QUANTITATIVE RESEARCH IN AGRICULTURAL ECONOMICS:
THE INTERDEPENDENCE BETWEEN AGRICULTURE AND THE NATIONAL ECONOMY*

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I Recent Developments

Recent trends in quantitative research in economics have led away from the more superficial analysis of "market barometers" (for example, share prices and wholesale prices) towards those more basic economic factors that are the end results of economic activity, such as volume of output, consumption, investment, and real income in the various sectors of the economy. This change in objectives has brought with it a change in the necessary theoretical framework and statistical tools. The emphasis has shifted from mechanical investigations of the ups and downs of certain descriptive time series to the development of theoretical models intended to explain, quantitatively, the mutual interdependence among the various economic factors. The purpose of studying such interrelations is to obtain an "explanation" of the mechanism that determines the level of economic activity and thereby the general economic welfare of the various groups in the economy. This same purpose is equally appropriate and desirable for modern economic research concerning the agricultural sector of the economy.†

II The Network of Economic Relationships

This change of emphasis in economic research is only a reflection of the general trend in economic and political thinking. In a sense, the trend in economic thinking—among economists as well as among those who make public policy with regard to economic

* This will be reprinted in Cowles Commission Papers, New Series, No. 27.
† The amount of literature on economic research in agriculture is already enormous, and even more material and results are probably contained in unpublished manuscripts in the files of the Department of Agriculture and other agencies. As far as the literature is concerned, the reader is referred in particular to Professor Henry Schultz' monumental work on The Theory and Measurement of Demand, (Chicago, 1936) which contains not only Professor Schultz' own findings but also critical surveys of the work of others and extensive references to the pre-World-War-II literature. For a more technical exposition of some of the newer ideas advanced below, reference is made to M.A. Girshick and T. Haavelmo: "Statistical Analysis of the Demand for Food," Econometrica April, 1947.

Reprinted from Journal of Farm Economics
Vol. XXIX, No. 4, November 1947
affairs—has perhaps been ahead of the corresponding developments in the appropriate research tools for quantitative analysis.

Current economic ideas on the subject of agricultural economics and the welfare of the farm population run more or less in these terms: Because of the mutual economic dependence between the two sectors, one cannot reach a full, or even approximate, explanation of the economic conditions within agriculture unless one has an understanding of the functioning of the economic mechanism that governs the non-agricultural sector of the economy. High incomes in the non-agricultural sector are an essential condition for prosperity in agriculture, and high incomes of the farm population are likewise important for prosperity in the rest of the economy. High prices for agricultural products are associated with high farm incomes, but does this mean that an increase in agricultural prices will cause only a shift in real income from the non-agricultural sector to the agricultural sector? Or does it mean a change in total real income and employment of the economy? Sometimes it may be possible to reach an answer to such questions through a priori economic reasoning. But more often the answer will depend on the actual quantitative values of the elasticities with which the various groups in the economy respond to price and income changes. The main objective of quantitative research in this field is, then, to measure the network of economic relationships that explains the functioning and the results of this mutual interdependence between the two sectors.

Let us examine this network a little more in detail. Suppose that our goal is to explain the fluctuations of the annual net income of farmers. We may start out by defining this net income as the value of sales to the nonagricultural sector plus the value of farmers’ total consumption plus the value of net change in assets minus expenditures made to the non-agricultural sector. To explain changes in farm income we would therefore have to study the relations that describe farmers’ decisions to produce, to purchase means of production, and to improve their farms, as well as the more technical input-output relations governing agricultural production. In attempting to explain these various economic decisions and actions within the agricultural sector, we should find that a variety of economic factors pertaining to the non-agricultural part of the economy enter into the picture—factors such as cost of farm machinery and other means of production, cost of consumers’ goods purchased from the non-agricultural sector, industrial wages and
their effect upon supply of farm labor, and prices paid for agricultural products in the non-agricultural sector.

