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# Incentive-compatible guaranteed renewable health insurance premiums

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**Abstract**

Theoretical models of guaranteed renewable insurance display front-loaded premium schedules. Such schedules both cover lifetime total claims of low-risk and high-risk individuals and provide an incentive for those who remain low-risk to continue to purchase the policy. Questions have been raised of whether actual individual insurance markets in the US approximate the behavior predicted by these models, both because young consumers may not be able to "afford" front-loading and because insurers may behave strategically in ways that erode the value of protection against risk reclassification. In this paper, the optimal competitive age-based premium schedule for a benchmark guaranteed renewable health insurance policy is estimated using medical expenditure data. Several factors are shown to reduce the amount of front-loading necessary. Indeed, the resulting optimal premium path increases with age. Actual premium paths exhibited by purchasers of individual insurance are close to the optimal renewable schedule we estimate. Finally, consumer utility associated with the feature is examined.


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## 1. Introduction

### 1.1. Background

Many illness-related events do not begin and end within the single-year time frame that is typical for private health insurance policies. A person initially in good health who develops a chronic illness may expect to have above-average expenses in subsequent years. If the annual insurance premium is set proportional to expected expense in each year, someone who contracts a multi-year condition would face a substantial and unexpected jump in premiums—something public policy finds undesirable and something which a risk-averse person would prefer to avoid. A potential solution to this problem is for the insurance policy purchased when the individual is still in good health to contain a guaranteed renewability (GR) provision which stipulates that no insured's future premium for the given policy will increase more than any other insured's premium increases. Thus, people who unexpectedly become high-risk will pay the same premium as those who remain low-risk.

While the Health Insurance Portability and Accountability Act (HIPAA) of 1996 mandates GR for almost all individual insurance in the United States,[1] and while that feature in theory solves the "reclassification risk" problem, there are a few potential problems with successfully implementing GR. In a world of competitive unsubsidized insurance firms, the insurer offering GR faces a problem. If some individuals who are low-risk in period one will become high-risk in period two, a second-period premium incorporating these higher expected expenses may drive away from the plan those who remain low-risk. Low-risk individuals will be attracted to other firms promising to charge them no more than their own expected expenses. In this sense, the promise to "community rate" insurance in the future for a population of initial purchasers is not sustainable in competitive insurance markets.

There is, however, a solution in theory to this problem, as suggested by Cochrane (1995) and Pauly et al. (1995). The premium the insurer should charge the low-risk individuals in period one should be higher than the expected expense for that population in period one. The "extra" premium is used to cover the subsequent above-average expenses of those who became high-risk between period one and period two. It would then be possible to charge a premium equal to the low-risk individuals' expected expense in period two. At this premium, both those who became high-risk and those who remain low-risk would remain with the insurer.[2] Moreover, risk-averse individuals will prefer paying the higher premium in period one to paying a lower premium in period one and facing the uncertainty of above-average premiums in period two. The expected lifetime premiums are the same under both scenarios, but "front-loading" the first-period premium

[1] Even though many states had their own GR regulations in effect before HIPAA, most private insurance policies contained this feature even when not required by law (Pauly et al., 1999). Although HIPAA is somewhat incomplete in that it does not require premiums to be the same for all individuals within a rating class, Patel and Pauly (2002) find, in a national survey of insurance regulators, that 47 states do have this requirement.

[2] Although the Pauly, Kunreuther, and Hirth paper considered only two risk types, the intuition of the model can easily be applied to consider a continuum of risk types (as we essentially do with our empirical model). The "incentive compatible" aspect of the GR premium schedule is that no insured individual has an incentive to leave the plan. A model with a continuum of risk types would therefore have the GR premium schedule defined by the expected expenses of the lowest-risk person and the probability of not remaining the lowest-risk person during the year applied to all future "excess" medical claims.