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Oriental-Traditional and Occidental-Modern Background and the Economic Performance of Family Farm Operators

by

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Introduction

Deficient quality of human resources, inadequate schooling and inappropriate training, constitute a barrier to the transforming of traditional agriculture into modern farming. This deficiency, however, is merely one item in a host of obstacles barring a smooth and swift transformation. Suffice it to mention that within the traditional framework raw materials, necessitated by modern farming, are not readily available. Facilities for farm finance and for other services are lacking. Domestic markets for the finished farm products are underdeveloped. Exportation and marketing channels are inadequate. 1)

In view of the complex nature of the interrelationships involved the isolation and assessment of the specific effect of the quality of human resources on modernization may call for a miracle ... Consider T.W. Schultz's speculation in that respect: "Suppose that by some miracle India or some low income country like India, were to acquire as it were overnight a set of natural resources, equipment and structures and all the other modern (material) agricultural factors comparable to those employed in the United States". Within this imaginary framework one could raise questions regarding the quality of human resources. For instance "What would the farm people of India do with [the modern (material) agricultural factors], given their existing skills and knowledge." 2)

Imaginary as it appears an "experiment" resembling Schultz's speculation took place in the 1950's when the Jewish settlement (colonization) of Israel introduced immigrants from North Africa, Yemen and other "oriental" countries (including India) to modern farming. To be sure this was by no means an overnight miracle. Also, administering the newly established settlements at first and providing for comprehensive extension later, the public agencies in charge of settlement did not leave the human resource intact. But apart from this "interruption" the agencies acted as if they meant to satisfy the experimental conditions, as they provided the settlers with the "modern (material) agricultural factors". All this took place in a

- 1) See Mellor, J.W., "Toward a Theory of Agricultural Development", in H.M. Southworth and B.F. Johnston (eds.) Agricultural Development and Economic Growth, Cornell University Press, New York, 1967.
- 2) Schultz, T.W., Transforming Traditional Agriculture, Yale University Press, New Haven 1967, p. 177.

fairly developed economic system where agriculture accounted for a small fraction of the national product and employment,¹⁾ and where the oriental settlers accounted for a relatively small fraction of farm employment.²⁾ The farm community consisted mainly of "occidental" (European) immigrant settlers and native born of occidental descent.

The three "ethnic" layers coexisted within the framework of moshav villages where the operating unit was a small-holder family-farm and a cooperative organised at the village level provided municipal services and marketing, purchasing and credit facilities.³⁾

The layers of occidental settlers and native born of occidental descent on the one hand, and the oriental layer on the other, represented two distinct cultures, life patterns, and value systems. At the extreme poles the features of these "ethnic" layers were the following⁴⁾.

As compared with a small nuclear family at the occidental layers the oriental family was an extended clan-like unit characterized by early marriage and high fertility.

Unlike their oriental counterparts, the occidental settlers displayed broad social interests and political consciousness. The occidental tended to embrace rational universalistic values and associate status with personal achievement. The orientals were inclined to adhere to traditional conservative values associated among other things with an ascription-based pattern of social status.

The Outline of an Empirical Analysis

The following sections present an attempt to arrive at a quantitative appraisal of the economic performance of the farm operator with reference to his traditional, or modern background, as the case may be. This enquiry has been provoked by the unusual coexistence of the "traditional originated" and the "thoroughly modern". The empirical analysis has been facilitated by an extensive survey carried out in 1969 and 1970 covering more than 700 observations.⁵⁾ The data collected at the farm level allowed for the estimation of an empirical production function. The parameters thus estimated could then be interpreted to throw some light on the relationships involved.

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- 1) G.D.P.: 19% in 1955 and 6% in 1970; employment: 17% in 1955 and 9% in 1970. Israel, Central Bureau of Statistics, Statistical Abstract of Israel, 1972, p. 167 and 318.
 - 2) In 1971 orientals accounted for 28% of the total farm employment. Israel, p. 320.
 - 3) See: Ben David, J. (ed.), Agricultural Planning and Village Community in Israel, UNESCO, Paris 1964.
 - 4) Comments concerning the "ethnic" layers follow Weintraub's presentation in Weintraub, D., "A Study of New Farmers in Israel", Sociologia Ruralis, 4:3-51, 1964.
 - 5) See: Lowe, Y., The Profitability of the Family Farms in 1970, Institute of Farm Income Research, January 1972. (Hebrew).

An empirical production-function

The function estimated was of the Cobb-Douglas form with layer, and year effects. It also accounted for variation in production elasticities in accord with the line specialization of the farm in question.