From the point of view of economic action—that is, of the decisions to produce, to consume, and so on, within agriculture—the factors relating to the non-agricultural sector might perhaps be considered as "exogenous variables," not influenced by the farmers' own actions. That is, one might say that the farmers plan as if these factors were imposed autonomously "from outside." But this does not mean that the exogenous factors remain constant or that they are independent of the economic actions within the farm sector. Thus, even if we had arrived at an exact explanation of the level of farm output, farmers' consumption, expenditures on farm machinery, savings, and the like—in terms of the factors that appear as given from outside—we should still not be able to make any absolute statements about the variables to be determined. For that purpose, we should also have to know how the factors that appear to be determined within the non-agricultural sector are, in turn, affected by the economic activity of the agricultural sector. For example, it might be reasonable to assume that the price level at which a given output of agricultural products can be sold will be determined by the level of income in the non-agricultural part of the economy. To determine this price level, then, it might seem reasonable first to make a guess at the probable level of non-farm income and then to calculate the price level that might be expected, given this income. But obviously this is not adequate since it is not possible to guess at the income of the non-agricultural sector without already having some idea of what the farmers' income will be, and this in turn depends on the prices they receive. However, this situation does not mean that we are involved in circular reasoning. It simply indicates that, in addition to a theory of the supply of and demand for agricultural products, we must explain all the variable factors that enter into the analysis in terms of certain factors that are known explicitly or that are determined by autonomous government action.

This is what the economist means when he says that, in order to study the mutual interdependence between the various parts of an economy, it is necessary to establish the complete, determinate system of relations that ties the various economic variables together. This idea has a strong basis of tradition in economic theory, dating back to the work of the physiocrats and later to the more
explicit and elegant theories of Leon Walras. In modern times the interest of many economists has been directed towards investigations into the quantitative nature of the dependence between economic variables.

III More Efficient Statistical Tools

One might think that this new emphasis upon the necessity of studying many economic relations simultaneously is something that need not concern the statistician in his attempt to derive estimates of the individual economic relationships in the economy. For example, one might think that the statistician, when studying economic relations within the agricultural sector, could take all the outside, non-agricultural factors as given and then establish the reaction of the farmers to these various factors; or that, similarly, when the statistician is studying relations within the non-agricultural sector, he could treat the factors resulting from farmers’ decisions to produce, to consume, and so on, as external to the non-agricultural part of the economy. It can be shown, however, that—

from the point of view of statistical theory—this type of partial analysis leads to logical inconsistencies of much the same nature as the fallacy, in economic theory, of neglecting the mutual economic interdependence between the two sectors. The results of such an approach would usually not represent the basic behavior relations that we desire to measure in order to gain more profound insight into the functioning of the whole economy. This follows since the variables that appear to be exogenous to the agricultural sector are themselves influenced, in the final analysis, by the varying response of the agricultural sector to these exogenous variables. In the language of those that are familiar with statistical regression analysis, we would have situations where the variables considered as “independent variables” are themselves correlated with the residual variations of the variables that we try to “explain.” Under such conditions the classical method of multiple correlation analysis is not applicable.¹ It would, in general, lead to poor and biased estimates. It might even lead to spurious results in cases where one can show that an attempt to estimate makes no sense. That is, an erroneous procedure of estimation may lead to some sort of definite numerical results even when it can be proved conclusively that the estimation problem under consideration is in fact indeterminate.

¹ See e.g. Girshick and Haavelmo, op. cit. pp. 79–86.
The extensive literature on the classical problem of "deriving supply and demand curves from the same data" contains many examples of the confusion that may arise when these problems are not dealt with by rational and consistent methods.

But does one have to be concerned with these delicate problems when the purpose is only to derive some mechanical formulae for making predictions? Suppose, for example, that we should find a very high correlation between farm income and non-farm income. Could we not then use this relationship to predict farm income, assuming no changes in the structure of the economy? The answer is probably, Yes, if we know what non-farm income will be. But if we do not have any information on the non-farm income, it is of little use to guess at a value for this variable and then calculate the expected value of farm income by means of the correlation mentioned above. We might as well guess directly at the farm income itself. To obtain more useful prediction formulae, it is necessary to find out how the factors one wants to predict are related to factors that can themselves be predicted on an independent basis. In order to determine what our prediction formulae should be under this approach, it is usually necessary to investigate the nature of the various behavior relations that are the characteristics of economic activity in the economy that we are dealing with.

Recent developments in statistical theory have produced new and more efficient tools for handling research problems of this nature. It is not possible here to go into detail concerning the theory and technique of these new methods. They will often have to be fairly complicated. Suffice it to say here that they represent the theoretical and statistical counterpart of ideas, long advocated by economists and practical politicians, that a real understanding of what goes on in the various parts of the economy requires that we know the interrelations between the various economic variables that we are talking about. One must not assume "other things given" when, in fact, they are not.

