be higher if the price elasticity of demand for insurance exceeded unity i.e. if $e_{DD}^{M} > 1$. (a proof is obvious).

Diagrammatically (see Fig. 2), a fall in insurance price implies that the opportunity boundary changes from AE to CE. If I_1 is a superior good, Q must be to the left of PP'. Even if I_1 is an inferior good, a 'pure' (expenditure compensated) fall in terms of trade must always increase the demand for I_1 and decrease I_o; i.e. the equilibrium must shift from P to its left, to S on the expenditure compensated budget line A' B'. The new equilibrium point is Q on the new budget line CE.

II. The 'Savings only' economy:

I have already characterized the pre-reform Indian economy as a 'Savings only' economy where there was no market insurance available for a plethora of insurable income risks. However, to guard against the probable loss in the event of occurrence of a 'bad state', individuals were free to self-insure by undertaking some savings.

We assume that savings, as a proxy for self-insurance, reduces the size of the loss. Now, given the savings option, the loss to a person is of the form: $L = L(\hat{L}, S)$ where $\hat{L} = \hat{I}_o - \hat{I}_1$, S = Expenditure on self-insurance (this is considered as a proxy for savings) and

$$\frac{\partial L}{\partial S} = L'(S) \leq 0.$$

Now, we enter into a formal analysis of the expected utility maximizing behaviour of a representative individual in a 'savings only' (pre-insurance reform) economy. The expected utility can be written as:

$$U^* = (1-p)\,U(\hat{I}_o - S) + p\,U(\hat{I}_o - L(\hat{L},S) - S)$$

where 'S' is the saving done (as a proxy for expenditure on self insurance) as a precaution against the occurrence of the bad state (State 1). The value of S, i.e. S^1, that maximizes U* is obtained from the first order optimizing condition. Hence,

$$(1-p)U_o'(\hat{I}_o - S) + p\,U_1'(\hat{I}_o - L(\hat{L},S) - S)(1 + L'(S)) = 0$$

$$\text{or,} \quad -\frac{1}{L'(S')+1} = \frac{p\,U_1'}{(1-p)\,U_o'} \qquad (13)$$

This maximizes expected utility of the marginal utility of income and the marginal productivity of self insurance are decreasing, that is, if the indifference curves are convex and if the income transformation curve between the income states 0 and 1 (JK in Fig. 4) is concave to the origin. A necessary condition for a positive amount of savings (as self insurance) is $-L'(S') > 1$ or, that there be a net addition to income in state 1.

A diminishing marginal productivity of savings means there exists an implicit unit cost, 'α' of savings increasing. Here 'α' is a parameter that reduces the absolute value of L' for a given S. Thus we have a concave production transformation curve JK as in Fig. 3. In a 'savings only' economy, given the curvatures of the indifference curves and the production transformation curve, S_o^1 is an equilibrium point. The optimum savings S'

is actually the horizontal distance, $\overline{E_0E_1}$, between S_0' and E in Fig. 3. Here, E is again the initial endowment point $(\hat{I}_0,\hat{I}_1)$ of the individual.

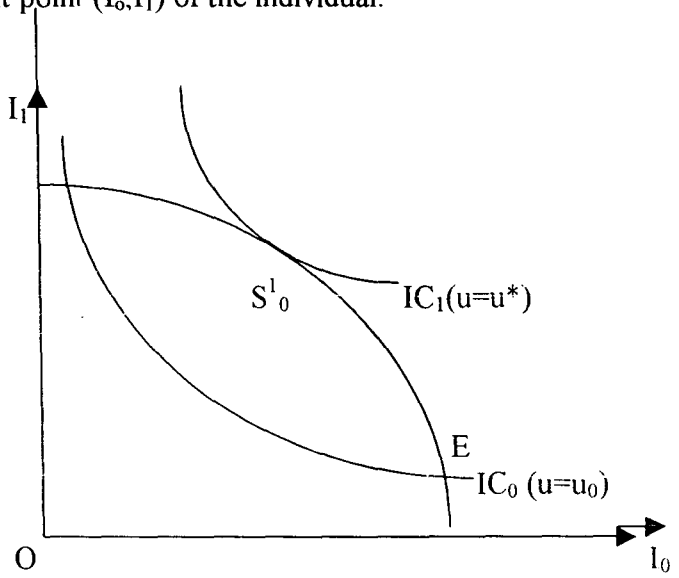

Figure 3: Optimum savings in a savings-only economy

Thus, a discussion of the pre-reform self-insurance economy captures the savings behaviour of the individual, particularly in terms of the precautionary savings motive and that has been taken as a proxy for self insurance. Given a diminishing marginal productivity of savings (or self insurance), each unit saved (or, spent on self insurance) reduces the size of endowed loss by more than one unit at a diminishing rate. Thus, in equilibrium the individual reaches a point S_0' where his welfare level U* is same as that along the indifference curve IC_1 in the diagram (Fig. 3).

III. Introducing the market insurance option:

Now, the individual faces a situation where the market and self insurance are jointly available. He can save and/or buy insurance. The individual pays the premium πM (as discussed in Section I) out of his 'good state' endowment, $\hat{I}_o$ to protect himself against the occurrence of 'bad state'. It may be assumed that savings and insurance markets are independent. However, the individual being assumed to be an expected utility maximiser, now takes his savings and insurance decisions jointly. Thus, values of S and M are now simultaneously chosen. Individual's problem becomes:

$$\max_{S,M} E\,U = (1-p)\,U(\hat{I}_o - S - \pi M) + p\,U(\hat{I}_o - L(\hat{L},S) - S + M) \qquad (14)$$

If the price of market insurance were independent of the amount of self insurance, the first order optimality conditions would be:

$$- \quad (1\text{-}p)\,U_o' \,\pi + p\,U_1' = 0$$

$$- \quad (1\text{-}p)\,U_o' - p\,U_1'\,[L'(S)+1] = 0 \qquad (15)$$

By combining these equations, we get

$$\pi = -\frac{1}{L'(S)+1} \qquad (16)$$

In equilibrium, therefore, the "shadow price" of self insurance would equal the price of market insurance.

Now, let the values of S and M for which the expected utility of the individual is maximum be $S^{1}*$ and M^* respectively. To examine how the introduction of the market insurance option affects savings behaviour, a comparison of the optimal savings, S^1 in the savings only economy with that (viz. S^{1*}) in the joint savings and insurance

possibility economy becomes necessary. A condition for the introduction of the market insurance option to be meaningful also emerges from the analysis.

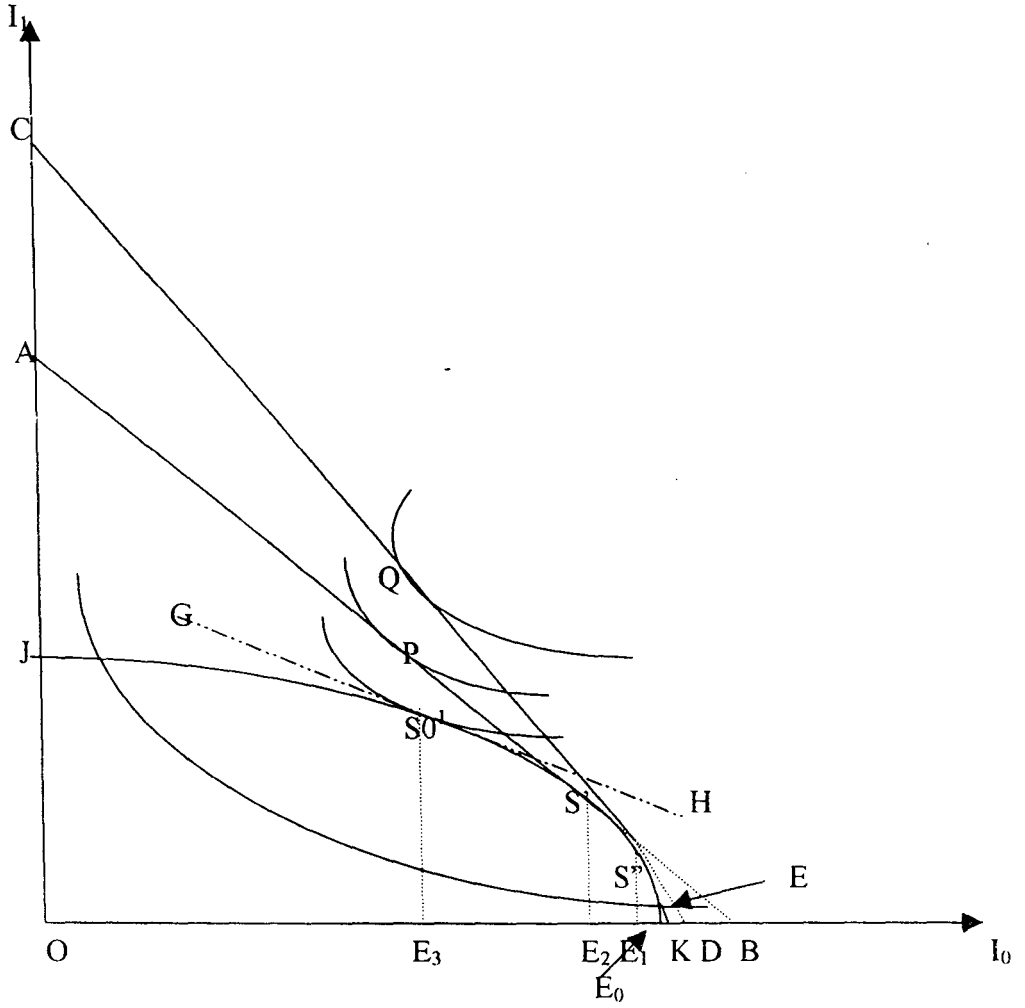

Figure 4: Optimum savings & insurance purchased given market insurance option :Welfare effect

We may take a look at Fig. 4, for the purpose. Given the self insurance (savings) option, the individual can already raise his level of utility from U_o (on indifference curve $1C_o$ passing through E) to a level, say U^*_{max} by moving along the income transformation

curve, JK. However, in the absence of any institutional market insurance mechanism he is restricted to move beyond the curve JK, and therefore cannot raise his welfare further. Thus, S^1 is the individual's optimal savings in the 'savings only' economy represented by the horizontal distance $\overline{E_oE_1}$ between S_o^1 and E in Fig. 4 (as pointed out earlier). When market insurance is introduced now, the individual is free to move his actual income combination beyond the income transformation frontier JK, and choose a point on opportunity boundary AS', where his welfare level is higher than U^*_{max}. The optimal income combination point P (in Fig. 4), given the joint savings and insurance possibility is such a point.

