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Figuring out the impact of hidden savings on optimal unemployment insurance ☆

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Abstract

In this paper, I consider the problem of optimal unemployment insurance in a world in which the unemployed agent's job-finding effort is unobservable and his level of savings is unobservable. I show that the first-order approach is not always valid for this problem, and I argue that the available recursive procedures are not currently computationally feasible. Nonetheless, for the case in which the disutility of effort is linear, I am able to provide a complete characterization of the optimal contract: the agent's consumption is constant while he is unemployed, and jumps up to a higher constant and history-independent level of consumption when he finds a job.

1. Introduction

In a recent paper, Hopenhayn and Nicolini (1997) study the properties of an optimal insurance arrangement between a risk-neutral insurer (principal) and a risk-averse worker (agent). They assume that the agent begins life unemployed and expends a hidden amount of effort to find a job in each period. His probability of finding a job is increasing in the amount of effort exerted; once he finds a job, he keeps it forever. Importantly, the insurer has complete control over the agent's consumption, because the agent cannot *secretly* transfer consumption from one period to the next.

They find that in an optimal contract between the principal and the agent, the agent's consumption is a decreasing function of his time spent unemployed. This general result

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has two consequences. First, an agent who has been unemployed for t periods has a lower consumption than an agent who has been unemployed for $(t-1)$ periods. Second, an agent who finds a job after a long period of unemployment must make a higher payment to the insurer than an agent who finds a job after a short period of unemployment.

As stated above, Hopenhayn and Nicolini assume that the principal can costlessly monitor the agent's savings and condition contractual payments on this variable. One can show that the optimal contract in Hopenhayn and Nicolini's setting has the property that the agent is *savings-constrained* when unemployed: the agent's shadow interest rate is lower than the principal's shadow interest rate. Nor is this feature of the Hopenhayn–Nicolini contract unique to the unemployment insurance problem. Rogerson (1985a) shows that in settings with repeated moral hazard, it is generally optimal to impose a sufficiently severe punishment for poor output performance that the agent ends up being savings-constrained. Intuitively, the agent would like to save so as to mitigate next period's punishment.[1]

It follows that with moral hazard, the optimal dynamic contract is only incentive-compatible under the assumption that the principal is able to costlessly monitor the agent's asset levels. This assumption is somewhat restrictive. After all, there are a number of ways that a person can transfer resources to the future (like foreign bank accounts or by accumulating durables) that may be hard for outsiders to observe. It is therefore important to understand the intertemporal structure of optimal contracts when the agent is allowed to engage in secret asset accumulation.

This paper is a contribution to this general research agenda. I relax the assumption that savings can be monitored by the principal in the Hopenhayn–Nicolini unemployment insurance model, and assume instead that the agent can secretly save at the same rate as the principal. I then look to solve for the optimal insurance contract.[2] Not surprisingly, this problem is generally impossible to solve analytically. Unfortunately, it is also difficult to solve numerically. In a recent paper, Fernandes and Phelan (2000) have described a recursive formulation for a related class of problems. It is not known, though, how to translate their recursive formulation into a practical computational procedure when savings can take on a continuum of values. Werning (2002) and Abraham and Pavoni (2003) attack the problem by using a computationally feasible first-order approach that replaces the agent's incentive constraints with the corresponding first order conditions. However, I show that even in simple examples, the first-order approach may not be valid because the agent's decision problem is intrinsically non-concave in effort and savings.

It is possible, though, to obtain an analytical solution in a particular case, even when the first-order approach is known to be invalid. I assume that the agent's disutility from effort is linear in the probability of his finding a job, and that the principal wants the agent to exert an interior amount of effort while unemployed. Under these assumptions,

[1] In a recent working paper, Shimer and Werning (2003) consider unemployment insurance in a version of the McCall search paradigm. They assume that the insurer cannot observe the wage drawn by the unemployed agent. They show that if the agent has exponential utility, then the optimal unemployment insurance contract is the same whether or not the agent can secretly save and/or borrow.

[2] I search across all incentive-compatible insurance contracts. Abdulkadiroglu et al. (2002) instead consider an incomplete markets economy with a limited set of possible unemployment insurance systems. They numerically characterize the optimal unemployment insurance system in that set.