IV Usefulness in Policy

Suppose we did succeed in deriving fairly accurate estimates of

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the supply relations, demand relations, production functions, and other economic laws that together would describe the interrelations between the various economic variables in the economy. For what purpose could this network of relations be used? Obviously, such knowledge is required to satisfy our scientific curiosity. But there is also a far more practical reason. Some knowledge of the nature of the mutual interdependence between the economic factors in the various parts of the economy is obviously a prerequisite for intelligent formulation of over-all government policies such as policies of taxation and subsidies, public spending, price regulations and rationing. Political debates on economic policies are often chiefly concerned with the desirability or non-desirability of the objectives of these policies rather than with the specific means by which such objectives might be reached. The means of reaching a certain objective might, to the politician, seem direct and obvious. For example, suppose that a political majority is of the opinion that farmers have unduly low incomes. As an immediate remedy it might seem appropriate for Congress to pass a law guaranteeing higher prices for farm products. But economic thinking, even of the crudest type, would almost immediately lead to the observation that one must also consider the indirect effects of such measures upon other parts of the economy, as well as the repercussions of these effects upon the economic policy under consideration. Without a rational analytical model of how the economy works as a whole, it is usually almost hopeless to keep track of these repercussions.

One might ask how the knowledge of the network of economic interrelations, describing the structure of the economy before a certain measure of policy is introduced, could help in describing what the economy would look like after the new policy is put into operation. The answer to this question will, of course, depend upon the nature of the policy or policies that are being considered. Some policies merely change the numerical values of certain economic variables which are already subject to government decision and which the individual private sectors of the economy already are accustomed to consider as being outside their sphere of influence. Speaking technically, this means that we could calculate the effects of changes in government policy simply by inserting the new values of these variables into the old behavior relations of the various private sectors. A change in the tariff of some imported product, or changes in the rates of taxation under a given tax system, are
examples. Other policies may be such that they influence the behavior of individuals or groups in a manner that can be determined by a priori considerations. Still other types of policies may disrupt the behavior patterns of some sectors of the economy while leaving other sectors unchanged. Thus, for example, a regulatory policy with respect to the supply of a commodity may not affect the behavior pattern on its demand side; one could then use the old demand function to calculate the effects of such a policy but not the previous supply function.

Whatever the circumstances, it is of no help to take the point of view that predictions of this type, based on past experience, are impossible. The practical administrator also makes use of simplifications, broad abstractions, and rough approximations. This is unavoidable. The economist who engages in quantitative research believes in stating more openly and explicitly what these simplifications and abstractions are, in order that their implications may be studied in a rational fashion. In this way he avoids piling logical inconsistencies and errors in reasoning on top of the mistakes that he—as well as everybody else—will necessarily commit in attempting to comprehend the full complexity of economic life.

The increasing research activity along the lines we have indicated is sometimes considered as a symptom of a trend in the direction of more government planning. This might cause shortsighted opposition to aiding such research work. To this argument, however, there is a simple answer—namely, that, given a decision upon a certain objective of government planning of some kind, the objective can probably be reached more efficiently and with less direct restriction upon the freedom of action of the individual private sectors in the economy if we know something definite about the intricate network of interdependence underlying the functioning of the whole economy.

V An Appendix to Illustrate the Methods of Model-analysis: The Demand for Food and Its Relation to the National Economy

In order to develop a rational economic model it is desirable to start with a precise classification of the various groups in society according to their principal economic actions. For our purpose, here, let us first divide the economy into two groups: the consuming sector and the producing sector. (One and the same person might
appear in both groups according to the type of action considered.)

The economic function of the consuming sector is to receive income, that is, wages and profits, to spend part of this income on consumer goods, and to save. The economic function of the producing sector, on the other hand, might be considered as the paying of income to individuals (or, to the consuming sector), and the supplying of consumer goods. If the producing sector pays out more income than it receives for sales of consumer goods, it invests. The counterpart of this investment expenditure—that is, of this excess of income paid out over receipts—consists of the value of the net increase in inventories plus the value of the net increase in plant and equipment in the hands of the producing sector. We may also consider exports and imports as passing through the hands of the producing sector, in which case there might be an additional counterpart to investment expenditures as defined above, namely, the net increase in foreign balances.

Let us now divide the producing sector into two sub-sectors according to the type of consumer goods supplied. Let Sector 1 be the sector producing and supplying food to consumers and Sector 2 the sector producing and supplying non-food consumer goods. Thus, Sector 1 will cover farms, processing industries, food dealers and so on. A similar interpretation applies to Sector 2. Each of the two sectors will make certain income payments to individuals. There will also be a certain transfer of goods and services between two producing sectors, but this transfer does not by itself affect the total income payments to individuals (or, if we disregard taxes, "disposable income").