Here, I have assumed that for some market price of insurance 'π', AS' is the corresponding opportunity boundary that the consumer faces. But then, the question that naturally crops up is how we characterize the opportunity frontier. It is important to note that gambling markets are non-existent. Thus, the individual is prohibited from gambling on his endowment bundle. When insurance option is introduced in a situation where savings option already prevails, one may observe that any point on the income transformation curve JK is already attainable by the individual. Thus, unlike in Section I, note that AB does not have to pass through the initial endowment point 'E'. Further, since gambling is prohibited, the individual's relevant opportunity boundary as represented by the market insurance option does not include the part of any tangent AB, that lies to the right of the point of tangency. Non-existence of gambling markets and its consequences is a realistic problem not considered by Ehrlich and Becker. The

consideration actually makes my findings on optimal savings behaviour robust. We will presently see how that works:

Let us recall the relation obtained in equation (16) from the first order maximizing condition over here.

$$\pi = -\frac{1}{L'(S)+1}$$

Now, if the market insurance is actuarially 'fair', the equilibrium condition in equation (16) becomes

$$-\frac{1}{L'(S)+1} = \frac{P}{1-p}$$

$$\text{or, } -L'(S) = \frac{1}{P} \qquad (17)$$

This is however, precisely the condition that maximises expected income (a proof is obvious[2]). Therefore, even with diminishing marginal utility of income, the individual will act as if he is risk-neutral and chooses the amount of saving that maximizes his expected income. Thus, unlike the savings only case, saving does not act primarily in the interest of risk transformation. Consequently, it is shown that apparent attitudes towards risk are dependent on market opportunities, and real attitudes cannot be easily inferred from behaviour.

More generally, even if insurance is not actuarially fair, the optimal amount of savings (self insurance) would maximize the market value of income given by:

$$\hat{I}_o + \pi \hat{I}_1 \equiv w \equiv I_o + \pi I_1 \qquad (18)$$

---

[2] Equation (17) can be derived by maximizing $E(Y) = (1-p)(\hat{I}-S-\pi M) + p(\hat{I}_o - L(\hat{L}.S)-S+M)$ with respect to 'S'.

(can be obtained from equation (4)).

Unlike the `savings only' situation, the optimal amount of savings is the "joint possibility" case would not depend on either the shape of individual's indifference curves or, on the probabilities of the states. Geometrically, therefore, optimal savings is determined by moving along the income transformation curve JK in Fig. 4. to the point of tangency between this curve and the market insurance line viz. some point S'. Thus, the optimal savings S^{1*} in the joint possibility scenario is the horizontal distance, $\overline{E_0E_2}$ between the initial endowment point E and point S'.

We find that $\pi \cdot \frac{U'(\bar{I}_1)}{U'(\bar{I}_0)} > \overline{E_0E_2}$, and therefore optimal savings falls when market insurance option is introduced. However, it may be recalled that we have found this result by considering the position of the market insurance line AS' arbitrarily. To prove my proposition that savings would fall unambiguously, we must show that the tangency point that any opportunity boundary generates should always lie to the right of the point S_0^1 (in Fig. 4). Let us explore how it works.

In the `savings only' case, we already know that the optimum amount of savings S^1 is chosen. This is equivalent to purchasing insurance at a unique terms of trade, say π^* (shown by the opportunity boundary GS_0^1 in Fig. 4) when the joint possibility is available. Hence, the critical value of terms of trade that the market insurance offers where the individual would be indifferent between insurance purchasing and saving is:

$$\pi^* = -\frac{1}{L'(S')+1} \qquad (19)$$

If market insurance that is introduced into the 'savings only' economy is costlier than this π^* (the possibility of gambling being ruled out), the representative individual would have no incentive to buy insurance. Given the shape of individual's utility curve, coupled with the non-existence of the gambling option, any tangency point to the left of S_o^1 (in Fig. 4) that a costly market insurance option generates is as good as the absence of the insurance option.

Thus introduction of the insurance option in a 'savings only' economy makes sense only when the terms of trade that it offers is cheaper than that offered by the savings option (along the income transformation curve, JK) at point S_o^1. Thus, any tangency point S^1 would always lie to the right of S_o^1 and the position of AS' cannot be debated. Hence, my proposition is proved.

(B) Insurance Reforms as Decrease in Price:

If insurance reforms are viewed as a new set of rules lifting entry barriers to the existing insurance market served by a state monopoly provider, we might as well assume that a level playing field for all providers, results in intense competition which involves a decrease in price of insurance, i.e. the consumer faces a cheaper terms of trade if he goes to the insurance market now in comparison to the earlier state.

Let us first examine diagrammatically what happens (see Fig. 4). If AS' represents the pre-reform insurance price line, then the new opportunity boundary due to a cheaper terms of trade may be represented by the steeper opportunity boundary CS'' (individual's highest possible bad state income for any given good state income thereby increases). The savings amount is optimal now (i.e. market value of income is

maximized) at the tangency point S''. Consequently, the optimum amount of savings is the horizontal distance between S'' and E, i.e. $\overline{E_0E_3}$. From Fig. 4, it is obvious that $\overline{E_0E_2} > \overline{E_0E_3}$, and hence optimum savings fall. We may also observe that the equilibrium income combination point moves from P to Q on CS'', providing a higher welfare level to the consumer.

To prove the proposition mathematically, we have to examine the terms of trade effect on optimal insurance and savings. To determine the terms of trade effect, we again consider the 'joint possibility' expected utility maximization problem.

From equation (14), we have

$$\max_{S,M} E\,U = (1-p)\,U(\hat{I}_0 - S - \pi M) + p\,U(\hat{I}_0 - L(\hat{l},S) - S + M)$$

The first order conditions were:

$$EU_M = -(1-p)\,U_0'\,\pi + p\,U_1' = 0 \qquad \text{(a) [from (15)]}$$

$$EU_S = -(1-p)\,U_0' - p\,U_1'\,[L'(S)+1] = 0 \qquad \text{(b)}$$

Now, (b) is satisfied iff $q = [(L'(S)+1] < 0$ i.e. only when there is net addition to bad state income due to savings.

Now, second order optimality conditions are:

$$EU_{MM} = (1-p)\,U_0''\,\pi^2 + p\,U_1'' < 0 \qquad \text{(20a)}$$

$$EU_{SS} = (1-p)\,U_0'' + p\,U_1''\,q^2 - p\,U_1'\,L'' < 0 \qquad \text{(20b)}$$

$$\Delta = EU_{MM}\,EU_{SS} - (EU_{MS})^2 > 0 \qquad \text{(20c)}$$

Equations (20a) and (20b) are satisfied if $U'' < 0$ and $L'' = \frac{\partial^2 L}{\partial S^2} > 0$, that is if both marginal utility of income and marginal productivity of saving is falling. These assumptions also satisfy equation (20c) where, $(EU_{MS}) = U_o'' \pi - p U_1'' q < 0$.

Utilising the first order condition that

$\pi (1+L') = -1$, we have,

$\Delta = -p(1-p) U_1' U_o'' L'' \pi^2 - p^2 U_1' U_1'' L''$,

where $\Delta > 0$, for $U'' < 0$, $L'' > 0$.

Now, the effect of a fall in the price of insurance on the optimal values of M and S when $\hat{I}_o$, $\hat{I}_1$, $\hat{L}$ and p are constant can be found by differentiating equations (15a) and (15b) with respect to 'π'.

Thus, we have,

$$\left[(1-p)\ \pi U_o'' - pU_1''(L'+1)\right]\frac{\partial S}{\partial \pi} + \left[(1-p)\pi^2 U_o'' + pU_1''\right]\frac{\partial M}{\partial \pi}$$

$$= (1-p)\left[U_o' - \pi M * U_o''\right] \qquad \text{(A1)}$$

$$\left[(1-p)\ U_o'' + pU_1''(1+L') - pU_1' L''\right]\frac{\partial S}{\partial \pi} + \left[(1-p)\ U_o'' - p(L'+1)\right]\frac{\partial M}{\partial \pi}$$

$$= (1-p)\left[M * U_o''\right] \qquad \text{(A2)}$$

By Cramer's rule,

$$-\frac{\partial M^*}{\partial \pi} = -\frac{A_1 EU_{SS} - A_2 EU_{MS}}{\Delta}$$

$$= -\frac{1}{\Delta}\left[(1-p)^2 U_o' U_o'' + p(1-p) U_o' U_1'' b^2 - p(1-p) U_1' U_o' L'' + p(1-p) U_1' U_o'' M^* \pi L'' \right]$$

$$= -\frac{(-)}{(+)} > 0.$$

Thus, $$\frac{-\partial M}{\partial \pi} > 0 \qquad \text{(A3)}$$

where $A_1 = (1-p)\,[U_o' - \pi M^* U_o'']$

and $A_2 = -(1-p)\, M^* U_o''$.

