Basic versus supplementary health insurance: Moral hazard and adverse selection☆

Jan Boone

CentER, TILEC, CEPR, Department of Economics, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands

ARTICLE INFO

ABSTRACT

This paper introduces a tractable model of health insurance with both moral hazard and adverse selection. We show that government sponsored universal basic insurance should cover treatments with the biggest adverse selection problems. Treatments not covered by basic insurance can be covered on the private supplementary insurance market. Surprisingly, the cost effectiveness of a treatment does not affect its priority to be covered by basic insurance.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

This paper considers a health insurance system where the government sponsors universal basic health insurance and private parties offer voluntary supplementary insurance. The question we analyze is: which treatments should be covered by insurance and how (i.e. basic vs. supplementary insurance)?

A well known intuition is that basic insurance can battle adverse selection problems but not moral hazard. In the words of Cutler and Zeckhauser (2000), pp. 588: "Moral hazard is a significant concern in insurance policies but it is not one that necessarily argues for government intervention. Government insurance policies … may engender just as much moral hazard as private insurance policies". Universal basic insurance by being applied to everyone can overcome adverse selection. This reasoning implies that basic insurance should cover treatments that suffer most from adverse selection. However, the literature on cost effectiveness analysis (see, for instance, Drummond et al., 2005; Gold et al., 1996, for overviews) suggests that the government should give priority to treatments that give the highest health gain per euro spent and cover

these by basic insurance. "Many health systems employ health technology assessment … (for example, cost effectiveness analysis) to determine what the publicly financed benefits package should cover", in the words of Stabile and Thomson (2014, pp. 508).

To analyze this question, we extend the Rothschild and Stiglitz, (1976) (RS) insurance model to include moral hazard and a number of different treatments. We show that a welfare maximizing government covers treatments by basic insurance where the adverse selection problems are biggest. Neither moral hazard nor (surprisingly) cost effectiveness affect the priority of a treatment for coverage by basic insurance. That is, moral hazard plays no role in whether (*extensive* margin) or how a treatment should be insured. Co-payments for a treatment increase and hence insurance decreases (*intensive* margin) if it suffers more from moral hazard. We come back to cost effectiveness in the conclusion. Further, the analysis shows that efficient health care consumption is not necessarily welfare maximizing. And the generosity of basic insurance is affected by whether or not the government can force private insurers to set efficient co-payments.

The reason to combine public and private insurance is given by the imperfections in the private health insurance market (Blomqvist and Johansson, 1997; Zweifel, 2011). Public and private health insurance can be combined in a number of ways. We consider the case where private insurance is bought to cover treatment for conditions that are not (fully) covered by public insurance. One can think of dental care,

---

physiotherapy and prescription glasses that are not covered by the public insurance system. But, also, the public system may not fully cover the costs of a treatment and people can insure the public co-payment on the private market. Examples of this combination of public and private insurance include Australia, Canada, France, Luxembourg and the Netherlands (after 2006) (Mossialos and Thomson, 2004; Stabile and Thomson, 2014). The Patient Protection and Affordable Care Act ("Obamacare") is also a move in this direction. Ten essential health benefit categories are defined that need (at least) to be covered by health insurance. It is left to the states to define which treatments within these categories will be covered exactly (McDonough, 2011). People are free to buy more coverage if they want, but any health insurance contract needs to cover at least the basics.[1] So which treatments belong to the basics?

We analyze the case with universal public coverage for a basic insurance package. There is a fixed budget to finance the public system; hence not all treatments can be covered by basic insurance. The private market (as in RS) features second degree price discrimination and hence there are inefficiencies due to selection incentives. The question is: which conditions should be covered by public insurance and which treatments can be left to the private market? We denote insurance offered by the private voluntary market: supplementary insurance.[2]

This paper is related to three strands of literature. First, from a technical point of view, we analyze a two tiered problem similar to DeMarzo et al. (2005) and Faure-Grimaud et al. (1999). In our case, the government sets parameters for basic insurance which then affect the equilibrium interaction between insurers and consumers on the private market. The health insurance context is similar to Bijlsma et al. (2014), but they consider the effects of risk adjustment in a private insurance market; not the distinction between private and public insurance.

Second, there is the (health) insurance literature on adverse selection. A seminal paper is RS: insurers separate customer types by offering efficient insurance for high risk types and a contract with under-insurance for low risk types. This under-insurance is the inefficiency of the market outcome. Dahlby (1981) is an early paper showing potential benefits of a combination of public and voluntary private insurance. However, the analysis in this literature is not done at the treatment level. That is, it does not answer the question how a treatment should be insured. Models in this literature generally ignore over-consumption of health care due to insurance.

