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## Two-Sector Models in Developing Economies

by Katsu Yanaihara

In this paper, developing countries are classified into two types: land-scarce and land-abundant types. The economy of each type is a dual one which is composed of a traditional subsistence sector and a modern exchange sector.

The common assumptions for both types:

### A. Traditional sector

- (1) The product is food representing consumer goods in general.
- (2) The unit of producer is a peasant family which is composed of peasants and their dependents.
- (3) The peasant family owns or occupies the land. There is neither landlord nor hired labourer.
- (4) The food consumed in a family is selfsufficiently supplied.
- (5) The factors of production are land and labour, which are homogeneous in quality in each category.
- (6) The production function is linear-homogeneous. The marginal productivity of each factor is decreasing.
- (7) A peasant behaves so as to maximize his utilities in the preference of goods (or income) and leisure.
- (8) The total number of peasants is fixed.
- (9) The technology is stationary.

### B. Modern sector

- (1) The factors of production are capital and labour, which are homogeneous in quality. For agricultural production under a plantation system, land is added as a third factor.
- (2) Capital is supplied within this sector or from foreign countries.
- (3) Labour is supplied exclusively from the traditional sector.
- (4) The cost of migration from traditional to modern sector is zero.
- (5) The capitalists demand for food is neglected.
- (6) After migration, land is equally reallocated among the remaining families in the traditional sector.

The specific assumptions for each of two types:

Land-scarce type

### A. Traditional sector

- (1) Land is fully utilized.
- (2) There is a lower bound for the technically possible land/labour ratio, and the lowest is actually adopted.
- (3) Beyond a point, the marginal productivity of labour reaches zero.
- (4) The output of food is already maximized with zero marginal productivity of labour to maintain the minimum level of livings in the physical sense.

### B. Modern sector

- (1) The products are manufactured goods, i.e., capital and consumer goods other than food.
- (2) Modern sector offers an attractive wage rate to induce peasants to immigrate to itself.
- (3) The unit of migration is a peasant with his dependents.

Notations:

Total number of peasants in the traditional sector:  $N$ .

Total endowment of land:  $T$ .

Total output:  $Q$ .

Land per peasant:  $t$ , ( $t \equiv \frac{T}{N}$ ).

Labour input per peasant:  $l$ .

Output per peasant:  $q$ , ( $q \equiv \frac{Q}{N}$ ).

The production function of each peasant:  $q = F(t, l)$ .

Now,  $(1 - \frac{1}{\lambda})N$  peasants are assumed to migrate from the traditional to the modern sector.

( $\lambda > 1$ )

For the sake of consistency, the constancy of total output  $Q$  is required. This means that  $q$  must be raised to  $\lambda q$ . After migration, land is reallocated among remaining peasants. This process requires that the amount of labour input is also increased to  $\lambda l$ .

On the demand side, the consumption of food in the traditional sector must be kept unchanged. Land-abundant type

### A. Traditional sector

- (1) Land is not fully utilized.
- (2) There is an upper bound for the technically possible land/labour ratio, and the highest ratio is actually adopted.
- (3) There is a division of labour by sex.  
An adult male is potential wage-earner and cultivator of agricultural products for export.

The number of adult male is  $(1 - \frac{1}{k})N$ .

A female is engaged in food production. A boy is included in this category.

- (4) The output of food is more than enough to meet the demand at saturation point.

B. Modern sector. This is classified into three types: (A), (B) and (C).

(A)

- (1) Indigenous peasants produce in the rural area agricultural products for export.
- (2) The factors of production are land and adult male labour.

(Example: cocoa in Ghana)

(B-1)

- (1) The industry is mining which is owned and managed by non-indigenous people, and its product is exclusively for the foreign market.
- (2) The factors of production are labour and capital.

(Example: gold in the Republic of South Africa)

(B-2)

- (1) The production for export or for domestic market is under a plantation system, which is owned and managed by non-indigenous people.
- (2) The factors of production are land, labour and capital.

(Example: maize in Kenya)

In (B), An adult male is assumed not to take his dependents to the modern sector.

(C) An adult male has the choice to be wage-earner or cultivator of crops for export.

(Example: tobacco in Malawi)

Now, the stage is set to analyze the model.

(A) An adult male begins to plant crops for export, but does not go out. Imported consumer goods become available, by the sale of new product to foreign market.

(B)  $(1 - \frac{1}{\lambda})N$  peasants are assumed to migrate to the modern sector. ( $k > \lambda > 1$ )

If remaining females increase leisure and decrease food production down to  $\frac{1}{\lambda}q$ , a society will suffer from shortage of food. To avoid this situation, they must put the same amount of labour as before into productive activity and sell the surplus food to the modern sector.

(C) Hypothesis in (A) or (B) is equally applicable.

The realistic consideration of the models:

The introduction of landlord-tenant system into land-scarce type will intensify the difficulty of increasing labour input and keeping food demand unchanged in the traditional sector.

(Example: India)

It will be also plausible that population begins to increase rapidly after migration.

In (A) of land-abundant type, there will possibly exist a third sector which can be called the city. This sector has the tendency of being over-populated. (Example: Ghana)

In (B), the absence of adult male decreases the productivity of land in the traditional sector in the long run. (Example: Central and South Africa)

The "Native Reserve" would be regarded as a land-scarce enclave in the (B) of land-abundant type. This intensifies the temporary character of migrant labour. In this situation, a labourer

has a tint of target-worker and does not settle down in the modern sector, resulting in low wage rate and thus low efficiency. (Example: Rhodesia)

Concluding remarks

The possibility of economic development with unlimited supplies of labour is greater in the land-abundant type than in the land-scarce type. In the former case, an adult male can surely migrate from the traditional to the modern sector, but he will be an unstable target-worker not suitable for modern industries.

From the view-point of economic policy of development, a suitable reallocation of labour in two sectors should be taken into consideration, not necessarily in line with the hitherto one way and once for all process of labour migration.

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## La Révolution et les Destinées des Biens Nationalisée

par *Kunihiko Watanabe*

Les aliénations qui les nationalisations suivirent représentent l'une des translations de propriétés les plus considérables que mentionne l'histoire.

Toutes les classes sociales ont acheté des biens nationaux. Cependant, les aliénations ont surtout profité aux gens riches ou aisés. La très grande majorité sans ressources, malgré la vaste translation de biens fonds que représentent ces ventes, n'avait pas pu prendre part aux adjudications nationales, est demeuré considérable, après la Révolution comme auparavant.

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## Structural Change in the Leontief System

by *Iwao Ozaki*  
*Junji Sagara*

In the Leontief input-output system, technical changes would be expressed as the changes in input-output coefficients matrix including labor and capital requirements. Therefore, the empirical studies of changes in input patterns of an economic system are considered to be crucially important for analysing the economic features of structural development in the course of economic growth.

The main purpose of this paper is to observe economic efficiency of these technical changes, — the effects of changes in input-output coefficients of each sector on the productivity, the propensity to import and the ratio of export of the whole system of Japanese industry. The first half of this paper presents a measurement model for economic efficiency of an industrial structure and the last half gives a number of empirical facts which was obtained in the applications of the above model to Japanese economy in 1960's.

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