Similarly,

$$-\frac{\partial S^*}{\partial \pi} = -\frac{A_2 EEEU_{MM} - A_1 EU_{MS}}{\Delta}$$

$$= -\frac{1}{\Delta}[-(1-p)^2 U_o' U_o'' \pi + p(1-p) U_o' U_1'' b]$$

$$= -\frac{(+)}{(+)} < 0.$$

Thus $$\frac{-\partial S^*}{\partial \pi} < 0 \qquad \text{(A4)}$$

Hence, from the results (A3) and (A4), we can consider market insurance and savings in this model to be substitutes. Further, a fall in `π' due to insurance reforms,

the probability 'p' of loss remaining the same, would increase the demand for market insurance and reduce the demand for savings. This proves the proposition once again.

Summary:

Following a comprehensive literature survey of aspects of rational insurance purchasing in the last chapter, I have devoted whole of this chapter to examine the association between insurance and savings decisions, in the backdrop of Indian insurance reforms which provides a rich setting for the analysis. I have stylized saving here as a proxy for self-insurance particularly focusing on the precautionary motive. Primarily using Ehrlich and Becker's (1972) framework for analysis, I have considered the issue of non-existence of gambling and extended the implications for the model. Particularly exciting has been the findings on the individual's optimal savings behaviour when the insurance option is introduced. Modelling insurance reforms in two alternative ways in Subsections (IIIA) and (B), I have proved my proposition that insurance reforms contrary to popular expectations, unambiguously results in a reduction of optimal savings. However, there remains abundant scope of extending the model in examining the implications for probability of insurer insolvency as an additional risk, implications for savings behaviour if gambling markets exist and long term growth effect of deeper term insurance penetration.

Dwelling at length with theoretical aspects of insurance liberalization, a need for a closer look at the Indian insurance scenario becomes obvious. Liberalisation experiences and greater degree of overlapping in competing financial services have thrown up new debates for the right kind of regulatory framework in insurance literature. The underexplored areas of insurance viz. health and pension benefits, along with issues in

regulation for the insurance industry are considerations that cannot be ignored. Thus, the next chapter discusses at length these areas relevant for the Indian insurance industry at the onset of the post-reform era.

CHAPTER IV

ISSUES IN REGULATION OF THE INDIAN INSURANCE INDUSTRY

The Indian insurance industry, now in its immediate post-liberalisation phase, is gradually warming up to competition. Private companies have already started operating both in the life and non-life sectors. The theoretical analysis in the previous chapter has demonstrated that market insurance and savings[3] (as a proxy for self insurance) are clearly substitutes. Therefore, in the current post-liberalisation phase, it may be expected that as product range widens and/or product prices fall in the insurance market, optimising behaviour would indicate that a representative individual's propensity to save (through the precautionary motive) would fall. Now, in a Keynesian macroeconomic sense, that would be unambiguously advantageous for the economy as output effect of each unit invested increases. Further, the availability of a risk-trading option at cheaper terms of trade, than what the precautionary aspect of saving can offer, would be welfare increasing for every individual. In an aggregative sense, the movement of the precautionary savings component is difficult to gauge as available savings data in India (see Table) do not identify the share of precautionary savings in the aggregate household savings. The theoretical analysis indicates what happens to savings for each unit of income earned. The consumption smoothing aspect of savings remains unaffected. A fall in the propensity to save precautionarily thus does not indicate that gross domestic savings would fall. On the contrary, generation of higher income out of a higher growth rate of gross domestic product (GDP) in a competitive economy will increase aggregate savings, if we assume that total amount saved is a rising function of income. A liberalised insurance sector is also expected to improve the level of insurance penetration

[3] Recall that I have considered saving in chapter III only in its precautionary aspect.

(defined as the share of gross domestic premium in GDP) that is presently quite low (around two per cent) when compared to developed countries. Now the extent to which the optimal savings behaviour changes, bringing welfare gains to the consumer (and economy as a whole) as discussed in the preceding chapter, depends primarily upon how the insurance industry in a liberalised economy performs vis-à-vis expectations. Experiences in developed markets viz. In U.S. show that competitive pressures in the last two decades have led insurers to assume greater risk in order to offer consumers more attractive prices and products, resulting in larger and more frequent insurer failures. Such post-contract risky behaviour of insurers broadens the scope for defining 'moral hazard' where not only the insured, but all parties to the insurance relationship may be included. Existence of this problem increases the probability of default and insolvency of the insurer. Now, the possibility of contract non-performance as an additional risk that the consumer faces in an open insurance market is one that is only recently being explored in the literature focussing on aspects of rational insurance purchasing. Such a consideration, that there is a finite possibility of contract non-performance that an individual might face, particularly in a newly liberalised insurance market may alter the results relating to the individual's savings behaviour and welfare as obtained in chapter III. Herein comes the importance of the right kind of regulatory framework that would be able to limit the possibility of contract non-performance and alter individual's savings behaviour in a desired manner. We would explore these regulatory issues in detail in Section II of this chapter. The first section briefly presents a clear picture of the insurance industry in India underlining its problems and prospects.

I. Aspects of Insurance Business in India:

Evolution of Insurance Activity:

In India, life insurance provision in its modern form was started by Britishers in 1818 under a racially discriminatory system of premium pricing. Bombay Mutual Life Assurance Society, the first Indian insurer that began operations in 1870, introduced an equal premium option. General insurance activity had also begun by then and the Triton Insurance Company Limited was the first general insurance company established in India in 1858, at Kolkata. Foreign companies dominated insurance business right up to the beginning of the 20th century. The first Indian general insurer, The Indian Mercantile Insurance Company Limited, set up office in Mumbai in 1907. Thereafter, the number of both Indian and foreign insurance firms in the Indian market kept growing and the pace, particularly in the life sector, was rapid during the 1920s and early 1930s. These developments underlined the need for codes of conduct to ensure fair and ethical business practice by the insurers. The passage of the Life Insurance Companies Act, 1912 and the Provident Fund Act, 1912, however, could not prevent the large scale fraudulent practices that mired insurance business during the 1930s. Thus, a comprehensive legislation was introduced under Insurance Act of 1938 that provided for stringent controls over insurance business in the country.

Nationalisation:

After Independence, competition between Indian and foreign insurers led to significant growth in business, though insurance mostly remained an urban phenomenon. However, insurer malpractices involving fund misuse, excessive costs and frauds

resulting in frequent liquidation of insurance companies robbed many policyholders off their savings and security. Public confidence in the system was shaken and even the passage of Insurance Act 1950 could not improve the situation. Confronted with this problem on one hand, the Government of the time was also looking for long term funds that would provide the much needed financial support to the Mahalonobis strategy of heavy industrialisation. As a rational policy decision that could effectively address both the problems at hand, the Government brought together 154 Indian insurance firms, 16 foreign ones and 75 provident societies (Iyer, 2000) under one nationalised monopoly corporation, the Life Insurance Corporation (LIC) in 1956. Private insurers who continued business in the non-life sector failed to cater to the personal insurance needs of the households and restricted their operations mainly to organised trade and industry in the urban areas. This prompted the government, in 1972, to merge 107 companies including the branches of foreign companies and group them into four companies namely the National Insurance Company Limited, the Oriental Insurance Company Limited, the New India Assurance Company Limited and the United India Insurance Company Limited with head offices at Kolkata, Delhi, Mumbai and Chennai respectively. The General Insurance Corporation (GIC) was formed as a holding company in November, 1972 for supervision and control of the business in the non-life sector.

Life Insurance Business:

With the organisational changes within LIC, such as decentralisation of functioning of divisional offices and decentralisation of policy servicing of branch offices, there has been a significant growth in the life business since the early 1980s (see

Rao, 1999) and almost 50 per cent of policy holders come from the rural areas. Now, life insurance policies typically offer a bundled savings component, where the latter is attached with a `lock-in' conditionality. Given this link between savings and premiums, any analysis of insurance business has to be seen in the context of all other savings activities of the households. Life insurance funds comprised 3.9 per cent of household savings in 1980-81 and increased to 7.1 per cent in 1999-2000. However, these funds remained by and large constant at 6 per cent from 1990-'91 onwards. The trend after 1990-'91 indicates that as percentage of household savings, these funds remained static (see Table 1).

In the 1980s, even with lower average sum assured per policy and increase in rural business where transaction costs are higher, the LIC had succeeded in converting a growing amount of annual premium income into life insurance fund. However, though total premium income of the LIC has grown at a compound annual rate of approximately 20 per cent in the '90s, the contribution of the life fund to the financial savings (which itself grew as a share of total household savings as Table 1 indicates) of the households has remained static. It may be pointed out here that household savings is the single largest component of Gross Domestic Savings in India. For instance, in 1999-2000, out of the total savings of 22.3 per cent of GDP, the household sector contributed 88.8 per cent. In a macroeconomic sense, the link between high growth rates and savings is well known from classical growth theory. In the Indian context, Patel (1997) indicates that a growth rate of GDP of 8 per cent is only possible with a savings rate of 30 per cent. Here, the household sector has a major role to play.

Table 1: Composition of Household Savings in India

	1980 -81	1990-91	'91-92	'92-93	'93-94	'94-95	'95-96	'96-97	'97-98	'98-99	'99-2000
(A) Financial saving as % of Total Household Saving of which	39.4	45.3	56.9	52.4	63.1	55.6	45.5	52.6	55.6	57.0	53.0
(i) Currency	7.4	5.7	7.5	5.3	8.9	8.1	7.9	5.2	4.9	6.2	5.5
(ii) Net Deposits	13.7	10.2	13.3	15.9	21.9	16.5	12.5	23.1	22.0	19.9	15.1
(iii) Shares and Debentures	2.0	7.7	14.5	11.1	9.9	7.9	3.8	3.7	2.1	2.0	4.0
(iv) Net claims on Govt.	2.6	6.7	4.1	2.8	4.1	6.6	4.4	4.5	7.9	8.4	7.1
(v) Life Insurance Funds	3.9	4.9	6.1	5.4	6.1	5.6	6.3	6.0	6.8	6.8	7.1
(vi) Provident plus pension funds	9.7	10.2	11.4	11.9	12.2	10.9	10.6	10.1	11.9	13.7	14.2
(B) Saving in physical assets	60.6	54.7	43.2	47.6	36.9	44.3	54.5	47.4	44.4	43.0	47.0

Source: Economic Survey (various years), GOI; Report on Currency and finance (various years),
RBI; National Account Statistics,, EPW Research Foundation (1998).

