Adverse Selection, Loss Coverage and Equilibrium Premium in Insurance Markets

MingJie Hao[1], Pradip Tapadar[2] and Guy Thomas[3]

Keywords

Adverse selection, loss coverage, risk classification, equilibrium

Postal address

School of Mathematics, Statistics and Actuarial Science, University of Kent, Canterbury, CT2 7NF, UK

Insurers hope to make profit through pooling policies from a large number of individuals. Unless the risk in question is similar for all potential customers, an insurer is exposed to the possibility of adverse selection by attracting only high-risk individuals. To counter this, insurers have traditionally employed underwriting principles, to identify suitable risk factors to subdivide their potential customers into homogeneous risk groups, based on which risk-related premiums can be charged.

In reality, however, insurers may not have all the information reflecting individuals' risks due to information asymmetry or restrictions on using certain risk factors in their underwriting process. In either case, conventional wisdom suggests that the absence of risk classification in an insurance market is likely to lead eventually to a collapse of the whole insurance system, i.e. an adverse selection spiral. However, this concept is difficult to reconcile with the successful operation of many insurance markets, even in the presence of some restrictions on risk classification by regulators.

Moreover, arguably from society's viewpoint, the high risks are those who most need insurance. That is, if the social purpose of insurance is to compensate the population's losses, then insuring high risks contributes more to this purpose than insuring low risks. Thus, the traditional insurers' risk classification scheme can be considered as contrary to this social purpose.

To highlight this issue, Thomas (2008, 2009)[4] introduced the concept "loss coverage", i.e. the proportion of the whole population's expected losses which is compensated by insurance. The main idea is that a modest degree of adverse selection in insurance can be desirable, as long as loss coverage is increased.

In this talk we investigate equilibrium in an insurance market where risk classification is restricted. Insurance demand is characterised by an iso-elastic demand function with a single elasticity parameter. We characterise the equilibrium by three quantities: equilibrium premium, level of adverse selection and loss coverage. We derive conditions for a unique equilibrium, which is assured for plausible population structures and elasticity parameter values. As demand elasticity increases, equilibrium premium and adverse selection increase monotonically, but loss coverage first increases and then decreases. We argue that loss coverage represents the efficacy of insurance for the whole population; and therefore that if demand elasticity is sufficiently low, adverse selection is not always a bad thing: a tolerable degree of adverse selection can increase the level of loss coverage.

---

[1] PhD student of the Centre for Actuarial Science, Risk and Investment, School of Mathematics, Statistics and Actuarial Science, University of Kent, Canterbury, Kent, United Kingdom. E-mail: mh586@kent.ac.uk, Tel: 01227826461

[2] Senior Lecturer in Actuarial Science, School of Mathematics, Statistics and Actuarial Science, University of Kent, Canterbury, Kent, United Kingdom. E-mail: P.Tapadar@kent.ac.uk

[3] Honorary Lecturer in Actuarial Science, School of Mathematics, Statistics and Actuarial Science, University of Kent, Canterbury, Kent, United Kingdom. E-mail: R.G.Thomas@kent.ac.uk

[4] Thomas, R.G. (2008) Loss Coverage as a Public Policy Objective for Risk Classification Schemes. The Journal of Risk and Insurance, 75(4), pp. 997-1018.

Thomas, R.G. (2009) Demand Elasticity, Adverse Selection and Loss Coverage: When Can Community Rating Work? ASTIN Bulletin, 39(2), pp. 403-428.