DISSERTATION ABSTRACT

Essays on Estimation and Testing of Intertemporal Optimizing Macroeconomic Models

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This dissertation develops the econometric procedures to examine the empirical validity of macroeconomic models with microfoundations and reevaluates some puzzles that have been found in empirical studies on consumption and asset pricing. Empirical and theoretical analysis of consumption has always been one of central topics in macroeconomics. In particular, explaining the implications of complete asset markets is the key element in most modern macroeconomic models. However, empirical studies made over the past few decades show the apparent failures of such models. The dissertation is mainly concerned with several issues arising from the interplay between the models and the econometric evaluation methods, and each chapter is devoted to the explanation of the empirical failures. The organization of the dissertation is as follows.

Chapter 1. Introduction: A Review of Research on Intertemporal Optimizing Macroeconomic Models

Chapter 2. Tests of the Permanent Income Hypothesis Using Information in Deterministic Trends

Chapter 3. The Intertemporal Elasticity of Substitution and Engel's Law: A Cointegration Approach

Chapter 4. Econometric Evaluation of the Lack of Risk Sharing and Imperfect Financial Integration

The first chapter provides a survey of research on intertemporal equilibrium models with a representative agent. The survey does not trace the historical sequence of developments, but rather focuses on the following four points: (i) estimation of the models without nonstationary variables, (ii) estimation of the models with stochastic and deterministic trends, (iii) consistency between the estimation techniques and economic implications derived from the models, and (iv) estimation of the models with structural breaks. This chapter, together with an empirical investigation using the Japanese data, points out that the estimation techniques must identify the restriction to be satisfied by stochastic and deterministic trends of different variables as well as the existence of such trends, and that if there are breaks in stochastic and deterministic trends, then the conventional approach will

lead to a misleading conclusion.

The second and third chapters are concerned with the treatment of these two issues. The second chapter reexamines the well-known implication of the permanent income hypothesis (PIH) through testing the deterministic cointegration restriction. Hall’s (1978) type of PIH implies that level consumption and level income satisfy the restriction, while King, Plosser, Stock and Watson’s (1991) type of PIH imply that log consumption and log income satisfy the restriction. In this chapter, we propose the testing procedure to analyze the interaction between the restriction and a trend break, and test the null hypothesis of the restriction. By applying the proposed procedure to the Japanese quarterly data, we find evidence that the restriction is violated when the full sample period is used, but the restriction is not violated for subsample periods when the trend break around the first oil shock is allowed. In contrast, we find less evidence against stochastic cointegration (which is often tested in the literature) even when the full sample period is used. These findings indicate the importance of testing the deterministic cointegration restriction with allowance of the trend break.

The third chapter examines the intertemporal elasticity of substitution (IES) using Ogaki and Park’s (1998) cointegration approach and demonstrates the cause of the puzzling estimates of the IES in Japan. In this chapter, we combine the cointegration approach with Hansen’s (1992) stability tests of a cointegrating vector to evaluate the test results more precisely. This is an important procedure because the standard cointegration approach does not take into account the parameter instability. In fact, we find that when we do not utilize this procedure in the estimation of the IES, we cannot evaluate the estimation results. The main empirical results can be summarized as follows. First, when we allow for the intratemporal substitution, unlike the results of the existing studies on Japan, the IES for necessary goods such as food is significantly different from zero and less one, while the IES for luxury goods such as non-food is excessively large. Second, when we allow the IES to vary with the level of wealth, the IES for the total consumption has the upward trend over the period 1975-1998 in Japan. These findings suggest that the aggregation over goods used in the standard Euler equation may be potentially problematic, and that the existing result that the estimated IES is excessively large in Japan may be explained by our results that the difference of the IES between the necessary good and the luxury good is large.

The fourth chapter develops the testing procedure to examine the assumption of market completeness underlying the Euler equation. This chapter focuses on the relationship between financial integration and the empirical rejection of international risk sharing. The proposed procedure is based on the recent development of stochastic discount factor methodology proposed by Hansen and Jagannathan (1997) (which is called HJ-distance). First, we introduce a cross-market version of the HJ-distance using the cross-market approach and define our market integration measure. Second, we propose the Wald type test to distinguish between the failure of market completeness and the model specification errors and then consider our method to present the time paths of the estimated HJ-distances. Finally, we apply such a new method to monthly data for Japan and the United States. Then, we discuss how the explanation for the apparent lack of international risk sharing is related to the degree of financial integration and the model specification errors. Our empirical results indicate that the proposed testing procedure is more powerful than existing tests based on the Euler equation in detecting the deviation from the complete market framework.