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The value of genetic information in the life insurance market

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Abstract

This paper analyzes the effects of additional information in a life insurance market under adverse selection. Individuals have an incentive to acquire information about their risk type if their informational status cannot be observed by insurers. In aggregate, however, the existence of a testing opportunity has an effect on the equilibrium premium. We describe the conditions under which, from an ex ante standpoint, all individuals gain, all lose or in which some gain and some lose from the existence of the test. © 2000 Elsevier Science S.A. All rights reserved.

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1. Introduction

The purpose of this paper is to determine whether information such as that obtained from genetic screening has positive or negative value in a life insurance market which displays adverse selection. In many countries existing or proposed legislation prohibits the use of genetic tests for ratemaking purposes and so assessing the impact of such information in the context of a model in which information about risk type is both private and increasing is an important exercise. Also, other types of health tests generate what is effectively private information for insureds.

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The question of the private and social value of additional information in insurance markets has been analyzed by Doherty and Thistle (1996) in the context of the usual insurance model of adverse selection. As we do, they analyze the case where insurers cannot observe whether consumers have obtained a test. They show that, in this context, acquiring information usually has a positive private value since by taking the test the market possibilities (especially the price of insurance) do not change for the individual but better information allows consumers to make a more informed choice; that is, to adjust the amount of insurance they buy to what is optimal for their risk type. However, the social value of the testing opportunity is negative. If there were no asymmetric information before the test, all individuals would insure for a medium premium. If insurers could observe test results then, depending on the outcome of the test, some (those with good news) could buy insurance cheaper and for those with bad news, the premium would increase. By the martingale property of conditional expectation, the *expected* premium would be the same as the medium premium before, but since the premium is a random variable and individuals are risk averse, all are worse off from an ex ante perspective. Asymmetric information after the test aggravates this problem, since low risks (those with good news) cannot buy full insurance for the low premium but must signal their type by purchasing only partial coverage.

Our model departs from Doherty and Thistle's in that we analyze the same problem in a life insurance model. The fundamental difference between life insurance and other insurance policies is, from an institutional point of view, that individuals can buy life insurance from as many companies as they want and therefore price–quantity contracts are not a feasible means against adverse selection; insurance companies can only quote a uniform price for all life insurance contracts.[1] A second important difference between life insurance and other insurance is that there is no *natural* choice for the size of loss. In most models of insurance there is a fixed insurable loss l and this loss is independent of its probability of occurring. Thus, a risk averse individual when faced with an actuarially fair premium will purchase full coverage insurance regardless of her probability of loss. Increasing symmetric information about risk type will therefore not have any potential for increased consumption efficiency in terms of the amount of insurance desired. In the context of life insurance, however, this is not the case as a change in the probability of death can, and as we show generally does, lead to changes in the amount of insurance demanded even when these probabilities are symmetrically observed. Thus, information of the type we study here has an added possible dimension for providing positive social value by allowing for better informed consumption choices.

There are several reasons for concerning ourselves specifically with the impact of genetic information in a pure adverse selection model. First, the impending

[1]Insurance companies also don't generally share information about the amount of insurance purchased by their customers. For a discussion about this possibility, see Hellwig (1988).