HOUSEHOLD BEHAVIOR AND FAMILY ECONOMICS

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Summary

This chapter presents the most important models of household behavior. The introduction gives an overall picture of the literature. The first part of the text is concerned with the behavior of single-person households. The classical models of goods demand and of labor supply as well as their extension to domestic production are discussed here. These models are quite simple because the household decisions can be represented by the maximization of a single utility function under one or several constraints. The second part of the chapter considers the behavior of multi-person

households. The traditional (also called unitary) approach in that case consists in ignoring the differences that may exist between single-person and multi-person households, and analyzing the behavior of the latter as if there were a well-behaved utility function at the household level. There are essentially three manners of justifying this approach: the dictatorial model, the consensus model and the 'Rotten Kid' model. In spite of these justifications, however, the theoretical foundations of the unitary approach remain unsatisfactory. Consequently, other ways of modeling the behavior of multi-person households have been initiated. Among these, the strategic approach adopts the non-cooperative game theory framework, which allows one to relax the restrictive conditions that household demands must satisfy. However, the fact that the outcome of the decision process in these models is generally not Pareto-efficient is problematic. The collective approach is thus based on the sole postulate that the decision process – whatever its true nature – leads to Pareto efficient outcomes. This allows one to generate testable restrictions on household behavior. The conclusion discusses heterodox approaches (issued from Marxism and feminism) to household behavior.

1. Introduction

Traditionally, the economic theory of the household examines, implicitly at least, the behavior of single-person households and focuses on consumption and labor supply decisions. In that case, the decisions of the household are described by a utility function which is maximized with respect to a budget constraint. Interestingly, this manner of proceeding leads to testable restrictions on household behavior. For instance, in the context of consumer theory, household demands must be zero-homogenous and must satisfy a symmetry and semi-negativity condition. If these restrictions are satisfied, the preferences of the consumer can be retrieved from the observation of the complete system of household demands and the econometrician can study the incidence of economic policies on individual welfare. One must stress, however, that more recent development in family economics – in the tradition of Gary Becker's pioneering works – have taken a broader view to household behavior, including not only market-related decisions but also such non-market activities as fertility, the education of children or the allocation of time. To treat these issues, the household is then depicted as a production unit that combines the time of the agent with market goods to produce the outputs which are ultimately desired by this agent.

Economists have dealt with the multiplicity of decision-makers in the household in different ways. In the unitary approach, which was almost universally adopted until the 1980's, the differences that may exist between single-person and multi-person households are simply ignored: the household behavior is treated as if there were a unique utility function at the household level which is maximized under a budget constraint. However, this approach turns out to be unsatisfactory on both theoretical and empirical grounds. (i) At the theoretical level, the utility theory is intended to study the choices of individuals and not of groups. Some economists have admittedly attempted to reconcile the unitary approach with methodological individualism, but these efforts have not been completely successful. In particular, Paul Samuelson has shown that a household will behave as a unique individual if agents choose to maximize a (Bergsonian) social welfare function. However, this author does not specify by which mechanism the household members can reach an agreement on the intra-household distribution of welfare. This problem is partially solved by Gary Becker who shows that, when the household is composed of an altruistic person and one or several egoistic persons, the household will behave as if the altruist's utility function was maximized subject to the household budget constraint. This result is referred to as 'The Rotten Kid Theorem'. Nevertheless, as has been recently shown, this theorem is based on implicit assumptions which are very restrictive. (ii) At the empirical level, the property of symmetry that household demands must satisfy is not well supported by evidence. Moreover, the income pooling hypothesis, according to which only the total exogenous income matters to explain household behavior, and not its distribution between members, has almost always been rejected in empirical studies.

Because of these weaknesses, the more recent models of household behavior are generally based on a non-unitary representation of the intra-household decision-making (which means that the household behavior cannot be rationalized by the maximization of a unique, well-behaved utility function). These models share the same theoretical postulate that each person in the household must be characterized by specific preferences, but they do not suppose a common mechanism to explain how these preferences are converted into household decisions. There are typically two alternative approaches. In the strategic approach, the decisions of the household are determined by Nash equilibrium. In other words, each household member is supposed to maximize his or her utility with respect to a budget constraint, taking the decisions of the partner as given. One drawback of the approach, however, is that the allocation of consumption and leisure at the equilibrium is not necessarily Pareto-efficient. On the contrary, the collective approach postulates a priori that the decision process, whatever its true nature, leads to Pareto-efficient outcomes. That means that, at the equilibrium, the welfare of one person cannot be increased without decreasing the welfare of the other persons in the same household. The models stemming from this approach include models based on the axiomatic theory of bargaining (e.g., Nash or Kalai-Smorodinsky bargaining) that rely on the specification of an explicit threat point. In that case, the threat point is generally the level of utility attained by spouses either if they separate or if they stop cooperating in the marriage.

