Regret, rejoicing, and mixed insurance

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ARTICLE INFO

ABSTRACT

This study examines how regret and rejoicing affect mixed insurance choice and demand. In contrast to expected utility theory, regret and rejoicing may explain why some individuals prefer to hold mixed insurance rather than term insurance. In this study, we derive the conditions under which an individual prefers to hold mixed insurance rather than term insurance. We also study demand for mixed insurance and specify the factors that influence the demand motive. The demand motive is determined by the risk effect and the rejoicing effect, when the rejoicing effect dominates the risk effect, under-insurance is optimal, and vice versa.

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1. Introduction

Term insurance is purchased to cover the specific damage suffered in a loss state. Because the damage involves risk, risk-averse individuals want to transfer that risk to insurance firms through term insurance. In other words, term insurance serves to transfer individuals' risk to insurance firms. According to the findings of traditional insurance economics studies such as Mossin (1968) and Ehrlich and Becker (1972), full coverage is optimal when insurance premiums are actuarially fair in perfect information markets. This result implies that individuals transfer all risks to the insurance firms in this case.

The advantage of term insurance is that individuals can receive insurance money in a loss state. Although the realization of a loss state is unfortunate, individuals who hold term insurance might rejoice in a loss state because of the benefit of term insurance. Indeed, according to the results of the Survey of Life Protection conducted by the Japan Institute of Life Insurance in 2013, 54.5% and 28.2% of respondents purchased insurance "for medical expenses for injury or sickness" and "for unexpected death," while only 6.7% and 2.4% purchased insurance "for living funds after retirement" and "for savings."[1] This survey results imply that a considerable proportion of individuals in Japan purchased insurance to prepare for damages in a loss state and thus might rejoice from the benefit of insurance money.

On the contrary, the disadvantage of term insurance is that individuals receive no benefit in a no-loss state. Again, while the occurrence of

a no-loss state is fortunate, individuals who hold term insurance might feel regret because of the perception that the payment of the term insurance premium has been wasted. According to the above-mentioned survey, 28.2% of individuals take out without-profit-type (no savings function) life insurance, while 64.7% individuals take out life insurance with a saving function.[2] This survey results imply that a considerable proportion of individuals in Japan desire to receive a benefit and do not want to feel regret in a no-loss state.

To attract individuals who want to rejoice or avoid regret in a no-loss state, life insurance firms in Japan sell mixed insurance, which provides two types of benefits even given the occurrence of a loss state. The first type of benefit, which is paid in a loss state, is that individuals can receive insurance benefits at the time of death. The second type of benefit, which is paid in a no-loss state, is that individuals can receive insurance benefits at the end of the policy term.[3] Fig. 1 illustrates several representative insurance products in Japan. It shows that endowment insurance, a type of mixed insurance, has a certain amount of the Japanese life insurance market.[4]

In a loss state, both term and mixed insurance pay insurance money. The insurance premium in mixed insurance is higher than that in term insurance because it is paid in both loss and no-loss states. However, the amount of rejoicing (regret) might rise (fall) in a no-loss state

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  [1] For more details, see page 70 of the following website: http://www.jili.or.jp/research/report/pdf/FY2013_Survey_on_Life_Protection_(Quick_Report_Version).pdf.

[2] For more details, see page 75 of the following website: http://www.jili.or.jp/research/report/pdf/FY2013_Survey_on_Life_Protection_(Quick_Report_Version).pdf.

[3] Death and maturity proceeds are not necessarily the same except in a typical type of mixed insurance called endowment insurance.

[4] It is difficult to extract the number of new mixed insurance policies since most new policies (e.g., medical insurance) do not distinguish between term insurance and mixed insurance. For example, some private medical insurance sold by life insurance firms offers not only medical protection in the case of diseases (a loss state) but also repayment in the case of no diseases (a no-loss state).
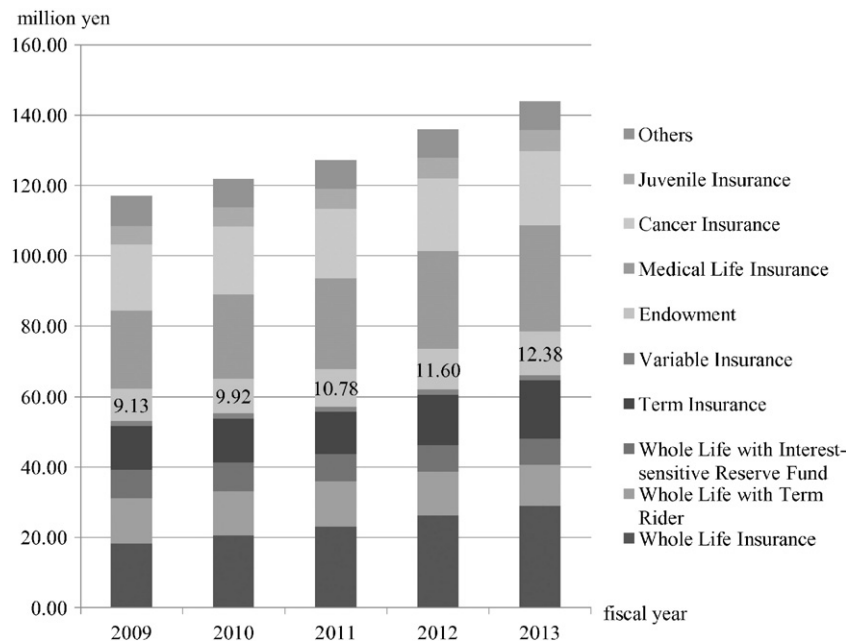
Fig. 1. Percentage distribution of individual insurance by type (number of new policies).
Source: Life Insurance Fact Book 2014 (Life Insurance Association of Japan)

