Abstract

Three Essays on Environmental Economics

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Three chapters are presented in this thesis, each in the field of environmental economics. The first chapter studies voting outcomes when people differ in their private expectations about marginal damages and the policy maker proposes an externality pricing instrument that is either based on a static political compromise or on a state-contingent updating rule (McKitrick, 2010). We examine cases in which voters are honest (they prefer the socially-optimal price based on their expectation of marginal damages) or dishonest (they prefer either a zero tax or a maximum tax on a priori grounds, irrespective of marginal damages) or combinations of these two. We show that when all voters are honest a standard pricing mechanism that aims at minimizing political losses may never obtain majority support, but implementation of the state-contingent pricing rule always obtains majority support. We then examine whether dishonest voters would prefer implementation based on the static rule or the state-contingent rule.

The second chapter examines the relationship between the social discount rate (a rate chosen by a social planner) and the pure rate of time preference (a rate chosen by a representative agent). We accomplish this by examining the slope of famous 'Ramey equation' with respect to the pure rate of time preference. In the literature, it is typically

assumed the value of the slope to be equal to one, which is equivalent to treating the consumption growth rate to be independent of the pure rate of time preference. Our general equilibrium framework shows that this relationship is rather complex, and depends on the relative signs and sizes of elasticities of consumption and the growth rate of consumption with respect to the pure rate of time preference. We then examine a closed form solution case where we observe their relationship depends on exogenous parameters of the model, such as initial capital stock, technology parameter as well as time index. Finally, we empirical estimate the relationship by using the Time-Varying Semiparametric Smooth Coefficient model using U.S data from 1930-2014. We find that the estimate of the slope of the social discount rate with respect to the pure rate of time preference to be 0.84 for the United States.

The social discount rate based on Ramsey equation is critically dependent upon future consumption growth rates and the pure rate of time preference. In practice, however, the pure rate of time preference is not observable, unlike with the consumption growth where past rates are known with certainty and future projections can be formed with some uncertainty. Ironically, numerous papers have incorporated and examined the effects of the consumption uncertainty but treat the pure rate of time preference to be constant and certain in social discount rates. The third chapter investigates the latter issue for various underlying cases in restricted and unrestricted frameworks. Overall, we find that the effects of uncertainty on the certainty-equivalent discount rate are critically dependent on the source of uncertainty and its assumed properties.