The following is the logarithmic transformation of the estimated function:

$$(1) \quad x_{oitjk} = a_o + a_t + a_k + \sum_{h=1}^H (b_h + b_{hj}) x_{hitjk} + u_{itjk}$$

where

x_{oitjk} is the output measured as the logarithmic value of the gross value added realized in farm i in year t , where the line of specialization is j and the "ethnic" layer is k ,

x_{kitjk} is the logarithmic value of the corresponding endowment of input h ,

u_{itjk} is a random factor characterizing production in farm i and year t ,

a_o is a general constant term,

a_t is a year constant,

a_k is a layer constant, and the sum

$(b_h + b_{hj})$ represents the production elasticity of factor h where the line of specialization is j .

The analysis concerned a population of 360 farms in 1969 and 379 in 1970. The "ethnic" layers contemplated were the oriental, occidental and native born. The equation presented in Table 1 below distinguished two major types of farming. One specialized in poultry and dairy farming, the other specialized in fruit growing and field crops. The inputs incorporated were three; labor measured in mandays, capital measured as the replacement value of the farm real assets and the quantity of irrigation water applied.¹⁾

Employing covariance-regression procedures empirical equations were estimated subject to certain assumptions and side conditions.²⁾ The particular equation presented by Table 1 assumed constant returns to scale.³⁾

- 1) Under the semi arid conditions water is the "limiting factor" in the land-water complex.
- 2) These were $\sum a_t = \sum a_k = 0$ and $b_{h1} = 0$.
- 3) That is, $\sum (b_h + b_{hj}) = 1$ for $j = 1$ and $j = 2$.

Equations allowed for increasing (and decreasing) returns, as well as for a more discriminative classification of farm types and for geographic region effects. Yet, for the purposes of the analyses presented below the differences in estimates encountered within that series were non-essential.¹⁾

"Ethnic" layer and total factor productivity

The estimated layer constants are indicative of the total factor productivity associated with the strata in question. For instance, the numerical values of the oriental and occidental constants indicated above are 0.76 and 1.00 respectively. The ratio $0.76 \div 1.00$ indicates that a (hypothetical) comparison of two family farms, which are equally endowed in terms of labor capital and water, and identically specialized, the one operated by an oriental settler will reach to the level of 76 percent of the gross value added in the farm operated by an occidental settler. A comparison between the occidental immigrant settler and the second generation of native born of occidental descent manifests a similar discrepancy.

The latter phenomenon seems to indicate that the disparity in economic performance between orientals and occidentals is like to be more than a mere reflection of a difference in mentality, cultural background and a value system. As the advantage of the native born over their (occidental immigrant) parents is undoubtedly a reflection of a better schooling and training directed at modern agro-technology, one is inclined to believe that the disadvantage of the oriental immigrants reflects relatively poor preparation in that respect.

Figures concerning schooling and farming experience seem to support this conjecture. As indicated by Table 2 below, the oriental settler has been lagging behind in both respects.

Table 2 presents three indices. One relates the total factor productivity characteristic. Another one interprets the percentage of the adult population which has completed public school education in terms of a comparative "schooling index". Still another one pertains to the length of time the farm has been operated by the farming family in question. Under the circumstances it is within this period that the immigrant settlers have had an opportunity to accumulate some farming experience. In the case of a farm operated by a member of the second generation (a native-born) this index characterizes the farming background of the present operator. In a sense the experience and schooling indices may be visualized as indices of formal and informal education. Table 2 reflects a positive association between productivity levels on the one hand and the intensity of formal and informal education on the other. This observation is consistent with, if not, indicative of the causal relationship contemplated at the outset of this paper.

1) An exception to that rule were differences encountered when the layer constants had been deleted from the equation. The result of that omission was a bias of the kind reported by Mundlak, Y., "Empirical Production Function Free of Management Bias", J. Farm Econ. 43: 44-56, Feb. 1961.

Table 1. Estimated production elasticities "ethnic" layer constants and geometric mean values, family-farms operated by oriental and occidental immigrant settlers and native born, Israel, 1969 and 1970.^{a)}

Item	Estimated production elasticities	Geometric mean values and layer constants			
		"ethnic" layer			units
		oriental	occidental	native born	
Poultry-dairy farm ^{b)}					
Labor	0.688 (0.041)	171	255	439	man-days
Capital	0.293 (0.038)	6.7	12.9	24.4	thousand dollars
Irrigation water	0.019 (0.022)	5.3	8.9	15.8	thousand cubic metres
Land	c)	1.6	2.2	7.1	hectares
Gross value added		1.4	3.1	7.4	thousand dollars
Fruits-crops farm					
Labor	0.589 (0.043)	247	235	370	man-days
Capital	0.168 (0.040)	3.5	12.9	14.4	thousand dollars
Irrigation water	0.243 (0.045)	11.2	13.4	22.2	thousand cubic metres
Land	c)	3.2	2.4	8.9	hectares
Gross value added		2.2	3.5	5.8	thousand dollars
Estimated layer constants		-0.272 (0.037)	0.007 .008	0.265 (0.044)	

a) An estimate of equation (1) expressed in natural logarithms; $R^2 = 0.681$; 1970 year constant 0.106; in parenthesis the respective standard errors. (0.051)

b) Properly interpreted the estimated elasticities in this section are comparable with the ones obtained by Mundlak, Op. Cit.

c) Not incorporated in the equation.

