Lecture 10
Topics in Development Economics: Household Models

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14.04.2023

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Motivation

- Most people in developing countries earn part of their livelihood through work in their own enterprises.
- Moreover, they consume a portion of the output of their productive activities.
- Household labor is an important input into the production process of the enterprise.
  ⇒ Individuals make simultaneous decisions about:
  - *production*:
    - the level of output;
    - the demand for factors;
    - the choice of technology.
  - *consumption*:
    - labor supply;
    - commodity demand.

Motivation

Agricultural household model:

a model of the household that is jointly engaged in production and consumption.

AHM under Complete Markets

Consider a household with 2 members, each of whom gets utility from:

- consuming a good (c_1 and c_2);
- leisure (l_1 and l_2).

Each household faces a complete set of competitive markets.

Let:

- p: the price of output;
- w: the wage of labor;
- $F(L, A)$: a concave production function:
    - A: area of the farm cultivated by the household;
    - L: amount of labor used on the farm.
- E_i^L: person i's endowment of time;
- E^A: household's endowment of land;
- r: the price of one unit of land.

AHM under Complete Markets

The household's problem is to solve

$$Max \; U(c_1, c_2, l_1, l_2) \tag{1}$$

subject to

$$p(c_1 + c_2) + wL^h + rA^h \leq F(L, A) + w(L_1^m + L_2^m) + rA^m \tag{2}$$

$$L = L_1^f + L_2^f + L^h \tag{3}$$

$$A = A^f + A^h \tag{4}$$

$$E^A = A^f + A^m, \; E_i^L = L_i^f + L_i^m + l_i, \; i \in \{1, 2\} \tag{5}$$

$$c_i, l_i, L_i^f, L_i^m, A^f, A^m \geq 0, \; i \in \{1, 2\}. \tag{6}$$

AHM under Complete Markets

Substituting (3)-(5) into (2), we find:

$$p(c_1 + c_2) + w(l_1 + l_2) \leq \Pi + w(E_1^L + E_2^L) + rE^A \tag{7}$$

$$\Pi = F(L, A) - wL - rA \tag{8}$$

$$c_i, l_i, L, A \geq 0, \ i \in \{1, 2\}. \tag{9}$$

The household's problem is now to maximize (1) (with respect to L, A, c_i and l_i) subject to (7)-(9).

AHM under Complete Markets

L and A do not appear in (1), hence (1) and (7) can be replaced with

$$\max_{\{c_i\},\{l_i\}} U(c_1, c_2, l_1, l_2) \qquad (1')$$

subject to

$$p(c_1 + c_2) + w(l_1 + l_2) \leq \Pi^*(w, r) + w(E_1^L + E_2^L) + rE^A \qquad (7')$$

where

$$\Pi^*(w, r) = \max_{L, A} F(L, A) - wL - rA. \qquad (8')$$

The transformation of the problem reveals the fact that the household's production decisions are characterized by a simple profit maximization condition (8').

AHM under Complete Markets

- Households choose labor and land inputs so as to maximize profit.
- Production decisions made on any plot depend only on prices and the characteristics of that plot, not on the household's endowments or preferences.

Separation property of the agricultural household model:

the production decisions of the household are separable from the household's consumption choices.

The separation property is robust to the non-existence of some markets:

- If there is no land market;
- If there is no labor market.

AHM under Complete Markets

Suppose that $U(.)$ is such that all prices and wages

- $c_1 = c_2 = c$;
- $l_1 = l_2 = l$.

Assuming that there is no market for land, the household chooses c, l, and L.