However, compared to other economies, the share of life insurance premium in the household savings, and more generally in the Gross Domestic savings is quite low (see Table 2).

Table 2

Life premium as percentage of gross domestic savings [1997]

Africa	Asia	Europe	Latin America	North America
South Africa	Japan	U.K.	Brazil	USA
80.90	27.10	55.40	2.20	25.40
Kenya	South Korea	France	Argentina	Canada
2.00	25.90	27.50	3.20	15.70
	China	Netherlands	Mexico	
	1.70	18.30	0.57	
	Israel	Italy	Columbia	
	24.50	8.50	3.20	
	Malaysia	Spain	Venezuela	
	9.20	11.20	0.12	
	India	Switzerland		
	6.20	28.20		
	Hongkong	Russia		
	8.20	1.30		
	Singapore	Germany		
	7.10	1.05		

Source: Calculated from World Development Report 1998-'99 and 1999-2000 and 'World Insurance in 1997', Sigma-Swiss, No. 3/99.

In life insurance, demand for policies with higher sum assured has been increasing. Whether this demand is driven by the need for higher risk coverage or whether it is simply a response to the available tax shelter is debatable. This is corroborated from the fact that around 33 per cent of new policies are taken up in March, the last month of the financial year. This March phenomenon reflects that life insurance needs to be sold innovatively and without any tax proposals, all of which greater

competition is likely to usher in. The inclusion of life insurance in the service tax bracket as announced in Budget 2002-'03 provides the right conditions to take up this challenge. Potential for growth and spread of life insurance is high in India due to strong economic growth and the presence of a rapidly ageing population in an environment of weak old age income security cover.

General Insurance Business:

In the nationalised general insurance era, gross domestic premium in this sector has increased manifold, recording an average growth of 16.90 per cent (see Table 3). However, the claims experience of theGIC has also shown an upward trend that may be attributed to increasing court awards and absence for structured compensation awards for third party claims. Although the total number of products in the general insurance industry are around 175, only a few, i.e. 40 to 50 products have dominated the market controlling about 75 to 80 per cent of the total market. The major ones are fire, motor vehicles, marine insurance that showed a market share of 24 per cent, 32 per cent and 10 per cent respectively in 1999-2000. Motor business is a part of the miscellaneous portfolio which has shown a steady growth in terms of market share keeping with worldwide trends. However, due to irrational pricing and third party claims, this business has suffered heavy losses. Another drawback that the industry suffers is that more than half of the gross domestic premiums collected, come from industry, rather than personal and small businesses. The health insurance market remains underexplored. GIC's Mediclaim policy is a relatively recent product, launched in 1986 and the marketing mechanisms are far from being adequate. Health insurance products roughly cover only 25 lakh population with premium income of about Rs. 20 crore. The entire thrust on

health insurance has been on the products after the occurrence of illness while the preventive aspects have been ignored. A ready objective analysis of the general insurance industry can be obtained from Table 3 (following page).

Table 3: Performance of General Insurance Industry in India (Rs. Crore)

	'73	'89-90	'90-91	'91-92	'92-93	'93-94	'94-95	'95-96	'96-97	'97-98	'98-99	'99-2000
(1) Paid capital	37	168	268	268	268	375	375	375	375	375	375	375
(2) Gross premium written direct to India	184	2175	2796	3287	3792	4449	4959	6047	7021	7736	8759	9522
(3) Gross premium outside India	24	104	117	216	278	317	312	330	327	350	399	460
(4) Total Gross Premium	208	2279	2913	3503	4070	4766	5271	6377	7348	8086	9158	9932
(5) % increase	--	21.3	27.8	20.3	16.2	17.1	10.6	21.0	15.2	10.0	13.3	9.01
(6) Net premium in India	--	1909	2419	2945	3284	3681	4102	5087	6041	6725	7732	8648
(7) Net premium outside India	--	277	323	505	584	746	777	869	693	632	670	716
(8) Total net premium	222	2186	2742	3450	3868	4427	4879	5956	6734	7357	8402	9364
(9). Underwriting profit	18	-119	-118	-77	-119	81	-705	-646	-678	-384	-687	-1215
(10) Net profit	14	258	334	428	503	670	377	551	721	1255	1077	874
(11) Investment income	21	449	566	752	859	957	1150	1475	1697	1978	2220	2392

Source: Annual Reports of General Insurance Corporation.

Despite the fact that the industry has grown after nationalisation in terms of premium income, introduction of new products, wide coverage of individuals and organisations, innovating new covers for weaker sections of the society, investment in social sectors, etc., several weaknesses have also come to surface during these years of operation. These are:

(i) Insurance penetration:

Insurance penetration defined as insurance premium as a share of GDP was as low as 0.56 per cent in non-life business in 1997 while life side accounted for 1.39 per cent. Even amongst the developing economies and other East Asian countries, the Indian insurance industry has lagged far behind in this area (see Table 4).

Table 4: Insurance Penetration: 1997
(Premiums as percentage of GDP)

Country	Total Business	Non-Life	Life
North America			
USA	8.49	4.64	3.85
Canada	7.37	4.30	3.07
Latin America			
Argentina	1.77	1.21	0.56
Brazil	2.12	1.74	0.39
Mexico	1.29	0.79	0.50
Europe			
Switzerland	11.94	3.61	8.33
U.K.	11.22	3.31	7.87
France	9.25	2.91	6.31
Germany	6.50	3.81	2.72
Italy	4.17	2.28	1.89
Spain	5.38	2.85	2.53
Poland	2.74	1.97	0.77
Yugoslavia	2.75	2.73	0.02
Asia			
South Korea	15.42	3.79	11.63
Japan	11.87	2.45	9.42
Taiwan	6.09	1.69	4.40
Israel	5.89	3.02	2.86
Singapore	5.14	1.31	3.83
India	1.95	0.56	1.39

Source: World Insurance in 1997: Sigma-Swiss, Re. No. 3/99.

(ii) Insurance density:

As a parameter to measure spread of insurance, the insurance density is defined as premium per capita. It was low in India even when compared to developing countries that have similar levels of per capita income.Lack of awareness among the consumers and underutilised marketing capacity may be pointed as a reason for this.

(iii) Quality of insurance services:

The quality of insurance services may primarily be evaluated in terms of expeditious settlement of claims, delivery of policy documents and after sales services. Time wise analysis of pending claims indicate that about 45 per cent claims were pending for more than one year and out of these, 23 per cent were pending for more than three years (see Srivastav, 2001). Delivery of documents has also generally been delayed. There is ample scope for improvement in these areas.

(iv) Availability of insurance products:

As discussed earlier, only few products have dominated the non-life market. There are very limited number of package policies (viz. Industrial All-Risks Policy and Office Umbrella Policy) that customers' demand these days, and are widely available in other markets. In the rural sector, limited number of products have been made available, and even the existing ones have not been properly marketed. The inadequate focus on health products has already been highlighted.

(v) Productivity:

There can be several parameters for measuring productivity in the insurance sector viz. Collection of premium per development officer, issuance of documents per employee, claim settlement per employee, underwriting results, yield on investments, etc. Over a period of time, underwriting operations of the GE have resulted into losses and these losses amounted to Rs. 1215 crore in 1999-2000, accounting for 13 per cent of net premium income. Measuring productivity in terms of collection of premium per development officer or, issuance of policy documents also indicate that it was quite on a

low scale and needs to be enhanced (e.g. collection of premium per development officer is approximately Rs. 30 lakh).

Inspite of such weaknesses, it is encouraging to note that the insurance business in India today enjoys a volume of Rs. 400 billion, and gross premium collection is growing between 15 and 20 per cent per annum. India also has the highest number of life insurance policies in the world, though only 23 per cent of the insurable population has some kind of life insurance cover (see Jha, 1995).

As a sequel to the financial reforms begun in 1991 and given the need for commercialisation of infrastructure, the insurance sector was liberalised in 1999. Experiences in some other countries with liberalisation have been positive.For example, in Indonesia, the market was opened up in 1983 and gross premium collections trebled in the last ten years. However, much of the performance of the market has been observed to be dependent on the promptness of the regulatory systems. Regulatory responsibility in India has been given to the autonomous Insurance Regulatory and Development Authority (IRDA). For the competitive scenario to improve upon existing drawbacks, the regulatory mechanism needs to be proactive. We look at these issues in the next section.

II. Regulatory Issues in India

Beginning with the recommendations given by the Committee on Insurance Reforms (better known as the Malhotra Committee 1994) for activating professional regulation as a matter of priority, the journey of insurance reforms in India is almost eight years old now. Liberalisation, in the true sense, however, only happened in 1999 with the passage of the Insurance Regulatory and Development Authority (IRDA) bill. While

regulating a hitherto publicly held monopoly such as the LIC is virtually redundant since there may be inbuilt procedures in its operation to deal with the issues normally addressed by a regulator, regulation is an imperative at the commencement of competition given the vulnerability of the industry to market failure. Thus insurance regulation in India is a challenge and a necessity for the desired and healthy growth of the industry which can thereby generate the kind of welfare gains I have considered in the last chapter. It is a challenge mainly because of lack of prior experience of providing a level playing field not only for all the players in the provider market but for both the parties to the insurance contract .The regulatory authority also needs to identify where the system is vulnerable to moral hazards --and to devise proper mechanisms to take preventive action.