2. The Behavior of Single-Person Households

2.1. The Model of Goods Demands

In the simplest model of household behavior, a single person is supposed to spend some resources on different goods and services (called 'goods' henceforth) to maximize a utility function. The utility function is denoted by

$$u = u\left(q^1,\ldots,q^K\right),$$

where $\{q^1,\ldots,q^K\}$ denotes a set of K goods. This function has the usual properties of monotonicity, strict quasi-concavity and smoothness. The total exogenous income of the household is defined as:

$$y = \psi + \sum_{k=1}^{K} p^k a^k,$$

where ψ denotes non-labor income, $\{a^1,\ldots,a^K\}$ the set of initial endowments in the K goods and $\{p^1,\ldots,p^K\}$ the corresponding set of prices. The initial endowments are generally equal to zero and can be ignored at this stage. The budget constraint is linear and can be written as:

$$\sum_{k=1}^{K} p^k q^k \leq y. \tag{1}$$

Then, the household optimization problem is simply given by

$$\max_{\{q^1,\ldots,q^K\}} u\left(q^1,\ldots,q^K\right)$$

subject to the constraint (1) and possibly non-negativity constraints (for the sake of simplicity, the latter will be ignored in the remainder of this text: one supposes there is an interior solution). The household demands that result from this optimization problem are called 'Marshallian demands' and are written as:

$$q^k = q^k(p^1,\ldots,p^K,y) \quad \text{with} \quad k = 1,\ldots,K.$$

To begin with, the Marshallian demands have two trivial properties which are formally stated as follows

Property 1: Adding up.

The total value of household demands is total income, that is,

$$\sum_{k=1}^{K} p^k q^k(p^1,\ldots,p^K,y) = y.$$

Property 2: Homogeneity.

The household demands are homogeneous of degree zero in total income and prices together, that is, for any scalar $t > 0$ and any $k = 1,\ldots,K$,

$$q^k(tp^1,\ldots,tp^K,ty) = q^k(p^1,\ldots,p^K,y).$$

These properties are a direct consequence of the linearity of the budget constraint. The derivatives of the Marshallian demands with respect to prices must also satisfy a set of strong restrictions which are more closely related to the structure of the consumer's optimization problem. To begin with, the Slutsky decomposition states that the effect on

Marshallian demands of a change in prices is equal to the sum of two components, namely, the income effect and the substitution effect. Intuitively, the substitution effect is the result of a price change that modifies the slope of the budget constraint, without affecting the consumer's utility, while the income effect is the result in the change in real income which is associated to the variation in the price. Formally, the Slutsky decomposition can be written as:

$$s^{kj} = \frac{\partial q^k}{\partial p^j} + \frac{\partial q^k}{\partial y} q^j$$

where s^{kj} is the substitution effect and $-(\partial q^k / \partial y) q^j$ is the income effect. The Marshallian demands have then two additional properties.

Property 3: Symmetry.

The cross-price substitution effects are symmetric, that is, for any $j, k = 1, \ldots, K$,

$$\frac{\partial q^k}{\partial p^j} + \frac{\partial q^k}{\partial y} q^j = \frac{\partial q^j}{\partial p^k} + \frac{\partial q^j}{\partial y} q^k.$$

Property 4: Negativity.

The matrix formed by the elements s^{kj} is negative semi-definite, that is, for any set of constants $\{e_1, \ldots, e_K\}$,

$$\sum_{j=1}^{K} \sum_{k=1}^{K} e_j e_k \left(\frac{\partial q^k}{\partial p^j} + \frac{\partial q^k}{\partial y} q^j \right) \leq 0.$$

Actually, the negativity property places a whole series of inequality restrictions on substitution effects. In particular, own-substitution effects must be non-positive:

$$s^{kk} = \frac{\partial q^k}{\partial p^k} + \frac{\partial q^k}{\partial y} q^k \leq 0,$$

which is usually known as the 'Law of demand'. This means the consumer will always substitute away from the good that is becoming more expensive. The cross-substitution effects can be positive, negative or zero. If the substitution effect between goods k and j is positive, then these goods are said 'substitutes' (according to the standard Hicks' definition) and, if the substitution effect is negative, these goods are said 'complements'. If the income effect of good k is positive, the good is said 'superior' (or 'normal') and, if the income effect is negative, the good is said 'inferior'.

