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Competitive long-term health insurance

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ABSTRACT

I study the interplay among competition, contractual commitment, income risk, and saving and borrowing in insuring consumers against both short-term healthcare expenses and longer-term changes in health status. Examining different combinations of firms' ability to commit to long-term contracts, consumers' access to credit markets, and the availability of termination fees helps to highlight sources of inefficiency.

1. Introduction

I consider a dynamic model of health insurance where a consumer's risk within a period varies with his current observable health state. Because health states evolve over time, the consumer would like to insure not only against within-period risk, conditional on health state, but also against changes in his health state (reclassification risk). There is consequently a clear role for multiperiod insurance contracts.

In the U.S., however, health insurance plans typically cover only a single year, whether purchased through an employer, on the exchange markets set up under the Affordable Care Act, or as part of Medicare or Medicaid. One reason that has been offered to explain the lack of multiyear plans is one-sided commitment. As Cochrane (1995, p. 447) puts it, even if contracts are binding for insurance firms, "*consumers* cannot be held to long-term contracts." The consumer can walk away in the future for a more favorable deal if his health state turns out to be better than expected. Handel et al. (2017) estimate that optimal dynamic contracts with one-sided commitment provide useful insurance against reclassification risk if consumers' expected income is flat over time, but are much less effective if income is increasing.

In this paper, I use the model to study the interacting effects of different market features on insurance against reclassification risk when insurers are competitive. I consider the following cases: insurers may or may not be able to commit to long-term contracts; consumers may or may not have access to credit markets; and termination fees for consumers to cancel long-term contracts may or may not be allowed. The model in this paper is general enough to include income that changes over time, time-dependent health state transitions, permanent health shocks (such as diabetes or organ failure), and health shocks that are transient but long-lasting (such as major injuries that require multiple surgeries). It also allows, at the extreme, i.i.d. health states, income, and medical expenditures across periods.

I find that when insurers cannot commit to long-term contracts, then access to credit markets can help consumers insure against reclassification risk. When insurers can commit, then with either access to credit or termination fees the competitive equilibrium achieves the second best outcome: consumers can fully insure against changes in their health states. It is not surprising, of course, that termination fees allow consumers to commit to a long-term contract. The contribution, rather, is to demonstrate that competition among insurers does not drive the termination fees to zero in equilibrium. In markets for typical consumer products, by contrast, a firm cannot charge a termination fee unless it has market power.

Many previous studies of dynamic insurance contracts with one-sided commitment (Pauly et al., 1995; Hendel and Lizzeri, 2003; Finkelstein et al., 2005; Herring and Pauly, 2006; Handel et al., 2017) focus on front-loaded premium payments. Such front-loading removes the consumer's incentive to walk away, but if credit markets are imperfect it can be costly for consumers, especially those with low income or those who expect their income to increase over time. That cost drives Handel et al. (2017)'s finding that optimal dynamic contracts do badly when income is growing. The analysis in this paper suggests that one-sided commitment need not be an impediment to insurance against reclassification risk. Termination fees are consistent with competitive forces, and they avoid the costs of front-loaded premiums.

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The most closely related paper is Cochrane (1995), who argues that a sequence of one-period contracts combined with a system of special accounts for insurance payments can implement the second best outcome. The idea is that after observing the consumer's new health state at the end of each period, the firm and the consumer settle any change in the consumer's long-run expected health costs. If the consumer's health state has deteriorated, then the insurer pays the increase in expected future health costs into the account. If the health state has improved, then the consumer pays in the decrease in expected costs. After those settlements, the consumer negotiates a new one-period contract with any insurer. The account and settlement payments thus act as insurance against changes in insurance premiums resulting from reclassification. As Handel et al. (2017) point out, though, to prevent the account from running into a negative balance, the consumer may need to make a large upfront payment.

Cochrane (1999, p. 449) also proposes that aside from the special accounts, "If insurers are successfully forbidden from raising premiums or limiting coverage for the sick, severance payments could happen only when a consumer decides to change insurers." In this paper, I explore that claim formally to determine whether and how such severance payments (called termination fees here) can arise in competitive markets, and I investigate their consequences for related markets.

Geruso and Layton (2017) give an overview of selection in health insurance markets, and Hendel (2016) surveys the literature on dynamic contracting and reclassification risk. Fang and Gavazza (2011) and Cabral (2017) explore other dynamic inefficiency in insurance markets: Fang and Gavazza (2011) study under investment in health under employer-sponsored plans, and Cabral (2017) examines strategic delay of treatment. Dionne and Lasserre (1985), Cooper and Hayes (1987), and Janssen and Karamychev (2005) analyze long-term insurance contracts under asymmetric information with permanent risk types, while Farinha Luz (2015) considers evolving types.

