CONSUMPTION AND HABITS: EVIDENCE FROM PANEL DATA

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The paper tests the existence of habit formation in decisions of consumption. By including habit formation as an approach to modeling time dependence in preference, the predictions of the time-separable models are improved. However, most of the previous work uses aggregate data which has aggregation problems and is not enough to explain the time-invariant unobserved heterogeneity across households (the fixed effects) due to the lack of a detailed microeconomic data set. Therefore, when testing the existence of habit formation in consumption decisions, the previous estimates are inconsistent.

To identify the structural parameters consistently, the paper uses the data from ECPF which has the advantage that it gives information for more than four quarters and involves several consumption commodities. More specifically, the paper uses the data in eight consecutive quarters, which is long enough to control the fixed effects. In addition, the paper models three nondurable goods (food at home, transport, and service) to solve the identification problem if there is only a single or a composite of nondurable goods.

After solving the problems of data, by maximizing the present discounted value of a lifetime utility of a household, the paper estimates the intertemporal Euler conditions and the within period MRS between goods, so as to find the evidence of habit formation in consumption decisions between goods. The habit formation can be represented by the negative sign of the cross-partial derivatives between the utility on t+1 and consumption on t. The intuition of the negative sign is that, with habit persistence, households are more dissatisfied with the increase in consumption. To keep the analysis close to the previous research, the authors build a flexible direct translog utility function to describe the preferences for the three goods. The model also includes the term to explain the time non-separabilities and preference shocks. In addition, to control the demographic and labor supply variables, the empirical specification includes the age, education, family composition variables, season dummies, dummies for the labor force participation of wife and husband, and interactions between wife's labor market status and goods quantities. Based on this empirical model, the author further checks the existence of two stochastic variabilities.

The model has two sources of stochastic variability: the error terms of MRS and the Euler equation which by rational expectations are orthogonal to variables dated at t, and the preference shocks. The preference shocks are averaged out because the authors use data from a longer time period. However, due to the existence of the time-invariant unobserved heterogeneity variables, the choice variables are not valid instruments because they are correlated with the fixed effects. The authors rewrite the error term by adding the fixed effects. According to the new error terms, the paper defines the variables κ_{jt}^{MRS} and κ_{jt}^{E}. One can multiple the MRS and Euler equation by these variables. In this case, the errors of the new equations are orthogonal to the choice variables dated t-2 and earlier, which allows them to be valid instruments.

Then, the paper estimates the MRS and Euler of two equations by GMM: food versus services, and transport versus services. To estimate this, the authors first minimize the quadratic form of each equation. Then, the minimum distance to the unconstrained coefficients is used to restrict the equation and recover the parameters. The equations have the same expressions but with the transformation described in the previous paragraph.

To estimate the parameters in levels, the paper firstly checks the first-order serial correlation of MRS and Euler of two equations without the unobserved heterogeneity. The Sargan test shows the correlated fixed effect. However, the result can be caused by misspecification. Therefore, the authors test the serial correlation in the equation residuals in levels. The results show no proof of first-order serial correlation. Notwithstanding, the Sargan test may indicate some

potential problems. So, the authors test the intertemporal separability of MRS and Euler. The results show no evidence to reject the hypothesis of separable preference, which is the same as the results from Meighir and Weber (1996). Secondly, the authors test whether the additive separability is a valid assumption. The results show that the effect of services and transport on food is significant. Finally, the hypothesis of homothetic separability also cannot be rejected according to the results. In conclusion, the preferences are intertemporally separatable when unobserved heterogeneity is not included.

However, because the individual heterogeneity is not accounted for in the previous estimation, the authors use the method of GMM to test whether the previous effects can be in part explained by the fixed effect. However, because GMM has the problem of the weak instrument, the authors firstly check the weak instruments. The F-statistics of the results show that weak instruments are not a problem in this model. When the unobserved heterogeneity is controlled, the model is not declined by the Sargan test, implying that there is no obvious evidence of misspecification. In addition, the differenced residuals have the MA(1) pattern. The new results show that the preferences are non-separable. More specifically, in the Euler equation, there is habit formation in food while there is no evidence of habit persistence for transport and services. Moreover, the authors find that the unobserved heterogeneity hides the true state dependence. Given these results, the paper checks whether the liquidity constraints are binding or not by comparing the coefficients in MRS and Euler. The results demonstrate that for young households, the liquidity constraints are still binding. However, in this case, there is no homothetic and additive separability. Instead, there is evidence that there is within period nonseparability between food, transport, services, and other expenditures. Conclusively, we can get the significant parameters reflecting the habit only by including the fixed effects, we cannot reject the equality of effects gained from MRS and Euler equations, and there is evidence of dynamics for food and services.

Furthermore, the authors calculate the intertemporal elasticity of substitution, showing the importance of sources of heterogeneity and some differences with the recent empirical evidence in the case of food and transport. In conclusion, the paper shows the significance of including the fixed unobserved heterogeneity across households in the analysis of the existence of intertemporal non-separabilities in consumption decisions. The authors find that 1) the preferences are intertemporally separatable when unobserved heterogeneity is not included; 2) by including the unobserved heterogeneity, there is habit formation for food and services; 3) the effects derived from MRS and Euler equations are equal; 4) for young households, the equality in 3) does not hold. These conclusions demonstrate the importance of including the time-invariant unobserved heterogeneity in the model.