Chapter 29

THE TERMS OF TRADE OF AGRICULTURE IN CONTEXT OF ECONOMIC GROWTH

BY

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I. INTRODUCTION

In a competitive economy, where the value marginal productivities of the factors of production are equal in all sectors, the terms of trade of one sector are meaningfully measured by the rent realized by factors specific to this sector. If there are no specific factors, there is no problem of terms of trade.

Of course, if the economy moves with friction, there are short-run discrepancies in the remuneration of the various factors. Such discrepancies may be important, and of great concern to policy-makers. However, the economy is, sooner or later, likely to iron them out. Since this process takes time, and since with time some of the data change, the original discrepancies also change. Thus, if one is interested in the short-run adjustments, he may do well by starting with the study of the long-run dynamic equilibrium path of the economy. By long run we mean the competitive solution of the economy when all adjustments have been made, and with dynamic variables held constant. But for the story to be revealing, the dynamic variables should be accounted for. This is 'the context of economic growth' which dominates much of this paper.

The analysis will involve a division of a closed economy into two sectors: agriculture and non-agriculture. The agricultural sector employs a specific factor, say land. Thus, our ultimate objective will be to trace the changes which take place in the rent of land. One

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1 This work was supported by the Maurice Falk Institute for Economic Research in Israel, and by the Ford Foundation grant for International Studies in Agricultural Development at the University of Chicago. I am indebted to Ron Mosenson for valuable comments on an earlier draft.
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of the interesting aspects of such an investigation is that it provides a measure of the changes in the value marginal productivity of the specific factor. If one introduces a supply function for this factor, he can also obtain the optimum level for its employment.

Such an analysis can be applied to evaluate the desirability of undertaking heavy investment in desalination of water for agricultural production. Perhaps, in order to obtain results for such practical questions, it will be necessary to extend the model to an open economy.

Finally, by way of reservation, it should be mentioned that this paper is not the result of long study, but rather my introduction to the subject. For a start, I have sought simplified assumptions.

The works on two-sector models listed in the bibliography have been very useful in this analysis. The illuminating survey by Hahn and Matthews contains, among many other things, references to other works on two-sector models.

II. ASSUMPTIONS

We deal with a closed economy which consists of two sectors: agriculture and non-agriculture, to which we refer as sectors 1 and 2 respectively. Sector 1 employs labour \((L_1)\), capital \((K_1)\) and ‘Land’ \((A)\), whereas sector 2 employs labour \((L_2)\) and capital \((K_2)\). Labour and capital are homogeneous, transferable and fully employed. The last assumption implies:

\[
L_1 + L_2 = L \\
K_1 + K_2 = K,
\]

where \(L\) and \(K\) are the total supply at a given time.

The production function of 2 is linear homogeneous in \(L\) and \(K\), whereas that of 1 is linear homogeneous in \(L\), \(K\) and \(A\), separable with respect to \(A\) and homogeneous of degree \(\mu < 1\) in \(K\) and \(L\). Furthermore, there are Hicks-neutral technical changes in the two sectors designated as \(\gamma, j = 1, 2\).

Specifically

\[
Y_1 = F_1(L_1, K_1, A)e^{\gamma_1} \tag{2.3}
\]

\(F_1\) can be separated into two components:

\[
Y_1 = F_1(A)\bar{F}(L_1, K_1)e^{\gamma_1}.\]

\(^1\) In particular, the analysis by Takayama (5). In the revision I also benefited from the exposition by Ronald Jones (2).