Agency Models with Frequent Actions

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Abstract

The paper analyzes dynamic principal-agent models with short period lengths. The two main contributions are: (i) an analytic characterization of the values of optimal contracts in the limit as the period length goes to 0, and (ii) the construction of relatively simple (almost) optimal contracts for fixed period lengths. Our setting is flexible and includes the pure hidden action or pure hidden information models as special cases. We show how such details of the underlying information structure affect the optimal provision of incentives and the value of the contracts. The dependence is very tractable and we obtain sharp comparative statics results. The results are derived with a novel method that uses a quadratic approximation of the Pareto boundary of the equilibrium value set.

1 Introduction

We consider dynamic contracting problems in which a risk neutral principal interacts repeatedly with a risk averse agent under asymmetric information. These are benchmark models in labor economics, corporate finance (CEO compensation and optimal capital structure), and the literatures on optimal dynamic insurance and taxation. The questions of the optimal dynamic incentive design in those situations are central to both economic theory and the applications. In the paper we develop a novel discrete-time method that allows us to solve such problems analytically for a range of contracting environments.

We focus on settings with frequent decisions and information arrival (“short period length”). Importantly, the class of models we consider is permissive regarding the precise nature of information structure in each period. It embraces models in which the agent has private information about his own action only, as when devoting costly effort to develop a risky project (pure hidden action), models in which the agent also has some partial information about the environment, for example own stochastic productivity (private information), and models when the agent acts after all the uncertainty is resolved, as when diverting funds from the realized cash flows (pure hidden information). Aside from the degree of private information, models differ in distributions of signals and the effects