Third, there is an extensive literature on moral hazard in health insurance. We discuss this literature under two headings. First, the literature that considers optimal coverage at the treatment level. This literature does not consider the public–private split of insurance coverage. Second, we discuss papers that do consider public vs. private insurance, but not at the treatment level.

The classic result on the degree of coverage at the treatment level is the tradeoff between risk sharing and excess demand for the treatment (moral hazard). The co-payment for treatment k should be higher the smaller the financial risk imposed by k and the more elastic the demand for k. Pauly (1968) and Zeckhauser (1970) are seminal papers. Using empirical estimates of demand elasticities for health services, Manning and Marquis (1996) find optimal co-insurance rates of almost 50%. The literature then moved away from the case of a single health care service to analyze interdependencies in demand for health care services. Besley (1988) derives a Ramsey pricing intuition for the optimal

co-payment for treatment k. Goldman and Philipson (2007) argue that if the use of a certain drug saves on hospital costs (substitute treatments), the optimal co-payment on the drug is low even though its demand may be quite elastic. With complementary treatments, the optimal co-payment is higher than the elasticity would suggest. Ellis and Manning (2007) extend this idea to multiple states of the world and multiple time periods.

This literature tends to define moral hazard in the following way. Consider a treatment k that an agent uses if it is covered by health insurance but does not use if she would pay the full costs of k herself. Then treatment k is seen as over-consumption induced by moral hazard of insurance. "Optimal insurance plans would pay for treatment only if the individual would have chosen the same treatment had he borne the full bill" (Cutler and Zeckhauser, 2000, pp. 576/7). We show that this definition can be misleading in the sense that this type of moral hazard can be efficient (ex ante welfare maximizing).

We conclude with three papers on the split between public and private health insurance. Blomqvist (1997) consider a model with only moral hazard. They show that a mixed public–private health insurance system is less efficient than a purely private system. The reason is the externality between the insurance systems: increasing coverage in one system raises the expected costs in the other system. In our model, the government takes this into account when designing the public system. Further, in our model the government can repair another market imperfection: adverse selection. Coate (1995) analyzes mandatory public insurance in the light of the Samaritan's dilemma. Altruistic rich agents give the poor money to buy private health insurance. The poor underinvest in insurance, hoping that the rich will help them once treatment is needed (Samaritan's dilemma). By making insurance mandatory, the underinvestment in insurance is avoided. Finally, Petretto (1999) analyzes a system with optimal constant co-insurance rates[3] for public and private insurance in a system with linear taxation. None of these papers answers the question that we are interested in: which treatments should be covered by public and which by private insurance?

Our paper is organized as follows. The next section introduces a model where people buy health insurance because they are risk averse. Then we explain the basic and supplementary insurance set up of the model. Section 4 gives the details of the insurance contracts used. Then we characterize the market equilibrium in the supplementary market. Section 6 derives which treatments should be covered by basic insurance. Proofs can be found in the appendix.

2. Model with adverse selection and moral hazard

This section presents a model of health insurance: a risk averse agent buys insurance to reduce consumption risk. The market imperfections are adverse selection and moral hazard.[4] We derive efficient health care consumption and the co-payments needed to get to this efficient outcome.

2.1. Utility

People are risk averse with respect to income/consumption and therefore buy health insurance. We capture this here by using a simple mean-variance utility structure. Models with both adverse selection and moral hazard tend to become technical (see for example Laffont and Martimort 2002, chapter 7) but mean-variance utility allows a tractable

---

[1] Two other ways in which private and public insurance can be combined are the following. First, private insurance may substitute for public insurance. That is, people are either covered privately or publicly. This is the case in Ireland, Spain and used to be the case in the Netherlands before 2006 (Colombo and Tapay, 2004, pp. 14). Second, private insurance is bought in addition to public insurance to get faster access (i.e. shorter waiting lists), have a broader choice of providers and treatments for a given condition. Examples include Austria, Denmark and Finland (Mossialos and Thomson, 2004, pp. 38/9).

[2] Sometimes this is called complementary insurance (see Mossialos and Thomson 2004, pp. 16).

[3] Much of the moral hazard literature assumes a constant co-insurance rate. That is, the insurer reimburses a constant fraction of health care expenditure. An exception is Blomqvist (2011).

[4] We use "moral hazard" here in the health economics sense of excessive care consumption.