Econ 613 - Applied Econometrics - 2022 Spring
Reading 4

Summary of *Consumption and Habits: Evidence from Panel Data*

Yican Liu

March 30, 2022

Many influential papers have been discussing about the estimation of habit formation in consumption. However, most of the empirical microeconomic works were done with aggregate data, which might cause serious inconsistency when estimating the structural parameters. To solve the aggregation problem and test the habit formation in consumption preferences properly, the authors use the data set from Spanish Continuous Family Expenditure Survey (ECPF) and control various fixed effects to address the time invariance unobserved heterogeneity in the households. Compared to the regression without controlling for unobserved heterogeneity, the results are significantly different when controlling for fixed effects and estimating with instrumental variables. In conclusion, it is of great importance to consider the fixed effects in the analysis of consumption decisions with time non-separabilities.

The authors use the marginal rate of substitution (MRS) and the Euler equation to analyze such formation of consumption. They use a model with borrowing restrictions, in which they focus on three non-durable goods, including food, transportation, and services, and assume that households maximize the present value of future utility. In the first-order condition, this maximization problem shows that the MRS between two goods depends only on the relative prices. Moreover, because of the time non-separabilities, they use a translog utility function to show the preference for different goods. Then, they derive the equations which should be estimated in the empirical analysis part. Finally, the authors also consider the age and education of the head of the household, family composition variables, dummies for seasons, and dummies for labor force participation of wife and husband as control. To estimate this model, the authors use the generalized method of moments, GMM.

In the empirical analysis, the authors use the ECPF data set by Spanish National Statistics Office from 1985 to 1995, and this data set includes 125,394 observations. This data set is better than the other consumption data sets, such as the CEX, PSID (for the U.S.), and FES (for the U.S.), because ECPF provides information about more kinds of consumption and covers a longer period for each household. For the record completeness, the authors require the households to be included in the analysis should have a full information record for at least five consecutive quarters. The authors also exclude the households whose incomes are lower than 300 euros and whose expenditures on the goods the authors focus on are zero. Moreover, the observations with missing values that should be used to estimate the Euler equation are dropped out. Thus, there are 2,606 observations with 1,499 households in this data set. As for the consumption of the goods in their model, food consumed at home does not include alcohol expenditures, transportation only includes public and private transport expenditures, and services include education, medical care, and others. Some control variables such as the number of children, education of the husband, etc., are also included.

In the next section, the authors show some empirical results in which the time invariant unobserved heterogeneity is controlled. First, they analyze the estimation for levels. In the estimation for MRS, the authors use instrumental variables such as dummies for education, home ownership, etc., and they show that the Sargan test for instruments is high. They also compute the tests for serial correlation in residuals. All the results from these tests lead to the conclusion that there is no first-order serial correlation in the equation in levels. Additionally, after estimating the parameters in MRS and Euler equations, the authors got the conclusion that there are no liquidity constraints in this model and preferences are separable. Also, the preferences dynamics in the Euler equation and MRS are the same. However, the test for additive separability shows the possible spurious dependence and individual heterogeneity in our model. The authors discuss this problem in the next section.

Second, the authors estimate the differences in consumption preference with time invariant unobserved heterogeneity. This is because the effects from the previous section might partly come from correlated fixed effects, so the estimation could contain bias. They start with selecting a group of "strong" instrumental variables to avoid weak identification problems and run GMM tests on the MRS and Euler equations. Then, they compare the results yielded from the MRS and the Euler equation and find that there is no homothetic separability or additive separability. However, within period nonseparability between three goods is found in these models. According to the MRS model, habit formation exists in food and service consumption. But in the Euler equation, the evidence of habit formation only exists in food consumption. Additionally, they calculated the within period elasticities. If the authors estimate the within period elasticities with MRS levels, the income elasticity for food is close to 1. However, if they estimate by MRS differences, the price and income elasticities for food are smaller than 1. These results are different from what they get in the previous analysis. Hence, including fixed effects is important when calculating the elasticity of consumption with the model of time non-separabilities.

Third, the authors estimate the intertemporal elasticity. In the time separable model, the author estimates the intertemporal elasticity of substitution (IES) by the first and second partial derivatives of the utility function. Moreover, they calculate the strength of habits, the degree of habit formation in behavior.

In conclusion, in this paper, the authors compare different estimations of habit formation with a novel data set, the ECPF. By estimating the elasticity of food, transportation, and services with MRS and Euler equations, they show the importance of including different fixed effects when calculating the elasticity of goods with time non-separabilities. The fixed effects, however, might be unusual, because they might be a nonlinear combination of unobserved characteristics and observed variables. In my view, this paper has one limitation. That is, the authors have not reached a conclusion that which kind of fixed effects should be included in the estimation for elasticity or preference formation.