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Tench Coxe and American Manufactures

by *Katsumi Nakamura*

The purpose of the present paper is to clarify the stages of development of American manufactures and regional characteristics. The writer is fully conscious of the fallibility of "Digest of Manufactures" by Tench Coxe and the consequent danger of basing conclusions on this materials. However, since the census of manufactures taken in 1810 was the first and only detailed account of household manufactures ever secured by the national government, it is quite evident that no account of manufactures would be at all complete without presentation of such statistics even though they are quite fallible and fragmentary.

Tables reveals several interesting facts concerning the American manufactures in the early nineteenth century as follows.

1) Household manufactures of woolen, flaxen and mixed cloths and raw material industries (such as pig and bar iron production and leather industry) are common throughout all the sections of the United States. Cotton fabrics are common in the South. However, sectors for fabrication such as carding, fulling and dyeing process are located more in the northern and middle states and so they are not developed in the southern states where plantation system prevails. As for metal industries, iron manufacture (agricultural tools, small arms, hardwares and others) are more concentrated in the northern and middle (mainly in Pennsylvania) states. Similarly, production of labor saving machinery is distributed in northern and middle states.

2) Such regional distribution of manufactures has deep connection with the agrarian system. The development of capitalism proceeds more rapidly in the regions where independent free farmers prevail. On the contrary, in the southern states where plantation system are common, lack of *domestic* market makes the development of capitalism difficult.

3) In "Digest" Coxe had aggregated the number of mills or establishments, amount of production, and value of production of various manufactures without making any distinction between planters manufactories and mills or factories of modern capitalists.

Agricultural Production Function

by Yasuhiko Torii

This paper deals with agricultural production function; theories and statistical estimation of their coefficients.

The problem of production functions is fundamental for economic models because of the following reasons:

- (1) The nature of production function plays important part in economic development models, as its role is to determine the extent to which national products can be increased from given resources.
- (2) The magnitude of production coefficients provides the base which determines the optimum patterns of inter sectoral trade.

As Professor Fox has suggested, even in Input/Output analysis which deals with constant coefficients, conventional production function surface is useful, especially when "agricultural complex sector" is studied.

- (3) The concept of production function is fundamental to certain theories that are related to the functional distribution of income.

The conditions under which labor demand schedule is derived depend on the nature of production function of the firm. Concurrently, the conditions under which the labor supply schedule is derived depend on the nature of the production function of the family which supplies its labor for the employment.

- (4) The production function provides one of the two general classes of information needed in determining use of resources and pattern of outputs which maximize profits of the firm.
- (5) The nature of supply functions of outputs depends upon the nature of production function.

The purpose of this paper is to estimate statistically some production function of agricultural firm, which gives us the basic conditions of labor supply scheme of agricultural household in Japan.

The labor supply schedule of farm, or agricultural sector occupies the fundamental part of economic models such as in case of Rewis' Model which showed the essential conditions of economic development.

The theoretical model of labor supply of a family has been showed by Professors Ozaki and Obi. The model requires the farm production function

as a fundamental part.

It is necessary to estimate the production possibility curves by each age and sex class of family labor. So, the main production function surface is estimated as a function of some types of family labor input.

This paper gives the results of the special types of agricultural production function that were obtained as follows.

$$(1) Y = bL_1^{a_1}L_2^{a_2}H_1^{a_3}H_2^{a_4}N_1^{a_5}N_2^{a_6}K_1^{a_7}K_2^{a_8}$$

$$(2) Y = bL_1^{a_1}L_2^{a_2}H_1^{a_3}H_2^{a_4}N_1^{a_5}N_2^{a_6}K_1^{a_7}K_2^{a_8}Q_1^{b_1}Q_2^{b_2}Q_3^{b_3}\dots Q_9^{b_9}$$

where L_1 : Male labor input (Family and Employed)

man-hour per farm per year

L_2 : Female labor input (Family and Employed)

man-hour per farm per year

H_1 : Horse and cattle power input (containing rental)

hour per farm per year

H_2 : Machine power input (containing rental)

hour per farm per year

N_1 : Fertilizer input, yen per farm per year

N_2 : Agricultural chemicals, yen per farm per year

K_1 : Buildings (Except living quarters) "tsubo"

(3.3 m²) per farm

K_2 : Land (except living quarters)

"se" (1a) per farm

Q_1 : Index of TOHOKU Area

Q_2 : " " HOKURIKU "

Q_3 : " " SANIN "

Q_4 : " " KITA-KANTO "

Q_5 : " " MINAMI-KANTO "

Q_6 : " " TOKAI "

Q_7 : " " KINKI "

Q_8 : " " SETOUCHI "

Q_9 : " " KITA-KYUSHU "

$Q_1 \sim Q_9$ are 1-0 dammy variables which are supposed to show the over-all nature of a special district.

Such dammy variable has been partly proved to be some index of each district by the method of principal component analysis.

The elasticity of male labor input a_1 is estimated as 0.27 and the elasticity of female labor input as 0.13.

The significance level of these parameters seems to be improved by the introduction of the dammy variables $Q_1 \sim Q_9$.