Insurers are important financial intermediaries selling promises of future delivery. They are subject to regulation in every significant market, although the degree and kind varies with each country's social, economic and political environment. For example, as the extent of competition varies across countries, in some countries, the insurance industry is lightly regulated (e.g. U.K., Ireland, Netherlands) and in others it is strongly regulated (e.g. Germany, Japan, South Korea). It may be pointed out here that in the highly regulated Japanese market, the performance of the industry is extremely satisfactory. Indeed there are serious differences, especially among economists as to the very rationale of regulation. Those who strongly believe that an efficient competitive market imposes heavy discipline on the players, hold the view regulators should not create distortions and should ideally focus their attention in devising correctives for problems that are generated from asymmetric information. They want regulatory control

which maintains and furthers competition and counters development of monopoly. On the other hand, some economists believe that the lesson of history is that insurer failures affect a larger body of persons than those directly involved with the insurance transaction. Given the uncertainties inherent in the insurance pricing process, they believe that proactive regulation is needed to prevent the abuse of consumers. Whether proactive or reactive, scholars across the spectrum now accept the need for some sort of regulatory framework for the insurance market. However, there are debates regarding the objectives of regulation and nature of regulatory behaviour. Let us consider the theoretical perspectives involved:

Political Economy of Insurance Regulation:

Traditional public interest theory analyses the role of regulation in correcting market failures and improving economic performance. The correctives offered relate to solvency regulation and putting price floors and ceilings on insurance products. Market analysis suggests that owners of insurance companies have diminished incentive to maintain high level of safety to the extent that their personal assets are no at risk for unfunded obligations to policy holders that would arise from insolvency. On the other hand, it is costly for consumers to properly assess on insurer's financial strength in relation to its prices and quality of service. Moral hazard on the part of the insurer in the post-policy purchase period is another consideration that is difficult for the consumer to monitor. Thus, in the absence of regulation, imperfect consumer information and agency problems would result in excessive number of insolvencies. Solvency regulation is intended to limit the degree of insolvency risk in accordance with society's preference for

safety. Further, in the arena of insurance pricing; insurers have incentive to incur excessive financial risk and even engage in 'go-for-broke' strategies that may result in inadequate prices. Some consumers will buy insurance from low price insurers without properly considering the greater financial risk involved. Poor incentives for safety could induce a wave of "destructive competition" in which all insurers are forced to cut their prices below costs to retain their market position. Thus, regulators must impose a floor under prices to prevent the market from imploding. Again, it is argued that it is costly for insurers to ascertain consumers' risk characteristic accurately, giving an informational advantage to insurers already entrenched in a market and creating barriers to entry that diminish competition (see Cummins and Danzon, 1991). In this view, the objective of regulation is to enforce a ceiling that will prevent prices from rising above a competitive level and to protect consumers against unfair market prices. It would also put a check on the practice of passing on increasing claims costs to the consumer through higher premiums and provides insurers with the incentive to undertake claims fraud policing. Given these regulatory objectives, new public choice theory suggests that regulatory behaviour often deviates from them. It opines that self-interested insurance regulators are motivated to maximize political support rather than economic efficiency and, hence, will seek to enforce prices somewhere between the competitive level and profit-maximising level, depending on the cost and demand conditions and the relative political sensitivities of consumers to prices and insurers to profits. Further, government officials may reap political benefits from suppressing insurance prices below competitive levels if consumers and voters fail to appreciate the long term adverse effects of such policy. Meier (1968) incorporates additional variables in his model of the political economy of

insurance regulation including regulators' norms and resources, etc. Meier observes that the insurance industry should favour regulatory policies that benefit it and oppose policies that restrict it. Meier further observes that the insurance industry is not a monolith and different segments of the industry (small insurers, large insurers, agents, etc.) may have different views with respect to certain regulatory issues. The ability of the industry to influence regulation is hypothesized to be a function of its political resources, that is, its size and wealth. Similarly, consumers groups are expected to push for greater regulation and favour policies that restrict the industry. Their success will be positively related to their size and contact with each other. Political elites – the legislators and courts – mediate among competing groups and pursue their own policy values. Thus, the policy environment for insurance regulation tends to be complex and often the influence of industry and regulators is higher than that of consumer groups and political elites.

Although Peltzman and Meier offer useful frameworks for analyzing regulatory policy-making, some additional observations are relevant to understanding the motivations of and constraints faced by insurance regulators. Firstly, regulators do have incentives to adopt policies that increase economic efficiency as they can potentially increase their political support by correcting market failures and reducing deadweight losses. However, there will generally be constraints on how the economic gains from such policies can be redistributed among different interest groups to increase political support, viz. efficiency increasing regulatory policies may be thwarted by organized special interest groups that would be adversely affected by such policies. Again, limited information and other practical constraints also may prevent regulators from implementing market corrections. Secondly, informational constraints affect other

parties as well. For example, consumers, in particular, may be subject to misperceptions that cause them to favour policies, such as stringent price ceilings, which appear to be beneficial but that may ultimately harm them in the longer run.

Regulatory practice:

Given the above theoretical perspectives regarding the political economy framework of insurance regulation, an empirical observation common to most countries with longer tradition of a competitive insurance industry,is that the primary regulatory objective has been protection of consumer interest. There are two major factors that have triggered the shift in policy goals of regulation towards greater protection of consumer interest. One is the increased consumer concern about insurer's financial problems, and the second is the nature and severity of insurance market failures coupled with the availability of new technologies with the regulator to prevent them. It would now be prudent to look into the insurance regulatory activities in developed and developing countries where open regimes exist. The regulatory practices commonly undertaken elsewhere gives the IRDA, still in its infancy, a guiding framework to start with.

Consistent with the public interest objective of insurance regulation as underlined above, regulators need to ensure that insurers are financially in a position to be able to honour all claims that become due, and that all policy holders and beneficiaries are treated by the insurer in a fair and equitable manner. These functions are performed under two main categories of regulation viz. solvency regulation and market regulation – that are inextricably linked and need to be coordinated to achieve specific objectives.

(a) Solvency regulation:

This encompasses all the activities that protect policy holders and society in general against excessive insurer insolvency risk [and thus, enables the validation of the welfare improving results regarding savings behaviour as obtained in Chapter 2]. Solvency regulation polices various aspects of insurer's operations including capitalization, pricing and products, investments, reinsurance, reserves, asset-liability matching, transactions with affiliates, and management.

Capital standards are the linchpin of solvency regulation. It provides cushion against unexpected increases in liabilities and decreases in the value of assets. Capital is also intended to fund the expenses of a rehabilitation or liquidation of an insurer with minimal losses to policy holders and claimants. Insurers are required to have a certain amount of capital and surplus to establish and continue operations. For example, in India, the IRDA has laid down minimum capital standards, viz. the capital requirement for starting a general or life insurance company is equity paid-up capital of Rs. 100 cr. (and it is Rs. 200 cr. for a reinsurance company). The solvency margin is required to be the highest of (a) Rs. 50 cr. (Rs. 100 cr. in case of a reinsurer), or (b) a sum equivalent to 25 per cent of the premium income or (c) a sum equivalent to 30 per cent of net incurred claims. In case companies fail to comply to solvency margin requirements, the authority can initiate disciplinary action against the defaulters. Elsewhere, regulators can seize a company if the inability to meet its obligation to policy holders is proven. Even before a company falls below the minimum standards, regulators can and do take action against troubled insurers. Other regulatory requirements include maintenance of financial records and periodic filing of statements with the regulator, where the latter can also direct the kind of accounting standards to be followed.

Another area of solvency regulation relate to the investment practices of the insurer. Most regulators require insurers' investments to be diversified and often limits are placed on the amount of lower-quality bonds and other high-risk assets that insurers can invest in. For instance, the present directives given by the IRDA in the Indian market are that general insurance companies have to invest minimum of 30 per cent of their funds in government securities, and 15 per cent in housing projects including purchase of fire fighting equipments by state governments. Only 55 per cent of the funds may be invested in approved market securities

(b) Solvency monitoring:

Regulatory requirements are of little value if there is no mechanism to monitor insurers' compliance. Monitoring encompasses a broad range of activities that include financial reporting, early warning systems, financial analysis and examinations. The periodic financial statements filed by insurers serve as the principal source of information for the solvency monitoring process. Various additional sources of information are often tapped including claims-payment ability ratings, complaint ratios, market conduct reports, correspondence from competitors and agents, news articles, and other sources of anecdotal information.

Examinations are a fundamental component of the solvency monitoring process which may be both periodic and sudden. In India, IRDA has laid down qualifications for surveyors to be eligible to obtain a license issued by itself.

(c) Market regulation:

It primarily refers to regulatory practices that affect the conduct of insurance firms. It attempts to ensure fair and reasonable insurance prices, products and trade practices. It also includes the operation of an industry-funded guarantee fund, specification of `fine print' language in products and contracts, grievance redressal and dispute resolution, arbitration and so on. Institutionally speaking, the responsibility of supervision lies either with a governmental agency or with the insurers themselves. In most cases, a combination of the two is involved. As self regulatory organisations finance their own operations and has a better information about the industry, regulatory frameworks in developed markets often prefer them vis-à-vis government agencies. However, as industry experiences in many open regimes indicate (that we shall see in the next section), self-regulatory organisations would not be effective in the early stages of an open market such as India. The IRDA is therefore responsible for many of the market regulation issues.

(i) Rate regulation;

The justifications for imposing price floor and/or ceilings on premiums have already been discussed under the previous section dealing with the theoretical perspectives. In developed markets viz. the U.S., while rates and policy forms are subject to regulatory approval in some lines of business (e.g. personal property insurance), competitive rating approach prevails for commercial property/casualty lines. Premiums for life insurance and annuity products are not subject to regulatory approval, although regulators may seek to ensure that policy benefits are commensurate with the premiums charged. In India, the IRDA guidelines have laid down that "the authority shall be

satisfied about the nature of the product and its pricing before it is placed for marketing amongst consumers". The powers to control the price of the product is in addition to the premium rates which are fixed by the Tariff Advisory Committee (TAC) constituted under section 64U of Insurance Act, 1935.

