Annals of Actuarial Science, page 1 of 6. © Institute and Faculty of Actuaries 2018
doi:10.1017/S174849951800026X

Book Review

Loss Coverage: Why Insurance Works Better with Some Adverse Selection, Edited by R. Guy Thomas, Cambridge: Cambridge University Press, 2018, 274pp, ISBN: 978-1-107-49590-6

This is a book that is full of common sense. Thomas provides important and, what will be to many, controversial recommendations to curtail insurers use of certain characteristics of individuals for purposes of differential pricing. He includes HIV status, genetic tests, and gender, as possible targets for bans. A prominent economist told me recently that whenever he talked about insurance at a cocktail or dinner party, his listeners immediately started to yawn. You won't yawn reading this book. It is clever and witty and includes a fascinating history of his topic. The targets of his critical analysis, which include economists, actuaries, and insurance industry leaders, will mostly not agree with my assessment. But even members of these groups who are not too thin skinned can learn from his research and perspectives. Any general readers who were skeptical about the wisdom of economists, actuaries, and insurance business leaders before reading this book, will be even more so after reading it.

In my review, I will only highlight some of the features of the book. It can be understood and appreciated by professional actuaries, economists, decision makers in business, members of relevant regulatory organisations, and interested members of the public. Some part of the book – about 20% – makes use of mathematics that will not be familiar to all potential readers. Thanks to his masterly use of simple numerical examples, that part can be skipped without losing the important points of the case he makes. Being an economist, I will spend more space in this review on the criticisms he makes of the use of economic models used to support the case against encouraging any adverse selection in insurance markets through bans on any risk classification schemes. I agree wholeheartedly with his policy perspectives. I agree less with some of his critical views on economic modelling in general although feel that these parts of his book are still worth serious consideration.

It is well recognised in the literature on insurance that private information held by individuals which is not observable to insurers may lead to adverse selection. This happens since if higher and lower risk types face the same price of insurance, then since the higher risks will value the product more than the lower risks, the higher risk types will purchase more coverage. The result is that the single price charged to all must be higher than the average price would be if insurers were able and allowed to assign risk type specific prices. If the single price were not higher, insurers would incur losses and the insurance market, it is argued, would become financially non-viable. The orthodox view amongst academic economists, actuaries, and industry decision makers is that adverse selection in general is a bad thing and should be avoided if at all possible. In their view, bans on insurers using individuals' genetic test results or other characteristics like gender are a very bad idea since such bans create an environment of regulatory adverse selection; that is, without regulation, insurers would use all relevant information to categorise individuals into specific risk classes and assign risk-rated prices, thus avoiding the consequences of adverse selection.

The central idea in this book is that even if there is some adverse selection in an insurance market and aggregate insurance purchases are lower as a result, more losses may nonetheless end up being covered. This seems counterintuitive or just plain wrong. But Thomas carefully demonstrates that

even if there is less insurance overall being purchased due to a modest amount of adverse selection, the higher demand from higher risk types who have a higher claim frequency may counterbalance the reduced frequency of claims resulting from the lower demand of lower risk types with the result that more losses are covered, even though fewer contracts are sold. Using careful mathematical models, as well as very simple examples for the sake of the mathematically unsophisticated reader, he describes conditions under which this would happen. The conditions are very general and he shows effectively that it is quite possible that more losses are covered in the presence of a moderate amount of adverse selection. The key requirement for this result is that the extent of adverse selection not be too large. He convincingly makes the case that this is likely to happen when the fraction of high-risk types in the market or the difference in risk level between types is not *too large*. This would seem applicable for the case of a ban on the use of genetic test results for life insurance since only a small fraction of the population has information that is quantitatively important for mortality risk[1]. One may think his analysis would not apply to gender bans since women and men each make up a large fraction of insurance buyers in most markets. But the difference in risk level between men and women may not be very large and so this is another scenario under which more losses may be covered under a single price rule despite the presence of some adverse selection.

So why should we adopt loss coverage as a normative criterion or goal of regulation rather than, say, the number of insurance contracts sold or other performance measures of the market. Thomas offers the simple and compelling point that the purpose of insurance – both from individuals' and the societal perspective – is to provide payments to people (or to families) who suffer financial burdens from adverse events in their lives. The more losses that are covered, the argument goes, the better off is society. Industry leaders would argue that fewer contracts being sold is a bad thing. If profits were based more on the number of contracts sold than the aggregate of losses covered, then the profit motive would indeed be compromised by the presence of adverse selection. But the primary social goal of insurance should not be to enhance profits of firms. Insurers may also argue that by not being able to create finely grained risk categories and assess precisely determined differential prices, they may end up making losses and be financially compromised. Thomas provides compelling evidence that this has not in fact happened for the insurance industry in markets where they are banned from using genetic test results or participated in markets where some small, but non-trivial, fraction of consumers were privy to anonymous (privately held) HIV tests. Moreover, he catalogues results of academic papers in economics journals that "search for adverse selection in insurance markets" yet find weak evidence, if any, of significant problems arising due to asymmetric information. He recounts various claims about the threat of adverse selection that have, in hindsight, been seen to be hugely and repeatedly exaggerated. The collection of quotations from supposedly learned and responsible organisations that miss the mark on the extent of past or current threats of adverse selection is surprising and important to acknowledge.

