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Consumption–leisure nonseparabilities in asset market participants' preferences ☆

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Abstract

We use panel data to estimate nonlinear Euler equations for preferences that are nonseparable in consumption and leisure. This approach departs from existing panel data studies that investigate linearizations and/or separable preferences. Intuitively plausible estimates are obtained only when excluding nonassetholders from the sample, which indicates the importance of asset market participation. For market participants, estimated parameter values are intuitively appealing, but differ from existing estimates. They also differ from parameter values commonly used in computational experiments. These findings have implications for the extensive literature in macroeconomics and finance that studies models of intertemporal decision-making, and they confirm the importance of market incompleteness.

JEL classification: G12; E2; D91

Keywords: Incomplete markets; Asset market participation; Dynamic macroeconomics; Nonseparability; Euler equation

1. Introduction

We provide an analysis of nonlinear Euler equations for preferences that are nonseparable in consumption and leisure. Parameter estimates and test statistics are obtained using a

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minimum of ancillary assumptions: households have to be at an interior solution for consumption, and they have to participate in asset markets. To analyze the implications of nonparticipation, we compare samples with and without nonassetholders. Intuitively plausible estimates are obtained only when using samples that exclusively consist of assetholders.

We document how economic agents trade off consumption and leisure over time, as well as their level of risk aversion. The ensuing estimates and test statistics are of interest to several (related) research areas in dynamic economics and finance, because there is no consensus on the values of the parameters characterizing risk aversion and intertemporal trade-offs, and as a result the impact of intertemporal economic theory on many policy issues is unclear. First, these empirical results have implications for the literature on dynamic macroeconomics that uses computational experiments. While the estimates of the share parameters for consumption and leisure are roughly consistent with those used in the literature, estimates of the rate of risk aversion are substantially higher. Second, the results are relevant for the asset pricing literature, because our findings stress the importance of heterogeneity, asset market participation and market incompleteness, and suggest that representative agent studies may be difficult to interpret. Finally, estimates of the rate of relative risk aversion are lower and those of the intertemporal elasticity of substitution in consumption are higher than most estimates in the extant literature, and the results suggest that inference on these critical parameters may depend on whether one estimates nonlinear or linearized Euler equations.

The paper proceeds as follows. The empirical framework is provided in Section 2. Section 3 discusses the data, and Section 4 presents the empirical results. Section 5 interprets the results and concludes.

2. Specification and estimation

Estimation and testing are carried out with a minimum of auxiliary assumptions.[1] We assume the existence of a large number of individuals with an identical per-period Cobb–Douglas utility function, which is parameterized as

$$u(c_{i,t}, l_{i,t}) = \frac{1}{1-\alpha}(c_{i,t}^{\theta} l_{i,t}^{1-\theta})^{1-\alpha}, \tag{1}$$

where $c_{i,t}$ is the consumption of individual i in period t, $l_{i,t}$ is the leisure of individual i in period t, and θ is the percentage of the agent's time allocated to consumption activities, with $1-\theta$ the percentage allocated to leisure. We refer to θ as the share parameter. Following Kydland and Prescott (1982), we think of $c_{i,t}^{\theta} l_{i,t}^{1-\theta}$ as a generalized version of a unit of consumption, which allows us to interpret α as the risk aversion parameter.

We assume an interior solution with respect to consumption, and that the individual can invest in risky assets (stocks) as well as in T-bills. Because the household is the unit of

[1]No assumption needs to be made about the existence of corner solutions or rigidities in the labor market. Also, no assumptions about the structure of financial markets have to be made beyond the existence of a riskless and a risky asset. In particular, one does not have to assume market completeness. Finally, we do not model the entire economy, but simply investigate the consumption and leisure allocations resulting from the presence of some unspecified idiosyncratic risk.