Returns to labor

Should a uniform capital-labor ratio prevail throughout the entire family farm population, returns to labor in poultry and dairy farms would be subject to disparities identical in magnitude with ones indicated for the total factor productivity. Uniform capital-labor and irrigation water-labor ratios would have rendered similar results in farms specializing in fruit growing and field crops.

Table 2. Productivity, schooling and experience indices
family farms operated by oriental and occidental
immigrant settlers and native born, Israel 1969
and 1970.

Layer	productivity ^(a) (i)	Index of schooling ^(b) (ii)	experience ^(c) (iii)
	p e r c e n t		
Oriental	76	52	66
Occidental	100	100	100
Native-born	129	137	104

- a) Imputed in accord with the layer constants of Table 2 above. A series of estimates of the production function within which a more discriminative type-classification, increasing (and decreasing) retains to scale and region effects were allowed for rendered productivity indices which varied between 76 and 79 for the oriental layer and between 123 and 129 for the native born.
- b) Related to the percentage of the population which had more than eight years of schooling (the occidental layer 55%). Imputed from Israel, Central Bureau of Statistics, Statistical Abstract of Israel, 1970, p. 575.
- c) Related to the numbers of years of operation (21 in the occidental layer).

Yet, these ratios, particularly the capital-labor ratio, tend to decline from the developed to the less developed strata (Table 2). The dual effect of a capital-labor ratio which is positively associated with total factor productivity is more or less uniform marginal rates of return to capital and disparities in the marginal returns to labor. The latter are bound to exceed the disparities implied by differences in total factor productivity.

Table 3. Returns to labor, the family farm and Israel's Jewish population, 1969 and 1970.

Layer	Marginal rates of return ^{a)} the family farm		Average income ^{b)} urban employees
	poultry-dairy	fruits-crops	
	\$ per man-day ^{c)}		
Oriental	5.80	5.37	6.85
Occidental	8.43	8.80	10.30
Native-born	11.71	9.20	10.40

a) Imputed at the respective geometric means in accord with the labor elasticities of Table 1.

b) Imputed from Israel, Central Bureau of Statistics, Statistical Abstract of Israel, 1972, p. 271.

c) Imputed at the 1970 official exchange rate.

For instance, the oriental-occidental "parity" ratio of marginal rates of return to labor in a poultry-dairy farm is $5.80 \div 8.43$ (Table 3) or 69 percent. This ratio falls short of the oriental-occidental parity of 76 percent indicated for total factor productivity (Table 2).

If not for a vivid flow of the excess supplies of farm labor disparities in returns to labor were liable to be far wider. This would have been the case because 'outflow rates' were adversely associated with the (internal) marginal returns to labor. At the oriental layer on-farm employment accounted for 55 - 90 percent of the family's total employment and the effective 'outflow rate' ranged between 10 - 45 percent. The corresponding range of 'outflow rates' at the occidental layer was 0 - 20 percent.

Among the native born operators similarly imputed 'outflow rates' were -25 - -50 percent indicating a substantial net inflow of hired farm hands.

The outflow of excess labor improved the "parity" ratios. For instance, the oriental-occidental "parity" ratio mentioned above would have declined from the observed level 69 to a potential lower level of 61 percent should "outflow rates" be nil and the family labor be confined to farm employment.¹⁾

As they stand the marginal rates of return to farm labor fall in the close vicinity of the corresponding income levels of urban employees. In other words, disparities among the three "ethnic" layers in the farm sector do not exceed the disparities prevailing in the urban sector.

Some Concluding Remarks

The analysis of Israel's experience in family farming reveals some disparities in performance associated with the qualities of the human resources. Operators with an occidental-modern background perform better than their counterparts with oriental-traditional background. Equally endowed in material factors the oriental could reach to a level which amounts to three-quarters of the one accomplished by the occidental operator.

Considering the fact that many oriental settlers originated in the most backward surroundings of the underdeveloped parts of the Near East this is quite an accomplishment. In terms of the returns to labor this accomplishment meant up to a fivefold rise, compared with the standards prevailing in the underdeveloped countries of origin.

Furthermore, the oriental-occidental disparity and a similar discrepancy between the occidental immigrant settler and the native born of occidental descent were found to be associated with the intensity of formal and informal education. This finding gives hope that disparities could be

- 1) Let r stand for the outflow rate, then the potential ratio will equal the observed one times the factor

$$\left(\frac{1-r_{k'}}{1-r_{k''}} \right)^{1-b_h-b_{hj}}$$

$k' = \text{oriental}$

$k'' = \text{occidental}$

eradicated in the long run. This hypothesis will be subject to test in the near future once members of the first generation of the better educated native born of oriental descent take over their parents' place.