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Adverse selection, moral hazard and the demand for Medigap insurance

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ABSTRACT

In this paper we study the adverse selection and moral hazard effects of Medicare supplemental insurance (Medigap). While both have been studied separately, this is the first paper to analyze them in a unified econometric framework. We find that adverse selection into Medigap is weak, but the moral hazard effect is substantial. On average, Medigap coverage increases health care spending by 24%, with especially large effects for relatively healthy individuals. These results have important policy implications. For instance, they imply that conventional remedies for inefficiencies created by adverse selection (e.g., mandatory enrollment) may lead to substantial health care cost increases.

1. Introduction

This paper studies adverse selection and moral hazard in the US Medigap insurance market. Medigap is a type of supplemental insurance sold by private insurers to cover gaps in Medicare, the primary social program providing health insurance to senior citizens. While both the adverse selection and moral hazard effects of Medigap have been studied separately, this is the first paper to estimate both in a unified econometric framework.

Private information is central to the analysis of insurance markets. For instance, "adverse selection" is a propensity of high-risk types to purchase more coverage. As Rothschild and Stiglitz (1976) show, if people have private information about risk type, the competitive equilibrium (if it exists) is not efficient: adverse selection drives up premiums, and low-risk types are underinsured. Hence, there may be scope for government intervention.

Insurance markets can also be affected by "moral hazard". This is a type of informational asymmetry that arises if ex-post risk of insured individuals is higher than the ex-ante risk (Arrow, 1963; Pauly, 1968). Moral hazard occurs if insurance, by lowering the cost of health care, increases the rate of health care utilization (condi-

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tional on health outcomes) and/or decreases the incentive to avoid bad outcomes (which also increases utilization).[1]

Both adverse selection and moral hazard generate a positive relationship between ex-post realization of risk and insurance coverage (Chiappori and Salanie, 2000). This makes them challenging to disentangle empirically. But from a policy point of view the distinction is very important. The same policies that can deal with adverse selection (e.g. mandatory enrollment) may lead to greatly increased health care costs if the moral hazard effect is strong.

To address this issue, we develop a simultaneous equations model for the joint determination of (i) demand for health insurance, and (ii) health care expenditure. Joint modeling is important, as one cannot estimate the moral hazard effect without quantifying the extent of selection into insurance coverage; nor can one measure the extent of adverse selection without quantifying how insurance affects demand for services (conditional on health).

We build on work by Fang et al. (2008), henceforth FKS, who study selection into Medigap. As FKS point out, a key advantage of the Medigap market for studying adverse selection is that we can actually measure private information about health expenditure risk. By law, insurers can only price Medigap policies based on age, gender, state of residence and smoking status. Thus, expenditure risk due to other factors, such as health status, can be viewed as "private" information for purposes of the analysis. The ability to observe private information enables us to estimate sources of selection into Medigap.[2]

We extend FKS by estimating moral hazard jointly with selection. This is possible because several of our "private" information variables generate plausibly exogenous variation in Medigap coverage.[3] This allows us to identify the moral hazard effect of Medigap.

We also extend FKS in several other ways. First, we use a much more sophisticated model of health expenditure. To fit the complex health expenditure distribution we use a "smooth mixture of Tobits", which generalizes the Smoothly Mixing Regressions model of Geweke and Keane (2007). Second, like FKS, we merge data from two datasets in our analysis (the Medicare Current Beneficiary Survey (MCBS) and the Health and Retirement study (HRS)). However, in contrast to the *ad hoc* imputation method used by FKS, we use a formal Bayesian approach, known as "data fusion". Third, we estimate not only an average moral hazard effect, but the entire distribution of effects across types of people. Fourth, we consider additional potential sources of adverse selection beyond those considered by FKS. Race and marital status turn out to be important. Finally, unlike FKS, we allow for correlation in the unobservable determinants of insurance choice and health care expenditure.

Our main results are as follows: Conditional on Medigap pricing variables only, we find *advantageous* selection into Medigap. Contrary to classical theory, higher-risk individuals are *less* likely to buy insurance. However, conditional on a set of private information variables, we do find *adverse* selection into Medigap. But this effect is not very strong: a one standard deviation increase in expenditure risk in the Medicare only state (12,700 dollars) increases the probability of buying Medigap by only 5.5 percentage points (from 50% to 55.5% at the mean of the data). Among the private information variables, cognitive ability and income are the most important factors explaining advantageous selection.[4] These findings regarding the magnitude and sources of selection are consistent with the main results of FKS.

Our results imply that moral hazard effects of insurance are large: On average, a person with Medigap coverage spends $1615 (24%) more on health care than a comparable person without Medigap. As external validation of our model, note that this is comparable to the moral hazard effect in the RAND Health Insurance Experiment. Manning et al. (1987) find that decreasing the co-insurance rate from 25% to 0 increased total health care expenditure by 23%. A typical Medigap plan leads to a similar drop in the co-insurance rate,[5] and we predict it has a similar effect on expenditure.

We also find that the moral hazard effect varies in important ways with individual characteristics. In particular, the demand for health care is much more elastic for healthier people. As a result, given a universal extension of Medigap coverage, most of the increase in health care spending would be directed toward the healthiest seniors.

The paper is organized as follows: Section 2 contains the literature review; Section 3 describes the data; Section 4 presents our model of demand for Medigap insurance and health care expenditure; Section 5 presents the empirical results; Section 6 concludes.

2. Literature review

Part A: literature on health insurance in general

Many studies examine either adverse selection or moral hazard in health insurance markets. Cutler and Zeckhauser (2000) review the literature on selection, and conclude that most studies find adverse selection. These studies often use data from employers who offer different insurance plans (with different levels of generosity) to their employees. On the topic of moral hazard, we already discussed the Manning et al. (1987) work on the RAND experiment. Similarly, Chiappori et al. (1998) find that an exogenous increase in generosity of health insurance coverage in France had a positive effect on expenditure. Econometric studies by Munkin and Trivedi (2008, 2010) and Deb et al. (2006) also find large moral hazard effects.

Only a few papers estimate selection and moral hazard effects in a unified framework. This first was Cardon and Handel (2001). Using the National Medical Expenditure survey, they find little adverse selection but substantial moral hazard. Their estimates rely on the strong assumptions that insurance choice sets faced by individuals are exogenous, and that health shocks are lognormal. Bajari et al. (2011, 2014) obtain semiparametric estimates of a structural model of health insurance choice and expenditure. They find both moral hazard and adverse selection are substantial. But they do not allow for heterogeneous risk aversion, or correlation of risk aversion with expenditure risk. Both these features have been found to be important in other studies (e.g., Fang et al., 2008; Finkelstein and McGarry, 2006).[6]

[1] We focus on the first definition of moral hazard (i.e. insurance increasing health care utilization conditional on health outcomes), which is the most often used definition in the recent health economics literature.

[2] Aside from health measures, the private information variables we observe are cognitive ability, income, education, financial risk attitudes, financial planning horizon, longevity expectations, race and marital status.

[3] That is, while they enter the insurance equation, they can be excluded from the health expenditure equation, given our rich set of controls for health status.

[4] Both high income and high cognitive ability people tend to be (i) healthier and (ii) to demand more insurance conditional on health.

[5] Basic Medicare leaves about 55% of costs uncovered. Average out-of-pocket costs of people with Medigap are about 23% of total costs, or 1800 dollars (Kaiser Family Foundation 2005). Thus, on average, adopting a Medigap policy decreases out-of-pocket costs by 32 percentage points (from 55% to 23%).

[6] Cohen and Siegelman (2010) review work on selection and moral hazard in other insurance markets.