Many economists argue that adverse selection caused, for example, by a ban on insurers' use of customers' genetic test results will lead to a market allocation that is not Pareto efficient, whereas Pareto efficiency would result under full access to risk relevant information[2]. Based on the work of Vilfredo Pareto (1848–1923), this concept of market efficiency is, understandably, likely to be seen as esoteric by non-economists. An allocation is Pareto efficient if there is no other feasible allocation

[1] See Macdonald & Yu (2011) for a useful assessment of the quantitative relevance of genetic information within the population and its very modest impact for insurance pricing.

[2] This is the predominant concept in economics for assessing relative efficiency. I, along with many other economists, criticize the blanket use of Pareto efficiency as the sole criterion for policy analysis.

in which at least one person can be made better off without anyone being made worse off. This seems like a good thing. But economic efficiency ignores distributional and other social goals of society such as limiting feelings of discrimination or unfairness. I agree with Thomas that the economic definition of market efficiency is not a convincing basis to an argument against bans on the types of risk classification that are the focus of his book. Moreover, the relevant structure upon which economic efficiency is determined is based on the presumption that insurance purchasers are ultrarational decision makers (i.e. behave according to the Expected Utility Hypothesis (EUH)). There is significant research demonstrating that many individuals are not even close to being "ultrarational" EU maximisers and this seems especially so in terms of insurance purchasing decisions[3]. Many people "make mistakes" in perceptions about the likelihood of adverse events occurring or make decisions based on "non-rational" motives such as regret (e.g., see Kunreuther *et al*., 2013; Huang *et al*., 2016). Understanding contracts and consequences of decisions made in a world of uncertainty is a complex task for any individual. This makes opting for the pragmatic criterion of Thomas's loss coverage, which circumvents these complications, very attractive. Moreover, focussing on the outcomes of insurance – that is, the losses that get covered – rather than the valuations of insurance contracts by individuals at the time of buying insurance, has a counterpart in economics; namely, the ex post approach to welfare measurement. It has long been a controversy whether social evaluation should be based on the aggregations of individuals evaluations of their expectations of possible future events (the ex ante approach) or simply on their evaluations of outcomes (the ex post approach) (see Fleurbaey, 2010, 2018). The vast majority of economists appear to favour the ex ante approach. Thomas gives them reasons to reconsider at least in the context of insurance markets that he addresses.

Part III of Thomas's book provides what he admits are opinionated perspectives on "a variety of further aspects of risk classification" (p. 12). Although I don't agree with his criticisms about the development of economic theory to help us understand how insurance markets might behave, he does provide compelling criticisms about the widespread misuse – both implicit and explicit – of the Rothschild-Stiglitz (1976) model (RS hereafter). In particular, the RS model implies highly rationed (low coverage) insurance contracts for low risk types but high (full) coverage for high-risk types. This is the model's prediction only if the fraction of high-risk types in the population is "sufficiently large"[4]. The RS model seems quite clearly not applicable for scenarios like a ban on the use of genetic test results for health or long-term care insurance. The willingness of many economists to ignore this aspect of reality when prognosticating about policy recommendations regarding regulatory bans is seriously worrying.

Although Thomas points out that this state of affairs is not the fault of the model or its authors, I feel he gives too much attention to the RS model and not enough to the so-called WMS (Wilson–Miyaki–Spence) equilibrium concept and related models. These other models do not rely on firms creating, among the set of contracts they offer, one that has drastically lower coverage to attract the lower (better) risks as does the RS model (e.g. see Hoy *et al*., 2003). In fact, one version of

[3] Harrison & Ng (2016), for example, find that about half of their experimental subjects can be rejected as behaving consistently with the EUH in favour of the more general Rank Dependent Utility model. It is important to realize, though, that economists and others working in decision theory do not suggest that people actually adhere to some known utility function but rather have preferences and act on those in a way that can be modelled by one utility theory or another.

[4] If the fraction of high-risk types is not sufficiently high, the RS model has nothing to say about how insurance markets behave as in that case there is no pure strategy Nash equilibrium, which is the equilibrium concept that they rely upon.