Let us introduce the following symbols:

1) $x_1$ = volume of food sold to consumers per year
2) $x_2$ = volume of non-food sold to consumers per year
3) $P_1$ = price per unit of $x_1$
4) $P_2$ = price per unit of $x_2$
5) $I$ = total annual net investment expenditures of the two producing sectors
6) $Y$ = annual income of individuals
7) $P$ = index of cost of living

(Effects of changes in population could be eliminated by using per capita figures for $x_1$, $x_2$, $Y$, and $I$.)

From what has been said above it follows that the income of individuals is given by the definition
(1a) \[ Y = x_1 P_1 + x_2 P_2 + I, \]

or, what amounts to the same,

(1) \[ \frac{Y}{P} = \frac{x_1}{P} P_1 + \frac{x_2}{P} P_2 + \frac{I}{P}. \]

This definition must hold regardless of the value of \( x_1, x_2, P_1, P_2 \), and \( I \). The question is now whether we can say something more about these variables.

There seems to be rather strong theoretical and empirical evidence that total consumers' expenditures can be considered as a function of income, provided consumer expenditures and income are both deflated by an index of the cost of living. And, furthermore, this relationship seems to be approximately linear. Let the index of cost of living, \( P \), be defined by

(2a) \[ P = e_1 P_1 + e_2 P_2, \quad \text{or}, \]

(2) \[ \frac{e_1}{P} P_1 + \frac{e_2}{P} P_2 = 1 \]

where \( e_1 \) and \( e_2 \) are the (constant) weights of food and non-food respectively. Our statement about the behavior of total consumers' expenditures thus means that we can write

(3a) \[ \frac{x_1 P_1 + x_2 P_2}{P} = a_1 \frac{Y}{P} + a_0 \]

where \( a_1 \) and \( a_0 \) are certain constants, \( a_1 \) being the "marginal propensity to consume." Combining this equation with the definition (1), we obtain

(3) \[ \frac{Y}{P} = a_1 \frac{Y}{P} + a_0 + \frac{I}{P}. \]

The question now arises as to how the consumers divide their expenditures between food and non-food. If we make an assumption as to how much people will spend for food, this assumption, together with (3a), implies an assumption as to the demand for non-food. Empirically, it has been found that the demand for food can be described fairly well by a linear function of the food price and the income when the latter two variables are deflated by an index of the cost of living. We are therefore led to the statement
that

\[ x_1 = b_1 \frac{P_1}{P} + b_2 \frac{Y}{P} + b_3. \]

We now have four equations between our variables, but there are, altogether, 7 variables, as described above. The remaining three “degrees of freedom” are essentially due to the fact that we have not yet said anything about the decisions to supply \( x_1 \) and \( x_2 \) and the decisions that determine the investment expenditures \( I \). In order to explain past observations of our variables we should have to study the nature of these decisions, their dependence upon prices, sales and perhaps other variables. Here we shall not do this. Instead we shall study the effects upon \( P_1/P \), \( P_2/P \), and \( Y/P \) of alternative direct decisions regarding the variables \( x_1 \), \( x_2 \), \( I \). In other words, we shall attempt to answer questions of the following type: Suppose that the two producing sectors were in a position to decide autonomously upon the quantities \( x_1 \) and \( x_2 \) and the amount of investment expenditures \( I \), while the consuming sector behaves according to (3a) and (4); how would changes in these decisions of the producing sectors affect real income, \( Y/P \), and the prices \( P_1/P \) and \( P_2/P \)? These are questions to which one would like to have the answers if for example one were to consider introducing some new economic policy under which \( x_1 \), \( x_2 \), and \( I \) would in fact be subject to autonomous regulation.

It is seen that the answer to such questions cannot be obtained by considering any one of our equations taken alone. We have to consider the equations as a system. The direct and obvious method would then be to solve our system of four equations (1), (2), (3), (4), expressing each of the variables, \( P_1/P \), \( P_2/P \), \( P \) and \( Y/P \), in terms of \( x_1 \), \( x_2 \), \( x_3 \) and \( I \).

