INTERTEMPORAL DECISION MAKING WITH PRESENT BIASED PREFERENCES

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Extended Abstract

I study the behavior of individuals who have present biased preferences in a setting where they have to complete a costly long run project at a given time horizon. Quasi hyperbolic discounting is used to model these preferences.

Previous literature incorporating different types of hyperbolic discounters in intertemporal decision games examines how the characteristics of the agents affect the agents' investment behavior by taking their payoff as given (see O'Donoghue-Rabin, 2001, 2002). In this paper, I make the payoff structure endogenous by introducing a bargaining stage after the investment game. In the first stage, a hyperbolic discounter chooses when to complete a sequence of costly investments in his human capital (or a long run project). After completing all the investments (finishing the project), the agent and the principal bargain over the generated surplus through a Rubinstein alternating offers procedure. We assume each agent knows the opponent's type and the incurred period costs are homogeneous. We use *Naive Backwards Induction* (Sarafidis, 2006) as the equilibrium concept.

Under this framework, I show that since different types of agents perceive their payoffs (from the bargaining stage) differently, endogenizing the payoff affects agents' investment behavior. The naive agent overestimates his payoff, possibly, leading to a regret motive. The exponential always completes the investment stage immediately as a result of the optimality of finishing assumption, whereas the sophisticated agent has a cyclical completion behavior. On the other hand, depending on the parameter values, the naive agent either invests immediately or postpones it until the deadline. I show that if a naive agent does not procrastinate, a sophisticated agent does worse than the naive agent for two reasons: first, the sophisticated agent gets a strictly lower share in the bargaining game (Akin, 2007); second, since the naive agent starts the investment immediately while the sophisticated agent may not, the sophisticated agent would get a lower discounted payoff even if the bargaining shares had been the same. However, if the naive agent procrastinates, the sophisticated agent does better than the naive agent.

Afterwards, a bonus motive is introduced into the model and the minimal incentive scheme (or required bonus) to prevent inefficient procrastination is derived. We show that for

naive players, the minimal incentive scheme involves an increasing reward structure and for any given project, it requires higher rewards for players with higher time inconsistency problems.

As an extension, I introduce partially naive hyperbolic agents who potentially learn their true preferences overtime. After repeatedly planning to start or continue doing a task in the near future based on some beliefs, not carrying out these plans and not acting in accordance with those beliefs, the naive agent may realize the ineffectiveness of such plans. This may lead her to update self-beliefs such that she does not procrastinate anymore or she gives up the plans completely. In the context above, I allow the naive agent engaged in a long run project to update self-beliefs whenever she does not carry out an action she planned previously (I assume that there is no learning in the bargaining stage as opposed to Akin, 2007). Firstly, without learning, partially naive agents do not procrastinate as long as the perceived maximum tolerable delay is equal to the current maximum tolerable delay. If the former is strictly less than the latter, then they procrastinate finishing the project till the deadline. Secondly, with learning, I conjecture that if the learning pace is fast enough, then procrastination till the deadline does not occur. In addition, depending on the parameter values, since the perceived payoff from the bargaining stage declines with learning, the agent may give up starting the project.

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