these models – the Wilson E2 equilibrium concept – has a pooling policy as its equilibrium and so predicts all insureds will have the same coverage[5]. Thomas (p. 158) dismisses these models: "Much subsequent work building on Rothschild and Stiglitz, rather than moving closer to reality, has developed ever-more exotic concepts of equilibrium, such as anticipatory equilibria, mixed strategies and other obscure game-theoretic formulations". He also points out that actuaries don't focus on looking for screening mechanisms used by insurers to avoid adverse selection. This is not really surprising to me[6]. Thinking hard about incentives of firms and strategic behaviour is a particular concern of economic theory just as measuring financial soundness of insurance companies is more a concern of actuarial science. I think this is a strength of economics even if it is taken too far sometimes. Moreover, although the formal derivation of Wilson's pooling equilibrium may seem difficult and even exotic to non-economists, the description of its equilibrium is quite intuitive. As Rees & Wambach (2008: 83–84) note "In Wilson's equilibrium concept (Wilson, 1977), *every additional contract should stay profitable even if those contracts which make a loss after the introduction of the new contract are withdrawn*. It is easy to see that in this case a pooling contract might survive in equilibrium". The italics emphasise the key "extra assumption" relative to the RS model. The equilibrium contract is also intuitively pleasing. If an insurer is going to offer a pooling contract that both low and high risks are allowed to purchase, then designing the contract so that it is most attractive to the low risk types makes good sense (see also Hoy & Lun, 2017). Let the "other" firms service the more expensive customers[7].

Thomas argues that many insurance contracts, notably those in automobile insurance, have deductibles but these are much too small to facilitate screening high- and low-risk type buyers. He proposes more appealing reasons for small deductibles, such as avoiding administrative costs for settling small claims. I believe he is correct about this. However, some insurance markets have menus of contracts involving a wide range of coinsurance rates. Even after the Affordable Care Act (Obamacare), four basic plans that the insurers can offer both on and off the health exchange are allowed (see McCue & Hall, 2015). These include bronze (which has an actuarial value of 60%), silver (which has an actuarial value of 70%), gold (which has an actuarial value of 80%), and platinum (which has an actuarial value of 90%). A higher actuarial value simply means higher premium and less out of pocket expenses for the insured. Such a range of plans seems to me to at least have the potential to facilitate a significant amount of screening. Admittedly, one must perform careful empirical analysis to determine whether or not the better risks do tend to hold lower coverage policies. I am not aware of any definitive findings in the literature pointing to such an outcome and any such study must account for a wide range of data issues. One must study the entire set of contracts in the market (i.e. those offered both on and off the exchanges). Insurers must charge rates that are identical for plans offered both on and off the exchange. In addition, an insurer operating on the exchange is required to offer at least a silver plan and a gold plan (the richer plans). However, insurers operating (only) off the exchange are not under such obligations. This has been argued to be

[5] A good summary of the theoretical work is Mimra & Wambach (2014) and a nice application using these equilibria to analyse bans of personal information in insurance markets is Gemmo *et al.* (2017).

[6] Thomas notes "the main premises and predictions of these models – separation of risk-groups via menus of contracts with different deductibles, rationing of insurance for low risks, instability of markets with small fractions of high risks – appear unfamiliar and grossly counter-factual to actuaries and other insurance practitioners" (239–240).

[7] The paper by Wilson (1977) is not as highly cited as the one by Rothschild & Stiglitz (1976), but it is nonetheless quite highly cited at 1333 google cites as of 7 July 2018 (compared to 5954 for RS (1976). I suggest the disparity is that the RS paper is much simpler to understand and is viewed, perhaps unfairly, as "the" seminal contribution to the problem of how to model adverse selection in insurance markets.

a potential source of adverse selection or risk segregation, as healthier people are likely to buy off the exchange the bronze plans; with high-risk people purchasing richer plans on the exchange (see McCue & Hall, 2015).

I believe that, despite an active empirical literature on detecting adverse selection generally in insurance markets, it is still unclear whether there are substantial degrees of adverse selection existing in many insurance markets. Although existing studies that search for empirical evidence of adverse selection have become more refined in the use of appropriate econometric methods, major challenges remain. Salanié (2017) points out that many additional data issues need to be addressed to convince us of the existence and importance of potential adverse selection. Perhaps most important is that data from single insurance providers, which is the most common source, is not sufficient to model equilibrium empirically. He also points out that insurers compete in more dimensions than just price and quantity covered (i.e. sizes of deductibles or coinsurance rates) in an effort to select the best customers for their goal of maximising profit. So in my view, the jury is still out on this general issue. Nevertheless, it seems clear to me that Thomas is right for the many examples he explores (genetic testing, HIV status, gender). In these cases it seems very unlikely that a substantial degree of adverse selection is "ruining" these insurance markets as a result of bans on these characteristics for risk classification.

To sum up – Thomas's proposal to use loss coverage as a way to measure effectiveness or social value of insurance makes good sense. He demonstrates with great care when a regulation banning certain types of information will improve aggregate losses covered and so illustrates why a little adverse selection is a good thing. He is very explicit and fair in making his case, explaining why this doesn't mean any degree of adverse selection is a good thing and even provides a full chapter describing conditions under which his case would not apply. He makes cogent criticisms of many claims underlying the orthodox view that any amount of adverse selection is a bad thing and that regulations banning insurers' use of any risk relevant characteristics of individuals are ill advised. I agree with many of his criticisms of the orthodoxy, including many directed at economists. Even those views of his where I find myself disagreeing are worth the attention of economists. It is important to take seriously the criticisms of both insiders and outsiders to strengthen both the application and development of economics or any other social science. His criticisms are very well thought out.

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