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A Microregional Analysis of Clinton County Pennsylvania - Volume 2

Hays B. Gamble
Pennsylvania State University

David L. Raphael
Pennsylvania State University

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A MICROREGIONAL ANALYSIS OF CLINTON COUNTY PENNSYLVANIA

VOLUME II

BY HAYS B. GAMBLE AND DAVID L. RAPHAEL

THE PENNSYLVANIA REGIONAL ANALYSIS GROUP
THE PENNSYLVANIA STATE UNIVERSITY

ERRATA

pp 8:   Equation (3) should read:

$$Y_i = -a_{i1}X_1 - a_{i2}X_2 - \ldots + (1 - a_{ii})X_i - \ldots - a_{im}X_m$$

pp 14:   Equation (12) should read:

$$(I-A)X + B = Y$$

pp 15:   Equation (14) should read:

$$X = (I-A)^{-1}Y$$

pp 22:   Last matrix notation should read:

$$(I-A) = \text{etc.}$$

TABLE 3:   Total internal transactions
           should be 147,221 instead of 147,211
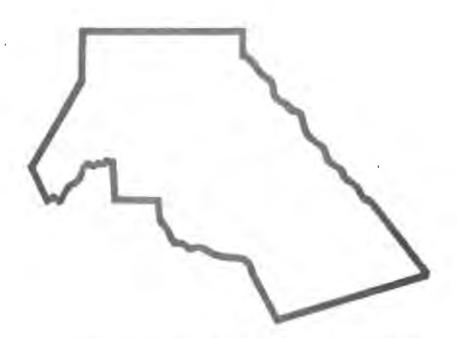
pp 66:   Line 9 - criterion instead of criteria

pp 70:   Line 15 - $(I-A)^{-1}$ instead of $(1-A)^{-1}$

pp 123:   Line 6 - activities instead of Households

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UNIVERSITY PARK, PENNSYLVANIA
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FOREWORD

The purpose of this report is to serve as a technical supplement to Volume I of the Clinton County, Pennsylvania, study. In Volume I, the input-output technique was presented in very general terms. There was only a brief discussion of the procedures involved in the collection of the primary data and its assimilation into the input-output matrix. The descriptive analysis of the economy of the county and the methodologies employed in the impact analysis phase of the study were handled in a cursory manner. The purpose of Volume I was to acquaint individuals not well versed in the input-output technique with the study of Clinton County made by The Pennsylvania Regional Analysis Group.

This report, Volume II, treats all empirical phases of the study in greater detail and at a considerably higher technical level than did Volume I. Of primary interest to the research worker, the report calls for a moderate degree of familiarity with the input-output technique. Reasons for undertaking the study, a description of the study area, objectives of the study, overall conclusions, and further research recommendations will not be reiterated in this volume. This information and a more general discussion of the study as a whole are available in Volume I.

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INTRODUCTION

An early application of the input-output technique was presented by Leontief (1) in 1941 as a study of the American economy. Since then, the input-output technique has experienced increasing use and application and undergone a number of modifications. Its theoretical base, however, still rests on the classical general equilibrium theory formulated by Walras (2).

More recent input-output studies in the United States have dealt with economies of varying size -- from a model of the national economy (3), a regional model of the United States emphasizing agriculture (4), and an interregional input-output model of the United States (5), to a study currently under way in New York State involving the economy of a single township.

There have been a number of excellent studies conducted at the state level. The Moore and Petersen Utah study (6) contains a detailed discussion of multipliers and their use and significance. The role of agriculture in the California economy has been studied through use of an input-output model as formulated by Martin and Carter (7), which also contains an excellent treatment of multipliers. Another California study, this one by Hansen and Tiebout (8), incorporates certain features of the economic base-foreign trade multiplier approach with certain features of the regional interindustry (input-output) approach, which they called an intersectoral flows analysis. Its distinguishing feature is use of number of employees in place of dollar values for the

empirical implementation of the model. A study recently completed of the State of Mississippi (9) focuses attention on those activities which are needed for development of families of structurally related industries, and the authors have made excellent use of a production skyline chart to emphasize this application. The University of Maryland has constructed an interindustry model of that state (10). All of the above studies relied principally on data from secondary sources. The Mississippi study, however, utilized survey techniques to obtain some of its data.

