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Rural Households Behavior in Economic Transition

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In economic transition, Russia, the East European countries, China and other countries tried to introduce the free management system into agricultural sector. In the old socialist economic system, Russia and the East European countries had state farms, collective farms and private plots. In state farms, they introduced the state enterprise management system. The state government gave co-operative management right to collective farms and free management rights to private plots. After economic revolution, the state government introduced free management rights to all agents of agricultural sector. In this paper, we analyze the rural household behavior in the long-term after the revolution of economic transition.

1. The model

We analyze rural households how to determine their long-run consumption in the planned economy.

The long-term problem for a represent rural household to maximize its discounted lifetime utility is given by

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$$\int_0^{\infty} U(c(t))\, e^{-\gamma t} dt, \tag{1}$$

where r denotes the constant rate of time preference, c is the represent rural household's consumption, and $u(\cdot)$is assumed to an increasing and strictly concave function.

The rural households' production that is the same as the assumption in the Chapter 4 is given by

$$Y = Y(NL),\ Y' > 0, Y'' < 0 \tag{2}$$

where N are the households' numbers and L are the labor supplied by the represent rural household.

The represent rural household's budget constraint is given by

$$I = \frac{\bar{p}\bar{Y} + P(Y - \bar{Y}) - K(L)}{N} \tag{3}$$

where I is the represent rural household's income, $K(L)$is the costs necessary for producing a farm product is a increasing function of the labor supplied by the represent rural household, that is K'>0 and K''>0, $\bar{p}$ is the government's purchasing price, and p is the market price.

The government's purchasing quantity in the next period is given by

$$\bar{Y} = \beta(\dot{Y} + Y) \tag{4}$$

where $\dot{y}$ is the increase in the farm product in the current period, β satisfies 0< β <1. Eq. (4) means that the government's purchasing quantity in the next period is the ratio of the sum of the current farm product and the increase in the current farm product. If the government's purchasing quantity in the next period keeps the same as that in the current period, it cannot improve the distribution and the division of the farm products, since form products in the planned economy are liable to be insufficient. On the other hand, if the increase in the current farm products is perfectly purchased by the government, it is likely to decrease the rural households[1] incentive, since they have no the rest of the farm product to sell on the free market to obtain rather higher yields.

Assuming that the represent rural household's income is perfectly used to their consumption, then its consumption is given by

$$c = \frac{(\bar{p}-P)\beta\ (\dot{Y}+Y)+PY-K(L)}{N} \tag{5}$$

Substituting Eq. (2) into Eq. (5), we can obtain

$$\dot{L} = \frac{1}{(\bar{p}-P)\beta\ NY'}\left[cN+K(L)-\{(\bar{p}-P)\beta+P\}Y\right] \tag{6}$$

The represent rural household seeks to maximize Eq. (1) subject to Eq. (6). The Homiltonian function is given by

$$H(c,L,\lambda)=U(c)+\lambda\left[\frac{1}{(\bar{p}-P)\beta NY'}\left[cN+K(L)-\{(\bar{p}-P)\beta+P\}Y\right]\right] \tag{7}$$

From Eq. (7), the first-order conditions for the maximization are given by

$$\frac{\partial H}{\partial c}=U'(c)+\frac{\lambda}{(\bar{p}-P)\beta\ NY'}N=0 \tag{8}$$

$$\frac{\dot{\lambda}}{\lambda}=\frac{U''(c)}{U'(c)}\dot{c}+\frac{NY''}{Y'}\dot{L} \tag{9}$$

Substituting Eq. (8) into Eq. (9), we can obtain

$$\dot{c}=\frac{U'}{U''}\frac{1}{N(\bar{p}-P)\beta\ Y'}\left[\{N(\bar{p}-P)\beta(1+\gamma)+P\}Y'-K'(L)\right] \tag{10}$$

In the steady state of the dynamic system characterized with Eqs. (6) and (10), we have

$$\dot{c}=N\left[(\bar{p}-P)\beta(1+\gamma)+P\right]Y'(NL)-K'(L)=0 \tag{11}$$

$$cN + K(L) - [(\bar{p} - P)\beta + P]Y(NL) = 0 \tag{12}$$

where we assume $[\beta(\bar{p} - p)(1+r) + p] > 0$.

From Fig. 1, we can obtain a unique labor where the represent rural household's consumption is determined.