(ii) Guarantee Fund:

This is a fund created by contributions from insurers. The purpose of this guarantee fund is to cover an insolvent insurer's financial obligations within statutory limits to policy owners, annuitants, beneficiaries and third-party claimants and to compensate accident victims of uninsured or unidentified drivers. However, the Fund System suffers from a 'free-rider problem-type' effect. It takes away the consumers' incentive to deal with financially strong companies and reduces the insurers' incentive to be prudent about their investment and business decisions. There are other moral hazard problems that we discuss in the next section.

(iii) Contract design and disclosure norms:

Insurance salespersons need to have established standards of knowledge of products. Most regulators, viz. IRDA issues licenses to the sales agents and monitors their activity. It is important to ensure that insurance agents communicate appropriate amount of relevant information to the consumer about the terms and conditions of the product. Many products sales are associated with a 'cooling time' (viz. A two-week period to reconsider the purchase decision). Enhancing consumer information about insurers' prices, products and financial strength is a critical function given the heavy

reliance on competition to ensure good market performance. Regulators enhance consumer information by providing insurance brochures, answering consumer enquiries and distributing information on insurers' prices, complaint experience and financial ratings.

(iii) Dispute resolution:

This aspect of market regulation deals with grievance redressal, arbitration and so on. Recourse to courts is usually not a satisfactory option for consumers. Dispute resolution could be designed so that it encourages informal mediation under a trained third-party mediator. Complaint monitoring by an insurance ombudsman, by tracking written and telephoned complaints makes the system more proactive.

(iv) Regulatory resources:

Another support activity to the above functions of the regulator is to raise the amount and quality of resources available to itself. Regulatory staff includes actuaries, financial examiners and analysts, rates and form analysts, market conduct examiners, attorneys, fraud investigators and system analysts. The IRDA Act in India provides scope for the involvement of experts in its operation. In developed markets, viz. the U.S., the availability of qualified actuaries to regulators has been a special issue because of the actuarial questions involved in rate review and financial analysis. Further regulators maintain an extensive insurance data base on insurers' operations, conducts research and development on standardizing insurance products, insurers' investment

models and accounting standards, and also trains internal staff, regularly updating their skills.

Experience in the developed insurance markets:

Following a detailed study of a regulator's functions, much of which the IRDA has already assumed, it is important to dwell upon recent experiences in open insurance markets, particularly in the developed economies, that points to the factors that are influencing insurance regulation and causing the latter to respond to emerging issues.

We consider the changed insurance scenario in developed markets where a liberalised system prevails. For example, the insurance market in the U.S. have changed significantly over the last two decades. Over time, a wide variety of insurance products and services have become available, reflecting the growth of the economy and the diversity of buyer needs and tastes. E.g. Life insurers now offer an expansive menu of life insurance policies, annuities and other interest-sensitive contracts with different risk-return characteristics. The increased significance of interest-sensitive products and insurers' greater exposure to disintermediation (i.e. policy loans and lapses) have increased the importance of asset-liability matching strategies. At the same time, competitive pressures have induced insurers to maintain high crediting interest rates on their policies as yields on their own investments have fallen. Company investment officers have been pressured to increase investment yields and preserve profit margins by lengthening bond maturities and investing in lower-grade securities. While insurers have encouraged their clients to be prudent risk-minimisers and 'managed' their loss ratio (claims payment against premiums received) through policing of the claims process and

through reinsurance, they have themselves been risk takers in speculative investment markets. Their risk taking has been both facilitated and cushioned by various mechanisms that effectively insure them. These mechanisms, *inter alia*, include industry funded regulatory regimes and policy holder compensation schemes. When speculatory investments have backfired, they have been pronounced insolvent putting consumers in trouble. A classic case of such imprudent investment-generated insolvency has been that of Confederation Life in 1994. Further, many insurers such as the one mentioned above have been using agent commission sales networks, where agents have inevitably participated in various forms of 'mis-selling' [that includes selling the wrong product, too much of the product or a product on unfavourable terms]. Indeed, mis-selling in the form of sales fraud is institutionalised in the marketing of life insurance and associated investment products (Michael Clarke, 1999). In the private insurance business, the commission structure has thus been a major source of moral hazard influencing life insurance sales people, providing incentives for selling practices that put the consumer at risk of making a dubious insurance purchase.

Dramatic changes have also occurred in the health insurance insurance industry. Severe medical cost inflation and competition have forced health insurers to change strategies. The dividing lines between insurers and health care providers blur as the financing and delivery of health services become more closely linked and firms take on specialised functions and form partnerships to take best advantage of their relative strengths. In response to these changes, many insurers tighten their underwriting standards and narrow their pooling of risks in order to control prices for low-risk groups. This reduces availability of coverage and raises premiums for less healthy individuals.

Even the nature of property-liability insurance business has changed significantly. The long claim payout tail for commercial liability lines make proper pricing and regulating difficult and subject to manipulation. Shifting liability rules also increase the margin for error and insolvency risk. This industry is rife with greater risk and depressed profits, inducing some buyers to seek alternative sources of coverage like self-insurance.

The nature of the insurance industry has also become more diverse in terms of both firm size and organisation. While a few, large firms have come to hold a dominant market share, many small and independent property and life insurers have been pushed to niche markets in geographically limited areas where they are better positioned to serve. Predictably, the increased financial risk assumed by insurers, combined with other economic events, has caused the number and size of insurer failures to increase significantly since the early 1980s. For example, the annual average insurer failures rose from 20 between 1973 and 1984 to an average of 70 between 1984 and 1993 [source: A.M. Best Company and National Association of Insurance Commissioners]. In fact, the greater complexity of products and investment strategies, coupled with inadequate incentives to survive in the market place, increases the opportunity for mismanagement, excessive risk-taking and fraud that lead to costly insolvencies.

Another alarming development in open developed insurance markets is the increasing differentiation and risk segmentation of consumers in various insurance markets, as insurers have increasingly sought to create and target-market to preferred and 'super-preferred' risks or otherwise, to profit from an increasing calibration of risk. Segmentation is simultaneously a process of marketing and one of risk assessment or underwriting, because preferred risks are doubly desirable as insurance clients: they are

seen to be both affluent consumers, on the one hand and less risky in terms of claims, on the other. The insurance industry increasingly uses sophisticated surveillance systems – in order to divide individuals into pools of standard, sub-standard, and uninsurable risks. This recent trend is further facilitated by the increasingly detailed risk information (e.g. financial and medical) which is available to actuaries and underwriters. Given such trends, concern about fair access to insurance are confronting established industry business practices in underwriting selection and pricing. Data analysis supports such concerns about high prices and diminished availability of house owners' insurance in poor neighborhoods (Klein 1994). This trend is also noticed in the field of health insurance where providers are moving away from broad pooling of risks. Some insurers have lowered rates for younger, healthier groups and increased rates for rejected older, less healthy groups.

Furthermore, there is another particular phenomenon that is resulting in fundamental restructuring in the insurance industry. This relates to the integration of the traditional four pillars of financial services (banks, trust companies insurance companies and securities dealing), and in particular the entry of banks into the insurance business; and attendant competition resulting in acceleration of acquisition and mergers.

To summarise then, the trend in developed open markets is towards more and more segmentation and de-selection of insured populations, creating greater inequality in contract conditions and classes of the insurance poor and uninsured. Company-organised mis-selling is also rife. Furthermore, while insurers-as-bookmakers heavily regulate their gambling at the level of what risks they will insure and for whom, as investors they are subject to enabling conditions and sometimes gamble wildly on what turns out in

retrospect to be folly. Not surprising all the above practices lead to a higher frequency of insurance failures and insurers seeing each other as morally hazardous, especially when it comes to partnerships in reinsurance and in industry-funded compensation schemes for policy holders.

Regulatory responses abroad:

All the forces above have created serious challenges for the insurance regulatory framework. Perhaps the most significant regulatory response to increased risk assumption by insurers and the greater complexity of risk exposures has been the adoption of more stringent restrictions on insurers' transactions and financial structures. They include increased capital and investment reserve requirements as well as constraints on specific investments and transactions. In one sense, this makes regulators' job easier by limiting the parameters of insurer risk taking. On the other hand, these restrictions can increase the complexity of enforcement as well as raise insurance prices and encounter political opposition from insurers, the investment community, and the insurance buyers adversely affected by the restrictions. Limitations of fixed minimum capital adequacy standards have caused them to be replaced by risk based capital (RBC) standards for insurers that would vary with the amounts and types of exposures that insurers face. Insurers are now required to report their RBC and total adjusted capital (TAC) in their annual reports. However, studies (Cummins, Harrington, Klein, 1994) show that relatively few failed companies had RBC ratios that would have triggered regulatory action prior to failure. To improve upon insurers' asset position, the NAIC has framed an investment model law. However, insurers have resisted regulations that significantly

constrain their flexibility in tailoring their investments. Regulators have also enhanced solving monitoring activities that helps focus regulatory sanctions against insurers that attempt to "go for broke" or that are simply unlucky, incompetent or fraudulent without imposing unnecessary restrictions on the activities of the financially sound companies. Thus, financial reporting requirements have been greatly expanded in recent years. Efforts on regulation have also focussed on improving examiners' capability by reskilling them and on examination procedures by the use of automated or electronic data processing-assisted systems. Given the trends in the industry, regulation has also focussed on restricting insurers' ability to deny coverage, constraining rate differentials, and requiring guaranteed renewability and portability of coverage. The severe abuses uncovered in agents' sales practices have also led to increased regulatory scrutiny of life insurers' market conduct. In recent years, increased resources have been devoted to insurance regulation – greater consumer concern about adequacy of insurer insolvency regulation have enabled an increase in political support for stronger regulatory funding.