The household's decision-making process proceeds in two stages:

1. Farm profit is maximized.
2. Utility is maximized given the full income budget constraint.
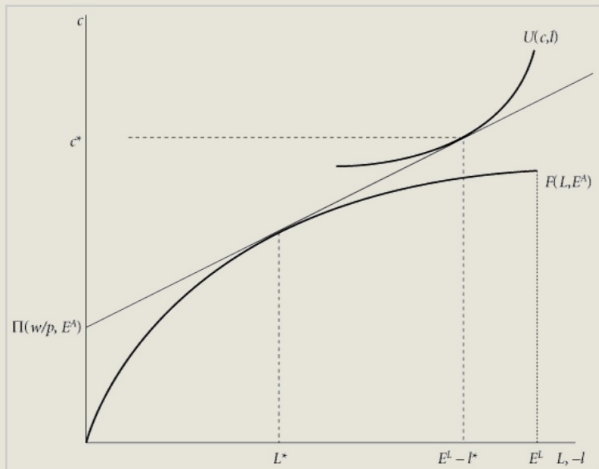
AHM under Complete Markets

Figure 2.1

AHM under Complete Markets

But are the markets complete?

AHM under Complete Markets

- In most developing countries where the hypothesis has been examined it is clear that the separation property does not hold.
- Everywhere in Africa, Latin America, and most of Asia where the hypothesis has been examined, it has decisively been rejected:
  - Kevane (1994);
  - Udry (1998);
  - Barrett (1996);
  - Collier (1983);
  - Jacoby (1993);
  - Carter (1984);
  - Bardhan (1973).

$\Rightarrow$ Farmers *do not* maximize profits; their production decisions are related to their preferences and endowments.

AHM under Incomplete Markets

If multiple markets are incomplete, the separation property no longer holds:

- The household no longer maximizes profit;
- Production decisions depend upon the preferences and endowments of the household.

Suppose that there is

- no market for land;
- some involuntary unemployment in the rural labor market.

The household cultivates its endowment of land, and might face a binding constraint on the amount of labor it can supply off its own farm.

AHM under Incomplete Markets

The household problem (now assuming just one person in the household) is:

$$\max_{c,l,L^H,L^F \geq 0} U(c,l) \tag{10}$$

subject to

$$pc = F(L^f + L^h, E^A) - wL^h + wL^m \tag{11}$$

$$l + L^f + L^m = E^L \tag{12}$$

$$L^m \leq M \tag{13}$$

where

- L^h is labor hired by the household to work on its farm;
- L^f is the household's own labor on its farm;
- L^m is the time spent by the household working for a wage;
- M is the maximum amount of time the household can spend working for a wage as a result of some labor market rationing.

AHM under Incomplete Markets

In this case, $L^m = M, \ L^h = 0$

Setting the numeraire $p = 1$, the household's problem becomes

$$\max_{c, l \geq 0} U(c, l) \tag{14}$$

subject to

$$c = F(E^L - M - l, E^A) + wM \tag{15}$$

- Then, the household's production choice depends on its preferences and its endowment.
- The separation property does not hold.

AHM under Incomplete Markets

This sort of market structure could give rise to an often observed pattern in rural areas of less developed countries:

- Small farms are often cultivated more intensively than large farms.
- More labor per unit area is used on small farms.
- Yields are larger on these smaller farms.
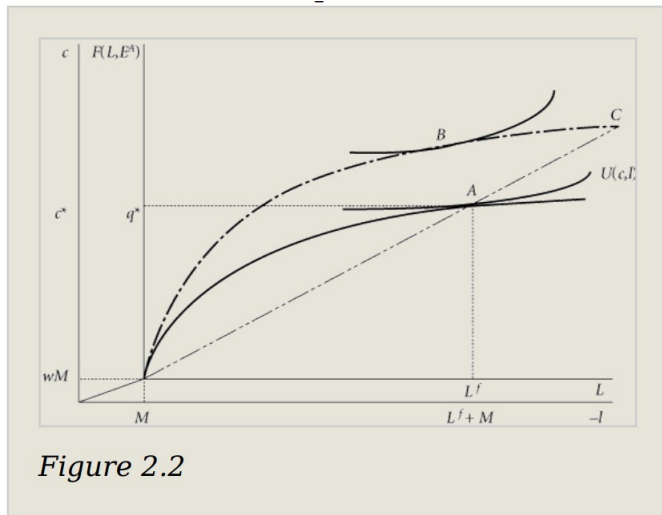
AHM under Incomplete Markets

Figure 2.2

Unitary Household Model

Unitary model of the household:

household as a single decision-making agent, with a single budget constraint, and maximizing a unique utility function in which each household member's consumption enters as an argument.