Several important points must be stressed at this stage. First, the econometrician generally observes (or estimates) the quantities of goods purchased as a function of prices, total income and eventually other variables that may affect preferences (the role of these variables will be examined in Section 3). In general, the purchased quantities are implicitly supposed to be equal to the agent's consumption. Second, using the four properties described above, the adequacy of the consumer theory to observed behavior can be empirically tested. In particular, the substitution effects can be calculated from the estimation of demand equations. Surprisingly, however, these tests have rarely been carried out on samples of single households. Third, integrability results indicate that from any system of household demands fulfilling the four properties above the underlying utility function can be recovered up to an increasing transformation. That is, the system of household demands exactly identifies the underlying preferences. This implies that the indirect utility functions can be retrieved (up to a monotonic transformation), that is,

$$v(p^1,\ldots,p^K,y)=u\left(q^1(p^1,\ldots,p^K,y),\ldots,q^K(p^1,\ldots,p^K,y)\right),$$

and guarantees that the assessment of the impact of economic policies (such as a modification in prices) on individual welfare can be made unambiguously, provided that the underlying theoretical framework is accepted.

2.2. The Model of Labor Supply

The adaptation of the consumer model to labor supply decisions is straightforward. To show that, the single person must be supposed to have a fixed endowment of a particular good: time. The latter can be divided into time spent working in the market place (and giving money income) or time spent in leisure (and giving direct utility). Formally, if leisure corresponds to good 1 (say) and if, conforming to usage, the wage rate $\left(p^1\right)$ is denoted by w and the leisure $\left(q^1\right)$ by L, the household budget constraint becomes:

$$wL+\sum_{k=2}^{K} p^k q^k \leq y. \qquad (2)$$

The behavior of the worker can then be described by the following optimization problem:

$$\max_{\{L,q^2,\ldots,q^K\}} u(L,q^2,\ldots,q^K)$$

subject to the constraint (2). If the prices of the $K-1$ goods are assumed to be equal to one, as is generally the case in labor supply analysis, the Marshallian demand for leisure that results from this problem is denoted as:

$$L=L(w,y),$$

and satisfies:

$$\frac{\partial L}{\partial w}+\frac{\partial L}{\partial y}L\leq 0. \qquad (3)$$

Note that leisure is generally supposed to be superior, that is, $\partial L/\partial y>0$. The corresponding Marshallian labor supply can be derived by the time constraint and is equal to:

$$h = T - L(w, \psi + wT) = h(w, \psi, T) \qquad (4)$$

where the endowment in time $\left(a^1\right)$ is denoted by T and the $K-1$ other endowment are set equal to zero. This function must also satisfy an inequality restriction that corresponds to the negativity property of the leisure demand. To show this, the Marshallian demand for leisure is differentiated with respect to w keeping ψ constant. This gives:

$$\left.\frac{\partial L}{\partial w}\right|_{\mathrm{d}\psi=0} = \left.\frac{\partial L}{\partial w}\right|_{\mathrm{d}y=0} + \frac{\partial L}{\partial y}\cdot T, \qquad (5)$$

that is, the wage effect can be broken down into a pure price effect (the first term on right-hand-side) and an income effect (the second term). Substituting this expression in the Slutsky inequality (3) gives:

$$\left.\frac{\partial L}{\partial w}\right|_{\mathrm{d}\psi=0} - \frac{\partial L}{\partial y}(T-L) \le 0.$$

Then, using the definition of labor supply (4) gives the positivity property of the labor supply, that is,

$$\frac{\partial h}{\partial w} - \frac{\partial h}{\partial \psi} h \ge 0.$$

This condition is sufficient as well. In other words, if the substitution effects associated to the labor supply are positive, then there exists a system of preferences that rationalizes the worker's behavior. One can show, in addition, that this system of preferences is unique. Note finally that since substitution effects are positive and income effects are negative, the total effect of a variation in wage is undetermined.

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Biographical Sketch

Olivier Donni is born in Belgium on Augustus 30, 1968. He is married to Basma Khlif-Donni and has two children. After having obtained his Master in Economics and Social Sciences at the University of Liege (Belgium) in 1991, he has received a PhD in Economics from the Ecole des Hautes Etudes en Sciences Sociales of Paris (France) in 2000. His supervisor was François Bourguignon.

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His current research field concerns the modeling of household behavior with a special emphasis on the intra-household distribution of resources. He has also worked in productivity analysis. He has published in The Economic Journal, The Journal of Human Resources, The Journal of Public Economics, The Canadian Journal of Economics, The Economic Letters, the Annales d'Economie et de Statistique and other journals. He is also the author of the article on collective models in the Second Edition of The New Palgrave Dictionary of Economics.