Lessons for the Indian insurance industry:

The trends described above, in the developed markets where open insurance regimes operate indicate that the task of the regulator, the IRDA is not going to be easy. Probability of contract non-performance and insurer insolvency is an issue that cannot be ignored, if the kind of desired welfare gains, as described in chapter II, are to be achieved as a result of liberalisation of the insurance sector. I have already described the kind of minimum capital standards that the IRDA has laid out in the arena of solvency regulation. However, minimum capital standards have its inherent limitations. As the structure in the

developed insurance markets shows, insurers range widely in size and the types of risk they assume. Thus, uniform minimum capital norms are rendered inadequate. The IRDA, on the contrary, should go in for a risk-based capital adequacy norm, in the lines of the RBC model in the U.S. Even there, the RBC model demonstrates limitations. The kind of model to be adopted in India has to be simple and effective, so that examinations of an insurer's asset-liability position give ready indication about the financial soundness of the firm. It should be devised such that the capital adequacy formula does not distort market decisions and unnecessarily raise prices or cause other inefficiencies.

Next comes the issue of imprudent investments – insurers have shown tendency to resist excessive regulation in this regard. However, speculative investments have to be checked. Here comes the dilemma faced by the regulator. Severe restrictions on insurers' investments are relatively easy to enforce but lower the overall yield insurers can obtain, resulting in higher insurance prices and diminished product diversity. This could limit innovation and thus the regulatory role (in consumer interest) of the IRDA can come in direct conflict with its developmental role in promoting competition and innovation. IRDA rules now allow only 55 per cent of the insurers' funds to be invested in approved market securities. It may further make it obligatory on the part of insurers to invest in assets and securities that have secured high rating from reputed credit rating agencies.

Another dynamic role for the IRDA would be to strengthen its solvency monitoring mechanism – financial reporting, analysis and examinations have to become more regular and stringent, particularly focussing on the activities of vulnerable firms as early warning systems identify them. For this, resources available with IRDA have to be

increased considerably and greater number of experts need to be involved with the regulatory process. Prevention of insolvency, or contract non-performance in general is all the more important in the Indian market because an event of insurer failure where the market openness is in its infancy, would potentially shy away many prospective consumers from insurance purchasing.

Another area that IRDA needs to focus on is that of pricing strategy and tariff control. IRDA will have to take a firm decision whether it expects the insurers to develop business at prices that generate underwriting surplus or, whether it accepts the operational norm of developed markets, which are now operating on cash flow basis generating cumulative surplus with investment income. At this stage of development, pricing should ensure underwriting surplus under all portfolios while the levels should be fixed. For instance, though underwriting surplus of our fire and engineering portfolios show a satisfactory average level approximating 20 per cent, with the escalation in the present marginal commission cost to 15 per cent level in post-liberalisation period, there will be steep decline in the underwriting surplus. However, the surplus in the above portfolios should be retained at the minimum level of 5 per cent inspite of this cost escalation and expected fall in premium rates under competitive pressure. Further, IRDA will have to play an immediate important role in evolving the right solution to the problem of raising motor premium in the market to the level which ensures at least a break-even position to insurers as compared to the 30 per cent underwriting loss which this portfolio currently constituting 35 per cent of our total business generates. Thus, the existing ceilings have to be raised and cross-subsidisation of motor portfolios with non-motor ones have to be phased out.

The risk unpooling strategies that insurers in developed markets, particularly in the health segment, undertake has to be prevented, if liberalisation actually has to keep the promise of providing affordable insurance access to a potentially large consumer base. Relevant underwriting restrictions that are necessary to address this problem include prohibiting the denial of coverage on the basis of the claims history or health status of employees and their families. Necessary pricing restrictions range from requiring pure community rating to imposing limits on the amount that premiums may differ due to claims experience, health status, or duration of coverage. Further, talking about the health segment, the IRDA Act '99, clearly stipulates that preference would be given in registering applicants who intend to provide health insurance cover. Here, the regulator needs to lay down suitable standards for market entry that would promote both competition and high quality products.

Further, the concept of a 'Guarantee Fund' (as described under market regulation activities in developed economies) need to be introduced in the Indian insurance sector. Though it is subject to moral hazard problems between contributing insurers, such a fund is known to be the best way of arranging for consumer compensation in the event of insurer insolvency.

The insurance market particularly in the life insurance segment is known to be a sellers' market. In developed economies this market is severely plagued by 'mis-selling' activities of the insurance agents. Given the low levels of literacy and consumer sophistication in India, the competitive insurance market in its infancy is all the more vulnerable to such exploitative marketing and claims practices of insurers. In such a scenario, the importance of disclosure norms framed by IRDA becomes all the more

crucial. Insurers may be obliged to disclose and make public information relating to nature of products proposed to be launched, the specific terms and conditions, methodology used in pricing, the likely claim ratio, management expenses etc. in clear and easily comprehensible language for the prospective buyers. The features of the policy or product that are distinct from others – viz. Deductibles, coinsurance provisions, coverage limits have to be clearly specified.

Our survey of rational insurance purchasing literature in Chapter I clearly identify how these factors affect insurance decisions. Further, to prevent mis-selling activities, particularly in life products, IRDA can devise a 'waiting period' (say, two weeks) during which the consumer can change his mind, before the contract is finally bound; the life insurance company may also be required to send a follow-up questionnaire to the consumer to ascertain his comprehension of the purchase that the regulator can scrutinise.

We have already observed that a discernible trend in developed markets is the integration of traditional pillars of financial services (viz. Banks, insurance companies and securities dealing). Consequently, regulatory experience in developed countries shows a trend toward a conglomerate approach towards regulation (e.g. in OECD countries). Here, firms in one sector are allowed to enter another through a subsidiary. Thus, economies of scope and building of cross-sectional products are allowed. However, such a system suffers from problems in application of the capital adequacy norms. As a regulatory response to financial liberalisation, India has begun with the pillars approach [see Figure].

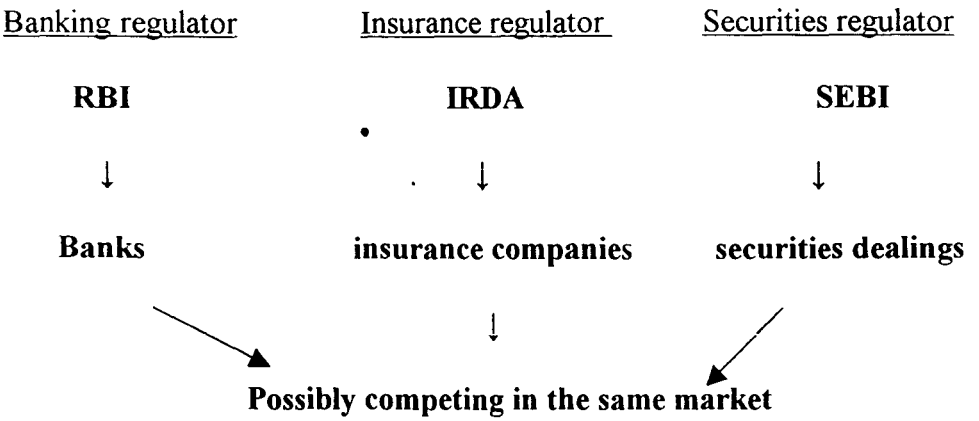

Figure: Pillars Approach

This approach treats banking, insurance and securities markets separate from one another and hence a separate regulator for each one of them. Capital standard, the most important component of solvency regulation is most effectively applicable in this approach. However, it limits economies of scope in producing financial services, in an industry which is increasingly viewed as one competing in one market – the market for risk management. Given the trend of convergence, moving to a coordinated approach – which allows coordination and cooperation between regulators -- may become essential.

Given the nature of the insurance industry, therefore, the primary focus of the IRDA must be financial soundness and prior experience of entrants. The initial stage would thus benefit from tariff and contract standardisation, even if this comes at the expense of hindering competition and innovation. This is important for several reasons such as the lack of sophistication of buyers, a relatively poor legal environment for contract enforcement, uninformed sellers who need to build up a database to be better equipped to estimate demand, categorise risk, etc. As the industry expands in terms of

penetration, density, coverage and number of players (though IRDA has preferred a restricted entry regime in the initial phase), the resources available to the IRDA – in terms of trained personnel, enhanced automation and upgraded information systems – have to rise commensurately for the plethora of regulatory issues discussed here, to be addressed comprehensively.

CHAPTER V

CONCLUSION

In the preceding chapters, I have discussed the insurance option available to an individual, attempting to link it up with his savings behaviour. In fact, liberalization of the insurance industry that began in 1999, gives a rich setting to explore into the interdependence of insurance and savings decisions. As mentioned earlier, I have moved according to a plan so that the issues at hand may be clearly presented before the reader.

In Chapter I, a comprehensive survey of the insurance literature that examines an individual's incentive to insure under different conditions has been attempted. Original research in this area has been conducted by Arrow, Borch, Smith, Gould, Mossin et al. They have proved a number of propositions, while analyzing the insurance decision in the expected utility framework. A long established result has been that when insurance is available at an actuarially fair price, the risk-averse individual will go for full coverage. A second one stems mainly from Mossin and Smith and suggests that with proportionate premium loadings, a sharing of risk between the insured and insurer (viz. through a finite amount deductible) is always optimal, full insurance being suboptimal. Mossin has also explored into the wealth effect on the individual's optimal insurance purchase. A third proposition surfaces from the Arrow-Raviv treatment of the problem. This asserts that policies with deductibles are preferred by risk-averse insureds over actuarially equivalent co-insurance policies. However, observed patterns of insurance purchase behaviour have often been inconsistent with predictions of the theory built under the expected utility framework. This has called into question the applicability of such a model in analyzing decision under risk. Subsequently, next generation insurance literature moved in two directions. On the one hand, there were economists who tried to build alternative theories to explain observed phenomena. A particularly stimulating one was the prospect theory

developed by Tversky and Kahneman which I have described. On the other hand, economists like Doherty and Schlesinger, Mayers and Smith have attempted to assimilate observed phenomena within the expected utility approach by relaxing certain restrictive assumptions. Another important stream of work has been the analysis of life insurance purchase, where choice of parameters affecting the individual's utility function has been different from that in the property-insurance analysis. Most work in this field has taken Menahem Yaari's (1965) paper as the theoretical basis. Recent work in the area focuses on the additional possibilities of contract non-performance, risk subdividing and habit formation – and how they affect the individual's insurance decision. The expected-utility framework still dominates insurance literature. Now, an interesting thing I have noted is that there has been a relative scarcity of research in exploring the close interdependence of insurance and savings decisions. I have taken up this aspect in my third chapter.