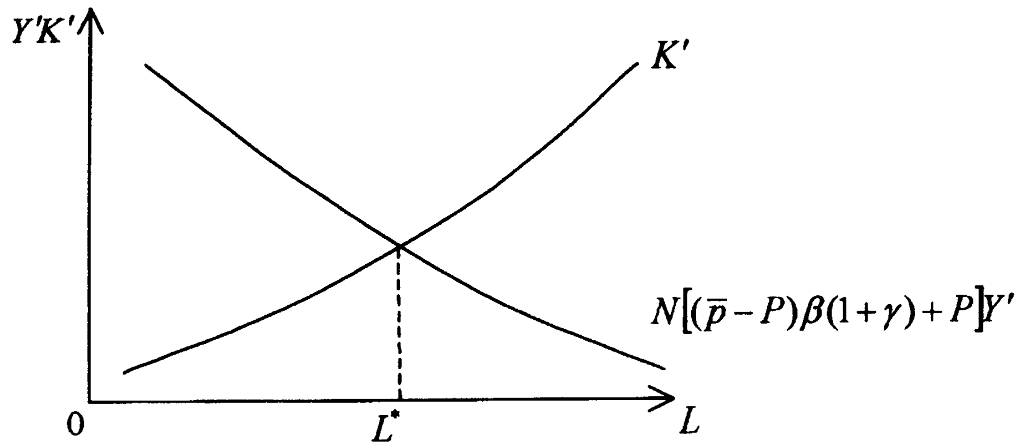

Fig. 1

Differentiating Eq. (12) with respect to L, we can obtain

$$\frac{\partial c}{\partial L} = \frac{\{(\bar{p} - P)\beta + P\}Y' - K'}{N} \tag{13}$$

According to $[\beta(\bar{p} - p) + p] > 0$, we have

$$\frac{\partial^2 c}{\partial L^2} = \{(\bar{p} - P)\beta + P\}Y'' - \frac{K''}{N} < 0 \tag{14}$$

Therefore, we can obtain the phase diagram of the dynamic model characterized Eqs. (6) and (10) in Fig. 2, where we have . In the case of the locus, the household's consumption is degreasing to the left side of the locus, and increasing to the right side of the locus. In the case of the locus, the labor supplied by the represent rural household is degreasing to the below side of the locus, and increasing to the above side of the locus. The vertical arrows demonstrate these directions of motion.

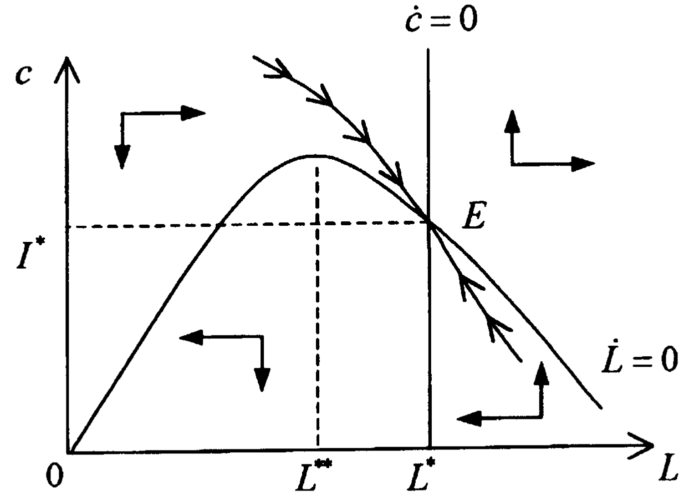

Fig.-2

Linearizing Eqs. (6) and (10) around the steady state, we have

$$\begin{bmatrix}\dot{c}\\ \dot{L}\end{bmatrix}=\begin{bmatrix}\dfrac{\partial\dot{c}}{\partial c} & \dfrac{\partial\dot{c}}{\partial L}\\ \dfrac{\partial\dot{L}}{\partial c} & \dfrac{\partial\dot{L}}{\partial L}\end{bmatrix}\begin{bmatrix}c-c^*\\ L-L^*\end{bmatrix} \tag{5-15}$$

$$\left.\begin{aligned}
&\frac{\partial\dot{c}}{\partial c}=0\\
&\frac{\partial\dot{c}}{\partial L}=\frac{U'}{U''}\,\frac{N\{(\bar{p}-P)\beta\ (1+\gamma)+P\}Y''-K''}{N(\bar{p}-P)\beta\ Y'}<0\\
&\frac{\partial\dot{L}}{\partial c}=\frac{N}{(\bar{p}-P)\beta\ NY'}<0\\
&\frac{\partial\dot{L}}{\partial L}=\frac{K'-N[(\bar{p}-P)\beta\ +P]\,Y'}{(\bar{p}-P)\beta\ NY'}>0
\end{aligned}\right\} \tag{16}$$

Assuming λ_1 and λ_2 are two eigenvalues of the matrix of the coefficients in Eq. (15), we have $\lambda_1+\lambda_2>0$ and $\lambda_1\lambda_2<0$.

Therefore, there are one negative and one positive eigenvalues in the dynamic system, that is, there exists unique perfect foresight equilibrium in the dynamic system.

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