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The effect of future income uncertainty in savings decision ☆

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Abstract

This paper analyzes consumption and savings decisions in a two-period consumption setting, supposing that future income is uncertain in the sense of Knight (Knight, F., 1921. Risk, uncertainty, and profit (Boston: Houghton Mi²in)). The results imply that uncertainty averse agents save more than risk averse agents.

Keywords: Consumption; Savings; Uncertainty aversion

JEL classification: D81; D91

1. Introduction

Consumption decision is a central subject for economists and, since the development of Friedman's (1957) Permanent Income Hypothesis (PIH), economists have agreed that consumption decisions depend on random variables such as future income, existing risk or uncertainty.[1] According to Knight (1921), risk is a situation in which a single additive probability measure on the states of nature is available to conduct choice. However, under uncertainty, information is too imprecise to be summarized by any additive probability measure. In general, economic models assume the rational expectations hypothesis, which

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[1] Some authors use ambiguity instead of uncertainty.

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means that individuals know the objective probability law, or the Bayesian approach in which they have a (single) prior subjective probability distribution. In both cases uncertainty is doffed.

Recently, Manski (2004, p.1330) has extensively argued that “observed choice may be consistent with many alternative specifications of preferences and expectations.” However, the prevailing practice is to assume the rational expectations hypothesis, which implies that other possible explanations for economics phenomena are discarded and applied works are reduced to inference about preferences alone. Manski advocates that researchers must use data on expectation formation to test assumptions about expectations. Following the advice, the first difficulty emerges immediately; in general, survey respondents have only the option to report expectations in probabilistic form because the questions asked are about point prediction of random events or verbal assessments of likelihood.[2] However, Das and Soest’s (1997, 1999) results generate indirect evidence in favor of uncertainty. Studying the Dutch Socio-economic Panel from 1984 to 1985, Das and Soest (1997) found that a large fraction of households (34.9%) underestimated their future income growth while only a small proportion (15.5%) overestimated their income change. According to the authors, a possible explanation is that some people are simply too pessimistic, on average. Das and Soest (1999) extended the sample until 1989, finding a similar pattern. Additionally, using a formal test, they rejected the rational expectations hypothesis.

A generalization of these results seems to be very premature. However, it is worth investigating what effects income uncertainty has on consumer behavior. In order to implement this analysis, this paper employs a two-period consumption model using the Choquet Expected Utility (CEU) approach, an axiomatic treatment of uncertainty, developed by Schmeidler (1989), in which the agent’s belief is represented by a convex non-additive probability function. Uncertainty aversion is introduced by means of a uniform contraction of any additive probability measure.

The paper proceeds as follows. Section 2 presents useful results of the CEU model. Section 3 develops and solves the model. The final section summarizes the conclusions in light of other departures from PIH.

2. Uncertainty aversion[3]

First of all, define Ω as a set of the *states of nature* and Λ as an algebra from its subsets. Thus, (i) $\Omega\in\Lambda$; (ii) $A, B\in\Lambda\Rightarrow A\cup B\in\Lambda$, and (iii) $A\in\Lambda\Rightarrow A^c\in\Lambda$, where A^c is the set of elements of Ω not in A. The elements of Λ are the events. A function P: $\Lambda\rightarrow[0, 1]$ is a non-additive probability if (i) $P(\phi)=0$, where ϕ is the empty set; (ii) $P(\Omega)=1$, and (iii) $A, B\in\Lambda$, $P(A)\leq P(B)$ if $A\subset B$. Imposing the additional restriction: (iv) $A, B\in\Lambda$, $P(A\cup B)+P(A\cap B)\geq P(A)+P(B)$, we obtain a convex non-additive probability function P.

In the presence of uncertainty, information is too scarce for the agent to discard the additive probabilities until there is only one left. For each action, an uncertainty averse agent considers the additive measure that accentuated the probability weights associated with the least favorable outcome (Mukerji and Tallon, 2001). The core of P, $C(P)$, identified these additive probability:

$$C(P)=\{Q\in\Delta(\Omega)|Q(X)\geq P(X),\ \text{for all}\ X\subset\Omega\},\tag{1}$$

[2] To enable persons to express uncertainty, survey researchers could elicit ranges of probabilities rather than precise probabilities for events of interest (Manski, 2004).

[3] Proofs are omitted and the reader is referred to Schmeidler (1986, 1989), Gilboa (1987), Gilboa and Schmeidler (1989) and Dow and Werlang (1992).