The solutions turn out to be fairly complicated expressions and we shall not take up space by giving all of them. But, as an example, let us derive the solution for the price of food, \( P_1/P \). By simple, but somewhat tedious algebra, the following expression is obtained:

\[ \frac{P_1}{P} = \frac{c_2(a_3b_2 + a_1x_1 - a_2b_3) - b_2x_2}{a_1b_2 + (x_1c_2 - x_2c_1)b_2}. \]

Similar formulae could be derived for \( P_2/P \), \( Y/P \) and \( P \).
What the formula (5) shows is this: Suppose the food producers were to change \( x_1 \) by a certain amount, the supply of \( x_2 \) and the investment expenditures \( I \) remaining constant. Then the effect of this change upon the real price of food, \( P_1/P \), would depend both upon the numerical values of the parameters \( a_1, a_2, b_1, b_2, c_1, c_2 \) and upon the level of the variables \( x_1 \) and \( x_2 \). In other words: The total effect, upon price, of a change in quantity supplied is not given by any simple "elasticity of demand," of the commodity in question, but depends—in a more complicated manner—upon the whole structure of the economy.

There is a simpler and more elegant way of studying effects of this type. Let us first re-write our system (1)–(4) using the notations

\[
\begin{align*}
\frac{P_1}{P} &= p_1 \\
\frac{P_2}{P} &= r \\
\frac{Y}{P} &= y.
\end{align*}
\]

Our system then reads:

\[
\begin{align*}
(1') & \quad y = x_1p_1 + x_2p_2 + \frac{I}{P} \\
(2') & \quad e_1p_1 + e_2p_2 = 1 \\
(3') & \quad y = a_1y + a_6 + \frac{I}{P} \\
(4') & \quad x_1 = b_1p_1 + b_2y + b_6.
\end{align*}
\]

Now let us consider the effect upon \( p_1, p_2, y \) and \( P \) of a change in \( x_1 \), keeping \( x_2 \) and \( I \) constant. This means that we are interested in calculating the partial derivatives

\[
\frac{\partial p_1}{\partial x_1}, \quad \frac{\partial p_2}{\partial x_1}, \quad \frac{\partial y}{\partial x_1}, \quad \text{and} \quad \frac{\partial P}{\partial x_1}.
\]

These derivatives are partial in the sense that \( x_1 \) and \( I \) are kept constant. If we knew these partial derivatives we could, obviously, also calculate the corresponding elasticities \((\partial p_1/\partial x_1)(x_1/p_1)\) etc. The problem therefore is to obtain these partial derivatives from
the system \((1')-(4')\). To solve this problem we differentiate each of the equations \((1')-(4')\) with respect to \(x_1\), keeping \(x_2\) and \(I\) constant. This yields, after rearranging the terms, the following 4 equations from which to determine the 4 unknown partial derivatives.

\[
\begin{align*}
\frac{\partial y}{\partial x_1} - x_1 \frac{\partial p_1}{\partial x_1} - x_2 \frac{\partial p_2}{\partial x_1} + \frac{I}{P^2} \frac{\partial P}{\partial x_1} &= p_1 \\
\frac{\partial p_1}{\partial x_1} + \frac{\partial p_2}{\partial x_1} &= 0 \\
(1 - a_1) \frac{\partial y}{\partial x_1} + \frac{I}{P^2} \frac{\partial P}{\partial x_1} &= 0 \\
b_2 \frac{\partial y}{\partial x_1} + b_1 \frac{\partial P_1}{\partial x_1} &= 1.
\end{align*}
\]

(6)

This is a system of four linear equations in four unknowns, namely the four partial derivatives involved. The determinant of the coefficients is:

\[
\begin{vmatrix}
1 & -x_1 & -x_2 & \frac{I}{P^2} \\
0 & e_1 & e_2 & 0 \\
(1 - a_1) & 0 & 0 & \frac{I}{P^2} \\
b_2 & b_1 & 0 & 0
\end{vmatrix} = \frac{I}{P^2} [a_1b_2e_2 + (x_1e_2 - x_2e_1)b_2].
\]

(7)

The solutions of (6) are obtained by ordinary methods of solving linear equations. The solutions, written as elasticities, read:

\[
\begin{align*}
\frac{\partial y}{\partial x_1} &= \frac{b_2e_2p_1 + e_2x_1 - e_1x_2}{a_1b_2e_2 + (e_2x_1 - e_1x_2)b_2} x_1 \\
\frac{\partial p_1}{\partial x_1} &= \frac{e_2(a_1 - b_2p_1)}{a_1b_2e_2 + (e_2x_1 - e_1x_2)b_2} x_1 \\
\frac{\partial p_2}{\partial x_1} &= \frac{-e_1(a_1 - b_2p_1)}{a_1b_2e_2 + (e_2x_1 - e_1x_2)b_2} x_1
\end{align*}
\]

