Asymmetric Information in Insurance Markets

Asymmetric information manifests itself primarily in terms of adverse selection and moral hazard. Adverse selection is caused by the inability of the insurer to accurately rate the risk of loss, while moral hazard is caused by the hidden actions of the insured which increase the risk of loss. In this study, we assume that the insured individual cannot affect his/her distribution of losses, which limits the analysis of asymmetric information to adverse selection.

Theoretical and empirical studies in automobile and health insurance markets have shown that adverse selection reduces the consumption of insurance by low-risk individuals, and results in the transfer of income from low-risk to high-risk insureds. The theoretical works of Akerlof (1970), Rothschild and Stiglitz (1976), Miyazaki (1977), and Wilson (1977) describe the insurance market under asymmetric information. Miyazaki and Wilson demonstrate that when it is impossible or highly expensive to distinguish between high- and low-risk insurance applicants, the insurer prices insurance contracts at an average premium for all individuals. This results in undercharging high-risk customers and overcharging low-risk customers for similar contracts. Empirical evidence in automobile and health insurance markets generally supports the predictions of these theoretical models (Browne, 1992; Browne and Doerpinghaus, 1993; Puelz and Snow, 1994).

Several studies have documented the implications of the presence of adverse selection on the performance of crop insurance in the United States. Ray (1974) argues that adverse selection in crop insurance markets can make the industry less self-sustaining if only high-risk farmers buy insurance, as evidenced in the U.S. market for crop insurance. Skees and Reed (1986) show that the potential for adverse selection depends on a farmer's subjective assessment of expected yield and variability of yield. They argue that premium rates based only on mean crop yields can lead to adverse selection, particularly when the variance of yields fluctuates considerably among farms.

Goodwin (1993) illustrates the effects of adverse selection on the actuarial performance of the U.S. crop insurance program, stating that only farmers whose risk is above average are likely to buy insurance. He concludes that high-risk producers are less responsive to premium changes because of adverse selection. In a review of the crop insurance program in the United States, Goodwin and Smith (1995) indicate that there is considerable evidence of adverse selection, and that adverse selection is a direct consequence of insurers' inability to set premiums commensurate with the level of risk.

In a recent study, Just et al., (1999) examined the adverse selection problem in the crop insurance market using nationwide data on the U.S. insurance program. They argue that adverse selection occurs when actual premium rates fail to reflect farmers' expected indemnities. Their results suggest that participating farmers tend to be those with higher expected indemnities, as farmers with lower expected indemnities are priced out of the program. They conclude that when the insurance market is concentrated with high-risk farmers, the result can lead to market failure.

The studies cited above narrowly focus on adverse selection when a yield insurance product was offered to farmers when participation was quite low. In addition, none of the crop insurance studies explicitly test for adverse selection. This study tests for adverse selection when both the number of crop insurance products available and farmer participation are increasing. We apply the asymmetric information modeling framework developed in health and automobile insurance markets to crop yield and revenue insurance markets. Our empirical results indicate that farmers' decisions to buy yield or revenue insurance are significantly affected by the risk they face, their level of income, and the cost of insurance. Our analysis also indicates that inaccurate assessment of individual risks results in overcharging low-risk farmers and undercharging high-risk farmers for comparable contracts. We find evidence of asymmetric information in the market for individualized yield and revenue insurance products.