In other words, *households* behave as if they are single *individuals*. Put another way, all resources are pooled and then reallocated according to some common rule.

Unitary Household Model

But is the household unitary?

Unitary Household Model

- Starting from the 1980s the unitary model of the household has been criticized on both the theoretical and empirical grounds.
- The *household* is not an *individual*. Why would the decision of the individuals within the household be made like those of one individual?

  1. *What are the specific cases when a household may act like one individual when making decisions?*
  2. *Why do we care about how decisions are made and how resources are allocated within the household?*

Unitary Household Model

- Starting from the 1980s the unitary model of the household has been criticized on both the theoretical and empirical grounds.
- The *household* is not an *individual*. Why would the decision of the individuals within the household be made like those of one individual?
  1. *What are the specific cases when a household may act like one individual when making decisions?*
     - "Dictatorial" household;
     - Household with "unanimous" preferences.
  2. *Why do we care about how decisions are made and how resources are allocated within the household?*
     - It is important to design effective policies and to evaluate the impact of these policies on outcomes (such as poverty alleviation, educational achievement, etc.)

Unitary Household Model

- In the unitary model, aggregate demand does not depend on the distribution of income within the household.
- However, a growing number of studies have found evidence that the budget shares of particular goods are significantly related to the shares of income accruing to women in the household.
  - *Example:* Thomas (1991) finds that in Brazil the unearned income of mothers has a much stronger positive effect on child health than the unearned income of fathers, contradicting the unitary household model.

Nash Cooperative Bargaining Models

- As a result, alternative models of household behavior have been proposed in the literature:
  - *Example:* Nash cooperative bargaining models.
    - One assumption of these models is that the allocation of resources within a household is *Pareto efficient*.
    - The particular Pareto-efficient allocation that is chosen is determined by the *threat points* of the individual members of the household.

Threat point

of an individual is defined as the utility achieved by that person if the household does not come to an agreement regarding the distribution of resources.

3. *What is* **Pareto efficiency**?

Nash Cooperative Bargaining Models

- As a result, alternative models of household behavior have been proposed in the literature:
    - *Example:* Cooperative bargaining models.
        - One assumption of these models is that the allocation of resources within a household is *Pareto efficient*.

3. *What is* **Pareto efficiency**?

Pareto efficiency (Pareto optimality)

a situation where no individual or preference criterion can be better off without making at least one individual or preference criterion worse off.

- But there are clear examples against Pareto efficiency in households.
    - *Example:* domestic violence against women and children.
    - *Example:* Udry (1996) finds that women's plots are cultivated much less intensively than their husbands' plots in parts of Burkina Faso.
        - It implies that total agricultural output within the household could be increased by reallocating factors of production across the plots cultivated by household members.
        - ⇒ This contradicts the Pareto efficiency of resource allocation.

Summary

- The available empirical evidence casts serious doubt on the validity of the unitary model.
- While the available work is mostly supportive of the more general model of efficient households, there is some evidence, particularly in Africa, that calls even this weaker model into question.
- More research is required before the general validity of the efficient household model can be accepted.
- If the efficient household model cannot adequately account for the intra-household allocation of resources, it appears that it will be necessary to move towards more detailed, culturally and institutionally informed noncooperative models of the interaction between household members.

References

- Bardhan, P., & Udry, C. (1999). Chapter 2. Development Microeconomics. Oxford University Press. https://doi.org/10.1093/0198773714.001.0001