The structure of the rest of the paper is as follows. Section 2 describes the model. In Section 3 I use a simple example to illustrate the working of the model, and Section 4 presents the results formally. In Section 5, the conclusion, I discuss why termination fees, though common in similar settings like automobile insurance and real estate loans, are not used in health insurance in the U.S.

2. Model

There is a set of consumers who face a finite-horizon insurance problem with T periods. Consumers differ in their initial health state s_1, an element of a finite set S. A consumer whose health state in a period is $s \in S$ receives stochastic income in that period drawn from the distribution F_s with mean $\bar{y}_s$. For each s, the support of F_s lies in a finite set Y. Let y_t denote a consumer's realized income in period t. Income here is interpreted as income net of medical expenditures: the distributions of both earnings and medical expenditures may depend on the current health state.

A consumer's health state evolves according to a Markov process with time-dependent transition probabilities $\pi_t : \triangle(S) \to \triangle(S)$. Health state transitions are independent across consumers and across time, and they are independent of income realizations. Income realizations are independent across consumers and (conditional on current health state) across time. Let $P_1 \in \triangle(S)$ denote the initial distribution of health states. For $t \in \{2, \ldots, T\}$ let $P_t \in \triangle(S)$, defined recursively as $P_t \equiv \pi_{t-1}(P_{t-1})$, denote the distribution in period t. Denote by $P_{t'|s_t=s}$ the distribution in period $t' \geq t$ conditional on period-t state s ($s_t = s$). Given discount factor δ, define

$$\bar{y}_s^{LR,1} \equiv \frac{1-\delta}{1-\delta^T}\sum_{t=1}^{T}\delta^{t-1}\sum_{s'\in S}P_{t|s_1=s}(s')\bar{y}_{s'};$$

$\bar{y}_s^{LR,1}$ is the discounted average income across all T periods of a consumer with initial health state s. Let

$$\bar{y}^{LR,1} \equiv \sum_{s\in S}P_1(s)\bar{y}_s^{LR,1}$$

be the unconditional long-run average. Similarly, for each $t \in \{2, \ldots, T\}$ denote by

$$\bar{y}_s^{LR,t} \equiv \frac{1-\delta}{1-\delta^{T-t'+1}}\sum_{t'=t}^{T}\delta^{t-t'}\sum_{s'\in S}P_{t'|s_t=s}(s')\bar{y}_{s'}$$

the discounted average income across the remaining $T-t+1$ periods of a consumer whose health state in period t is s.

The model allows for the possibility that two health states have the expected income or even the same distribution over income today, but different expectations for the future. To avoid trivial settings, I assume that the distribution of income F_s is nondegenerate for each health state s, and that the conditional average income $\bar{y}_s^{LR,t} \neq \bar{y}_{s'}^{LR,t}$ for any $s' \neq s$ and any t.

Let c_t denote a consumer's consumption in period t. Consumers are expected-utility maximizers. A consumer's total utility from a consumption stream $\{c_t\}_{t=1}^{T}$ is given by

$$\sum_{t=1}^{T}\delta^{t-1}u(c_t),$$

where u is the consumer's twice continuously differentiable, strictly increasing, and strictly concave Bernoulli utility function.

Competitive firms provide insurance against income risk. Firms maximize the discounted sum of expected profits. They use the same discount factor δ as the consumers.

A consumer's period-t history is $h_t = (s_1, y_1, \ldots, s_t)$, representing his current health state and all of his previous health states and income realizations. Denote by $\mathcal{H}_t$ the set of possible t-period histories, and let $\mathcal{H} \equiv \cup_{1\leq t\leq T}\mathcal{H}_t$ be the set of such histories of any length. For any history $h_t \in \mathcal{H}$ and $t' \leq t$, let $s_{t'}(h_t)$ denote the consumer's period-t' health state. Let $P_t^h(h_t)$, calculated recursively as

$$P_1^h(h_1) = P_1(s_1(h_1));\ P_{t+1}^h(h_t; y_t, s_{t+1}) = F_{s_t(h_t)}[y_t] \times \pi_t(s_t(h_t))[s_{t+1}] \times P_t^h(h_t),$$

denote the probability of history h_t. Similarly, let $P_{t'|h_t=h}^h(h_{t'})$ denote the probability of history $h_{t'}$, $t' \geq t$, conditional on period-t history h. Each consumer's period-t history is publicly observed at the start of each period t – there is no asymmetric information.[1]

I will consider two different contracting environments: one-period contracts, and multiperiod contracts with endogenous termination fees. What differs between the two environments is the strategy space of the firms. In both cases, a consumer who signs a contract at the start of a period commits himself to its terms for that period only. He can walk away (for example, to sign a new contract with another firm) at the start of the next period.

[1] As in Handel et al. (2017), I abstract from both asymmetric information and moral hazard in order to focus on the interaction of dynamic contracting and reclassification risk.