Studies employing input-output models encompassing regions smaller than states have been nearly as numerous, perhaps more so. Most of these have focused attention upon urban complexes and their economic structures. Outstanding among these are Hoch's model of the Chicago area (11), Hirsch's St. Louis study (12), and the study of the Sioux City area by Leven (13). The National Planning Association sponsored studies in three urban counties and constructed input-output models for each (14): Kalamazoo County in Michigan; Mobile County, Alabama; and Fulton County, New York. The main purpose of these last three studies was to identify and measure the direct and indirect impact of stipulated changes in foreign and domestic demand on the local economies of these three communities.

A multi-county study of southwestern Wyoming by Lund (16) has carried use of the input-output technique somewhat further than have previous studies. Lund (pp. 61-67) uses his input-output model to assess and forecast impact of changes in basic (export) income upon the

local economy. These changes take the form of increased output or external demand for already existing activities. He also takes into account changes in interrelationships endogenous to the model. Unfortunately, he does not spell out precisely how he accomplishes this, merely stating (p. 61) that changes could be overcome in actual application and were taken into account. Presumably this was accomplished by changing the values of technical coefficients. The Clinton County study, as will be explained in detail in chapters to follow, carries this impact technique much further, in that it not only assesses changes in final (external) demand, but introduces whole new industries and activities into the economy and also removes existing industries and changes completely the structure of an existing internal industry. The Wyoming model is unusual as compared to most other input-output models because it incorporates both local government and households into the producing (or internal) sectors rather than make them structural components of final demand. The Clinton County model also follows this procedure and carries it one step further by incorporating some federal and state government activities into the producing sectors and the remainder into final demand. Lund relied both on primary and secondary sources for his flows data.

The authors are aware of only three input-output studies in the United States at the single county level that have been oriented principally towards rural economies. Jansma and Bock (15) employed a version of the input-output technique in assessing secondary benefits to a local rural economy from watershed projects. They devised a

unique procedure for collecting transactions data through use of micro-
filmed samples of checks passing through the local bank. In a pene-
trating study of the natural resources of Carbon County, Wyoming,
Harmston (17) uses basically the same type of input-output methodology
as does Lund (16) and also assesses impact on the local economy re-
sulting from changes in basic output. Rao and Allee (18) in their
study of San Benito County, California, also portray the impact on the
local economy of changes in final demand, projecting their estimates
to the year 1975. Their main interest focuses upon rural-urban inter-
actions of an agricultural area experiencing definite signs of urbani-
zation. Data for this study was gathered from both primary and
secondary sources.

The above studies are not intended to be a complete listing of
all input-output studies in the United States, but they are, in the
authors' opinion, the most significant ones. For those readers desir-
ing further information on the input-output technique and closely re-
lated fields, the authors have compiled a list of selected references
located at the end of this report.

Chapter I of this report discusses theoretical aspects of the
input-output model, its mathematical concepts, limitations, and inher-
ent assumptions. We realize that this will be repetitious of much
that is to be found in the present literature on this subject, but we
have several reasons for including it in this report. First, it will
save the reader time in not having to look elsewhere for this informa-
tion if he so desires it. For those not well versed in the input-

output technique, we have attempted to present this material in as clear and concise a manner as possible. This we believe in itself may be a contribution to the field. Second, working as closely with the model and the data as we have, we tend to "lose sight of the forest for the trees." Going through the task of writing this portion of the report will, it is hoped, keep the input-output technique in its proper perspective, principally the inherent limitations of the methodology. Third, we believe that a firm theoretical and technical background must be established for the real contribution of this study that follows -- the extensive use of impact analysis.

Those readers choosing to omit this aspect of the report are urged to go directly to Chapter II, wherein is presented a detailed account of the gathering, compilation, and assimilation of data into the Clinton County matrix, together with a brief description of all sectors. The balance of the report deals with a discussion of multipliers (Chapter III), a detailed account of impact analysis methodology, procedures and results (Chapter IV), and a presentation of an interregional model of the Clinton County Economy (Chapter V).