through the holding of mixed insurance. Hence, the amount of rejoicing (regret) in mixed insurance is larger (smaller) than that in term insurance in a no-loss state, while the amount of rejoicing (regret) in mixed insurance is smaller (larger) than that in term insurance in a loss state.

The above-mentioned suggests that rejoicing and regret affect the extent to which individuals distinguish between term and mixed insurance when choosing their holdings. Indeed, introducing rejoicing or regret might offer new insights that cannot be explained by expected utility theory, which concludes that risk-averse individuals never choose mixed insurance even if the insurance premium is actuarially fair.[5] For example, because individuals are subject to a mean-preserving spread of final wealth if they purchase mixed insurance instead of term insurance, Rothschild and Stiglitz (1971) found that risk-averse individuals never want to purchase mixed insurance.

Let us consider the situation in which the insurance premium is actuarially fair. In this situation, full insurance is optimal in the case of term insurance and individuals do not take any risks. By contrast, full insurance in mixed insurance exposes individuals to some risks. Instead, if individuals can choose any mixed insurance coverage rates that eliminate their risk exposure, over-insurance is chosen and expected utility is less than that under term insurance. Hence, individuals take some risks at the full insurance level in the case of mixed insurance. Thus, expected utility theory concludes that holding mixed insurance is irrational.

However, as shown in Fig. 1, some individuals actually purchase mixed insurance (endowment insurance) in the Japanese insurance market, one of the largest markets globally and one that influences insurance markets in East and Southeast Asia where further economic growth is expected. Thus, why individuals purchase mixed insurance and the amounts they spend on doing so, are worthy to be pursued.

Based on the foregoing, we examine mixed insurance choice and demand by incorporating rejoicing or regret.

Both rejoicing and regret can explain why some individuals purchase mixed insurance in contrast to expected utility theory. Individuals can rejoice in a no-loss state or alleviate regret in a loss state by holding mixed insurance rather than term insurance. When this benefit is sufficiently large, individuals prefer mixed insurance to term insurance. Rejoicing theory is thus adopted to analyze mixed insurance demand since it can explain this choice under reasonable conditions. In rejoicing theory, insurance demand can be classified into the two effects, one is risk and the other is rejoicing. We find that under- (over-)insurance is optimal when the rejoicing effect dominates (is dominated by) the risk effect.

The remainder of this paper is organized as follows. In Section 2, the background for this research is described. In Section 3, we explain the preference representations incorporating rejoicing and regret. In Section 4, we consider the choice problem between term and mixed insurance. In Section 5, we examine optimal demand for mixed insurance. The policy implications derived from the results of the model are shown in Section 6. Section 7 provides concluding remarks.

2. Background

Bell (1982) and Loomes and Sugden (1982) introduced regret and rejoicing into preference representation. This representation can capture several paradoxical observations in expected utility theory, such as the Allais paradox (Allais, 1953) and probabilistic insurance (Kahneman and Tversky, 1979). Although Bell (1982) and Loomes and Sugden (1982) called this theory "regret theory," to avoid confusion, we refer to it as "regret and rejoicing theory" since the representation not only includes regret but also rejoicing. The important difference between regret and rejoicing theory and prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992) is that the former can incorporate ex-post state-dependent feelings into ex-ante decisions. This characteristic seems to be suitable for analyzing insurance problems because an individual who wants to purchase insurance has preference representations such as feeling ex-post regret and rejoice depending on each realized state.

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[5] Another explanation for the irrationality of mixed insurance may follow from arbitrage opportunities. When mixed insurance can be replicated by using other financial instruments such as a combination of savings and term insurance, these are priced to exclude arbitrage opportunities. However, perfect replication is difficult in real situations because of differences in liquidity. For example, it is difficult to immediately withdraw money from a fixed deposit at the time of an accident.