In the beginning of chapter III, I have discussed and presented the empirical interdependence of savings and insurance as observed in other countries. Then, I have elaborated on the precautionary motive to save, and how it may be consistent with well-known consumption models. Following this discussion, I have stylized insurance liberalization in India in two alternative ways. Then I have presented the standard baseline Ehrlich-Becker framework and used it to consider how the introduction of an insurance option affects the optimal choice of savings. I have proved a proposition that the insurance option in a liberalized market would unambiguously lead to a fall in private savings. Non-existence of the gambling option, that limits the opportunity boundary, has made my results robust. However, how savings behviour in a post-liberalisation insurance scenario is actually affected remains largely an empirical question that has to

be pursued elsewhere. For the present, I have underlined the possibility that results obtained might change if there is an additional risk of contract non-performance. Containing this possibility is largely a regulatory challenge that I have discussed at length in chapter IV. Chapter IV presents a brief picture of the Indian insurance industry to the reader. Then it goes on to highlight experiences in open insurance markets where the possibility of contract non-performance is getting significant as the nature of industry changes worldwide. Particularly in developed markets viz. the U.S., the insurance industry is rife with instances of 'risk unpooling', 'mis-selling' of products and other moral hazards embedded in the industry funded compensation schemes and commission-structured sales-agency system. These practices are raising consumer concerns relating to accessibility to market insurance, purchasing the right product and solvency of the insurer. The regulator in India, the IRDA has already framed certain rules and restrictions regarding solvency and market conduct. However, it has to equip itself so as to be able to adapt to the changing nature of the industry. Providing a level playing field not only to insurers but also to all parties to the insurance system is not going to be an easy task. For example, the present system of having uniform minimum capital standards might not be prudent and moving to some kind of risk-based capital-standard would be prudent. The regulatory issues at hand, therefore, given the welfare concerns of consumers, are explored in detail.

To sum up, once more, insurance liberalization in India is still in its infancy. There are several issues that need to be addressed to improve performance in this sector. On a representative consumer's side, there are many ways his savings and insurance decisions are interrelated, that need to be explored both on theoretical and empirical

terms. This work, hopefully, serves as a good beginning for research in these underexplored areas.

BIBLIOGRAPHY

Abel,A.B.: "Precautionary Saving and Accidental Bequests"—American Economic Review.(1985),777-91

Ahuja,R. : "Demand for Insurance Revisited : Insurance or Saving for a Rainy Day?" --Mimeo,IGIDR(!999)

Ahuja,Rajeev.,and Ranade,Ajit.: "Issues in Regulation of Insurance"—Economic and Political Weekly (jan 2000),3166-69

Arrow,K.J.: "The Role of Securities in the Optimal Allocation of Risk Bearing" --Review of Economic Studies (1964),91-6

Bauwens,L.,Briys,E.,Eeckhoudt,L., and Scamure,P. : "The Law of Large (Small?) Num-Bers and Demand for Insurance"–Journal of Risk and Insurance (1991)

Ben-Arab,Mounira.,Briys,Eric.,and Schlesinger,Harris.: "Habit Formation and Demand For Insurance" –Journal of Risk and Insurance (1996)

Borch,Karl. : "The Optimal Insurance Contract in a Competitive Market"–Economics Letters (1983),327-30

Briys,Eric.P.,and Louberge,Henri.: "On the Theory of Rational Insurance Purchasing: A Note" –Journal of Finance (1985)

Browne,Mark.J.,and Kim,Kihong: "An International Analysis of Life Insurance Demand" --Journal of Risk and Insurance (1993)

Doherty,Neil.,and Schlesinger,Harris.: "Optimal Insurance in Incomplete Markets" --Journal of Political Economy (1983),1045-54
--: "Rational Insurance Purchasing: Consideration of Contract Nonperformance"–Quarterly Journal of Economics (1990),243-253

Ehrlich,Isaac.,and Becker,Gary. : Market Insurance, Self Insurance and Self Protection" --Journal of Political Economy (1972),623-49

Ericsson,Richard.,Barry,Dean., and DoyleAaron : " The Moral Hazards of Neoliberalism :Lessons from the Private Insurance Industry."—Economy and Society (nov 2000),532-57

Fischer,Stanley.: " A Lifecycle model of Life Insurance Purchases"—International Economic Review (feb,1973)

Government of India : " Economic Survey–(1999-'00,2000-'01,2001-'02)—Ministry of Finance.

Hirschleifer,J.,and Riley,J.G.: "The Analytics of Uncertainty and Information– an

Expository Survey"—Journal of Economic Literature (dec1999),1375-421

Hubbard,R.Glenn.,Skinner,Jonathan.,and Zeldes,Stephen.P. : "Precautionary Saving and Social Insurance"—Journal of Political Economy (1995),360-99

IRDA : " Regulations Framed Under Insurance Regulatory and Development Authority" --(2000)

Kahneman,Daniel.,and Tversky, Amos. : "Prospect Theory : An Analysis of Decision Under Risk" –Econometrica (march 1979),263-91

Kihlstrom,R.,Romer,D.,and Williams,S. : "Risk Aversion with Random Initial Wealth" --Econometrica (1981),911-21

Klein,Robert W. : "Insurance Regulation In Transition"—Journal of Risk and Insurance (1995),363-404

Leland,Hayne.E. : "Saving and Uncertainty : The Precautionary Demand for Saving" --Quarterly Journal of Economics (august 1968),465-73

Lewsis,Frank.D : "Dependents and Demand for Life Insurance"—American Economic Review (june 1989)

Mayers,David.,and Smith,Clifford.: "The Interdependence of Individual Portfolio Decisions and the Demand for Insurance."–Journal of Political Economy (1983),304-11

McKinnon,R.I.: "Money and Capital in Economic Development"—Washington D.C: Brookings Institution (1973)

Meier,Kenneth.J.: "The Political Economy of Regulation : The Case of Insurance" --Albany : State University Of NewYork Press. (1988)

Mossin, Jan.: "Aspects of Rational insurance purchasing"–Journal of Political Economy (1968),553-68

Pant, Niranjan:"The Insurance Regulation and Development Bill:an Appraisal"-- Economic and Political weekly (1999),3166-69

Pashigian,B.P., Schkade.L.L.,and Menefee,G.H: " The Selection of An Optimal Deductible for a Given Insurance Policy."—Journal of Business(1968)

Pauly,M.V.: " Overinsurance and Public Provision of Insurance: The Role of Moral Hazard and Adverse Selection"—Quarterly Journal of Economics (1974),44-62

Pratt, John.: " Risk Aversion In The Small and In The Large"—Econometrica (1964), 122-36

Ranade,A.,and Ahuja.R.: "Impact of Savings via Insurance Reforms"—Working Paper ICRIER (2001)
--: "Insurance"—K.S Parikh (ed.): India Development Report ,OUP,New Delhi (1999)

Rao D.Tripati : " Life Insurance Business in India: Analysis of Performance"–Economic And Political Weekly (july1999),2174-81

Raviv, Artur. : "Design of an Optimal Insurance Policy"—American Economic Review (1979),84-95

Razin, Assaf. : "Rational Insurance Purchasing"—Journal Of Finance (march 1976)

Rothschild,Michael.,and Stiglitz,Joseph.: "Equilibrium in Competitive Insurance Markets : An Essay on the Economics of Imperfect Information"—Q.J.E (1976)

Samarth,R.D. : " Pricing of Insurance Products in Liberalised Economies: Lessons for India"—in Indian Insurance Industry :Transition and Prospects (2001)

Shavell, Stephen. : "On Moral Hazard and Insurance"—Quarterly Journal of Economics (1979), 541-62

Shogren,Jason.F.: "The Impact Of Self Protection and Self-Insurance on Individual Response to Risk"—Journal of Risk and Uncertainty (1990),191-204

Simon,J. : " The Emergence of Risk Society :Insurance, Law and the State."—Socialist Review (1987).61-89

Skinner,J. : " Risky Income, Life Cycle Consumption and Precautionary Savings" --Journal of Monetary Economics (1988),237-55

Skipper,Harrold.D.Jr. : "Insurance Regulation In Public Interest : The Path Towards Solvent Competitive Markets"—Geneva Papers on Risk and Insurance (oct 2000),482-504

Smith,Vernon.L. : "Optimal Insurance Coverage"—Journal of Political Economy (1968)

Stiglitz, Joseph. : " Monopoly, Nonlinear Pricing and Imperfect Information: The Insurance market'—Review of Economic Studies (1979),407-429

Srivastava.D.C.,and Srivastava,Shashank : " Growth of General Insurance Industry In India"-in Indian Insurance Industry:Transition and Prospects(2001)

Wilson,C. : " A Model of Insurance Markets with Incomplete Information"—Journal of Economic Theory (1977), 167-207

Yaari, Menahem. : "Uncertain Lifetime,Life Insurance and Theory of the Consumer" --Review of Economic Studies (1965),137-150