

More equal than others

Guy Thomas argues that some gender selection increases the societal benefit of insurance



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not lead to difficulties for either gender in buying insurance. I see this as very different from the proposition a few years ago that insurers should be banned from asking for genetic test results, when negligible costs if a ban was applied had to be weighed against clear potential social harms if it was not. However, a common feature of debates about both genetics and gender equality is that some arguments made by insurers seem suspect. This article examines one common argument: the idea that restrictions on rating may lead to adverse selection, and that this is always a bad thing.

Commentators who warn that less risk classification may lead to adverse selection do not always spell out why they think this is 'adverse' from a public policy perspective. However, if pressed, they usually explain that adverse selection leads to more insurance purchased by high risks, and less purchased by low risks, so that the break-even price of insurance rises; and as the number of high risks insured is usually smaller than the number of low

risks, the total number of people covered by insurance is likely to fall. They argue that this fall is a bad outcome for society. In my view this argument rests on a mis-measure of the benefit of insurance to the population as a whole. A fall in number of people insured can often be consistent with a higher number of losses compensated by insurance, if more of the 'right' people (those more likely to suffer loss) buy insurance. From a public policy perspective, a degree of so-called 'adverse' selection may often be beneficial.

The arithmetic of this point can be illustrated with simple examples. Suppose that in a population of 1,000, half the people (say one gender) have twice the risk of the other half. Assume that everyone can buy either one unit of insurance or none (this simplifies the presentation, but it is not necessary). If permitted, insurers will charge different prices to low and high risks. Insurance is less affordable to the high risks, so fewer

of them, say 200, buy insurance, compared with 300 of the low risks.

Table 1 shows the outcome. 70 of 150 (47%) of losses in the whole population are compensated by insurance. This 47% 'loss coverage' is an index of the social benefit of insurance to the population as a whole.

Now suppose instead that risk classification is restricted, so that insurers have to charge a single pooled price to both the high and low risks. One possible outcome is shown in Table 2. The pooled price is expensive for low risks, so fewer of them buy insurance, 230, compared with 300 before. The 'pooled' price is cheap for high risks, so more of them buy insurance, 260, compared with 200 before. The total number of policies sold falls, 490 compared with 500 before. But the shift in coverage towards high risks more than outweighs the fall in number of policies sold: 75 of 150

(50%) of losses in the whole population are now compensated by insurance, compared with 47% before.

A moderate degree of adverse selection has led to higher

loss coverage — a good outcome.

If the adverse selection becomes too severe, this can lead to a bad outcome. However, to generate a bad outcome in this example, it is necessary to assume a very large, and probably implausible, response to changes in price by low risks compared with high risks. This possibility is shown in Table 3. Only 150 of the low risks and 270 of the high risks buy insurance, giving a total number of policies sold of 420. The shift in coverage towards high risks is insufficient to outweigh the fall in number of policies sold: only 69 of 150 (46%) of losses in the population are now compensated by insurance.

Which of Tables 2 or 3 represents the more likely outcome if restrictions are imposed on risk classification? The answer depends on the relative numbers in the high and low-risk groups, their relative risks and the elasticity of demand for insurance in the high and low-risk groups. Simulation studies¹ suggest that with plausible elasticities of demand in high and

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Recent articles and news items in *The Actuary* have criticised the European Court of Justice's proposition that insurers should be banned from using gender as a risk factor. I agree that such a ban has costs as well as benefits, and that gender may be a relatively benign and effective classification. Possible costs include an increase in road accidents from more young men driving powerful cars, and insurers resorting to other, more intrusive, classifications. Possible benefits seem modest, because gender differences in risk have different signs for different products, and they generally do



low-risk groups, some degree of restriction on risk classification may often increase loss coverage; but the converse outcome is also possible. Under the loss coverage criterion, public policy on risk classification can be seen as a question of degree: what restrictions on risk classification are required to induce the optimal degree of adverse selection, which maximises the loss coverage?

Loss coverage is not the only criterion which public policymakers should consider when setting policy on risk classification. Social attitudes to discrimination, and where relevant the possible moral hazard effects of less risk classification (for instance, more young men driving powerful cars) might also be considered. However, to the extent that coverage effects within the insurance market are given weight, policymakers should carefully consider the metric they use to measure these effects. From a public policy perspective, loss coverage seems a better metric than conventional metric of number of policies sold. This is because loss coverage focuses on the expected losses compensated by insurance (risk-weighted insurance demand), which seems a better indicator of the social efficacy or benefit of insurance to the whole population than number of policies sold (unweighted insurance demand).

Application to gender discrimination

If gender were restricted as a rating factor, would loss coverage rise or fall? I do not know, but I suspect that the effects would be modest, and probably different for different classes of insurance. Even if the reality for some products corresponds to Table 3 — that is, the population's response to the change in prices 'goes too far', reducing loss coverage — the 'cost' of the adverse selection if correctly measured by loss coverage would be smaller than the 'cost' as commonly measured by the fall in number of policies sold.

I do not advocate a ban on gender rating, but nor do I think that it would be a disastrous outcome. In my view actuaries have a tendency to make exaggerated claims about adverse selection and the harm caused by restrictions on risk classification. Much of what actuaries said about genetics and insurance a few years ago now looks

Table 1 — No adverse selection		
	Low risk	High risk
Population	500	500
Risk	0.1	0.2
Break-even premiums (differentiated)	0.1	0.2
Insurance purchases	300	200
Losses compensated by insurance	30	40
Loss coverage	$\frac{\text{losses insured}}{\text{total losses}}$ 47%	
Table 2 — Moderate adverse selection, higher loss coverage (good outcome)		
	Low risk	High risk
Population	500	500
Risk	0.1	0.2
Break-even premium (pooled)	← 0.1531 →	
Insurance purchases	230	260
Losses compensated by insurance	23	52
Loss coverage	$\frac{\text{losses insured}}{\text{total losses}}$ 50%	
Table 3 — Severe adverse selection, lower loss coverage (bad outcome)		
	Low risk	High risk
Population	500	500
Risk	0.1	0.2
Break-even premium (pooled)	← 0.1643 →	
Insurance purchases	150	270
Losses compensated by insurance	15	54
Loss coverage	$\frac{\text{losses insured}}{\text{total losses}}$ 46%	

overblown; the same could be said of commentary a decade earlier on AIDS.

Is there a limit to the number of times that a credible profession can cry wolf? ■

¹ Further reading — (2007) 'Some novel perspectives on risk classification.' *Geneva Papers on*

Risk and Insurance, 32: 105-132; (2008) 'Loss coverage as a public policy objective for risk classification schemes.' *Journal of Risk & Insurance*, 75: 997-1018; (2009) 'Demand elasticity, risk classification and loss coverage: when can community rating work?' *ASTIN Bulletin*, 39: 403-428