(8)

(9)

(10)
\[
\frac{\partial P}{\partial x_1} \cdot \frac{x_1}{P} = \frac{P^3(1 - a_1)(-b_1e_1p_1 - e_2x_1 + e_1x_2)}{I(a_1b_2e_2 + (e_2x_1 - e_1x_2)b_2)} \cdot \frac{x_1}{P}.
\]

In exactly the same manner one could derive partial derivatives, or elasticities, with respect to changes in \(x_3\) or \(I\). (The determinant (7) remains the same, but the right-hand side of (6) will change.) If we knew the numerical values of the parameters involved in (8)–(11), we could calculate the derived elasticities. These elasticities will obviously depend also on the level of the variables involved. Certain approximate estimates of the parameters involved have been obtained from data for the United States 1922–41. The estimates of course depend upon the units of measurement of the various variables involved. Suppose we choose the units of measurement in such a way that the values of the price indices \(P_1\), \(P_2\), and \(P\) during the base period 1935–39 are all equal to 1 and such that the average value of real income \(y\) during this period is also equal to 1. It is thus found that the average values of \(x_1\), \(x_2\), and \(I\) during 1935–39 were approximately

\[
x_1 = .25
\]
\[
x_2 = .65
\]
\[
I = .10.
\]

The weights \(e_1\) and \(e_2\) of the index of the cost of living should, roughly speaking, be proportional to \(x_1\) and \(x_2\), that is

\[
e_1 = .25 \frac{100}{90}
\]
\[
e_2 = .65 \frac{100}{90}.
\]

In these units of measurement the following approximate estimates were found for \(a_1\), \(b_1\) and \(b_2\)

\footnote{The data used were: Per capita disposable income and per capita consumers' expenditures (Department of Commerce data), Index of cost of living and index of retail food prices (Bureau of Labor Statistics series), and index of per capita food consumption (Bureau of Agricultural Economics). For details of calculations involved, see M. A. Girschick and T. Haavelmo: op. cit. pp. 99–109.}

\footnote{The actual weights used in the BLS index of cost of living are slightly different because the weights of the BLS index refer to the lower income groups only.}
\[ a_1 = .7 \]
\[ b_1 = -.06 \]
\[ b_2 = .07. \]

Using these estimates we obtain the following values of the elasticities above, valid when the values of the variables involved are reasonably close to their values in the base period 1935–39:

\[ (8') \]
\[
\frac{\partial y}{\partial x_1} \frac{x_1}{y} = .36
\]

\[ (9') \]
\[
\frac{\partial p_1}{\partial x_1} \frac{x_1}{p_1} = -3.75
\]

\[ (10') \]
\[
\frac{\partial p_2}{\partial x_1} \frac{x_1}{p_2} = 1.45
\]

\[ (11') \]
\[
\frac{\partial P}{\partial x_1} \frac{x_1}{P} = -1.07.
\]

Stating our results in words, they read as follows:

If investment expenditures, I, and the output of non-food consumer goods, \( x_2 \), were to be maintained at constant levels, a 1% increase in the output of food would

1) increase the real income of consumers by about .36%,

2) decrease the real price of food by about 3.75% (which means that the real income derived from producing food would decrease by about 2.75%),

3) increase the real price of non-food consumer goods by about 1.45%, and

4) decrease the cost of living by about 1.10%.

The reliability of these conclusions depends, of course, upon the accuracy of the statistical measurement of the parameters involved, their sampling errors etc., and much careful research is yet to be carried out to check the tentative estimates we have used above. But our preliminary results might perhaps serve as an illustration of the type of analysis that would be required in order to study the final, net effects of certain changes in the structure of the economy.

To summarize, a study of this nature will usually involve the following analytical steps:
1) A precise description and formal analysis of the new structure to be considered.
2) A precise description of the prevailing structure in order to find out what parameters or properties of the prevailing structure will carry over into the new structure.
3) Estimation of these parameters, or properties, common to the two structures, on the basis of observations resulting from the prevailing structure.
4) The use of such estimates to predict results under the new structure before it is put into effect.

Above we have dealt mainly with steps 1) and 4), assuming the results of 2) and 3) to be available from other studies.