CHAPTER I

Introduction

In this section of the report, it is our purpose to derive and demonstrate the basic model used in the Clinton County study. The model used is a version of what has been called a static open Leontief model. It is essentially this model which is developed in the following discussion.

For our investigation, a region was viewed as a set of inter-related sectors where the sector breakdown would be in accordance with some meaningful classification. In this case, a classification of 54 sectors was made based on economic considerations. Sector classification is discussed in some detail at a later point in this report. Money, as income from export sales in meeting external demands on sectors, flows into various sectors of the region from the rest of the world. This money then moves from sector to sector within the region as an internal flow of funds and finally out of the region in the form of external expenditures or transfers of funds.

The structure and use of an input-output model to simulate this flow of funds over a given time period will be found in the following material. It has been assumed that these flows from sector to sector are related in a linear manner. Though this assumption may not hold in a strict sense, it was felt that errors in description or prediction due to this assumption would not be too large in magnitude to prevent carrying out this investigation.

Mathematical Derivation

1.1 Definitions:

X_i = total flow in dollars into the i th economic sector over a base period T.

x_{ij} = flow in dollars from sector j to sector i over a base period T.

Y_i = external demand or the amount of funds in dollars flowing from outside the region into sector i over a base period T.

We require

$$X_i \geq 0$$

$$x_{ij} \geq 0$$

$$Y_i \geq 0 \text{ and}$$

$$y_i > 0 \text{ for at least one i}$$

where i,j = 1,2,3, ..., m, i.e., we have m sectors in our region.

1.2 Derivation:

Obviously, for the i th sector,

$$X_i = x_{i1} + x_{i2} + \ldots + x_{ij} + \ldots + x_{im} + Y_i \tag{1}$$

i.e., the total flow of funds X_i through the i th sector is the sum of the flows from each of the sectors of the region; x_{ij}, j = 1,2, ..., m, and the flow from outside the region Y_i. However, we could express

equation (1) in the following manner:

$$X_i = a_{i1}X_1 + a_{i2}X_2 + \ldots + a_{ij}X_j + \ldots + a_{im}X_m + Y_i \tag{2}$$

where the a_{ij} are coefficients such that

$$0 \leq a_{ij} \leq 1$$

and

$$\sum_j a_{ij} \leq 1$$

The coefficients a_{ij} are called <u>input-output</u> or technical coefficients. The reason for this particular name will become obvious from the discussion of a specific example which follows below.

Now (2) can also be expressed with external demand as a linear function of the set $\{x_j\}$, $j = 1,2, \ldots, m$; i.e.,

$$Y_i = X_i - a_{i1}X_1 - \ldots - a_{ij}X_j - \ldots - a_{im}X_m$$

$$= a_{i1}X_1 - a_{i2}X_2 - \ldots + (1 - a_{ii})X_i + \ldots - a_{im}X_m \tag{3}$$

If we further "loosen" these equations by changing the equality of equation (3) to an inequality, we have

$$Y_i \geq - a_{i1}X_1 - a_{i2}X_2 - \ldots + (1 - a_{ii})X_i - \ldots - a_{im}X_m \tag{4}$$

This means we have a system of m inequalities in m unknowns. Equation (4) is one of m constraints which must be satisfied whenever a

set of values for the set $\{x_j\}$ $j = 1,2, \ldots, m$, is examined. Now the set of inequalities has an infinite number of solutions of this type. We wish to find the one solution which best satisfies a specific objective. For example, the objective might be to maximize profit expressed as a proportion of each sales dollar flowing into each sector. Specifically, let c_i be this proportion for the i th sector, then

$$c_i X_i, \quad c_i \geq 0$$

represents the profit of the i th sector over the base period T. Thus, we can define an objective function.

$$
\begin{aligned}
f(X_1, \ldots, X_m) &= c_1 X_1 + \ldots + c_i X_i + \ldots + c_m X_m \\
&= \sum_i c_i X_i
\end{aligned} \tag{5}
$$

which represents the total profit of all sectors of the region over time T. The researcher, of course, is not limited to a profit objective function but to any appropriate function which may be maximized or minimized. Whatever the objective function may be, our model is set up to select those solutions which will maximize or minimize the objective function out of the infinite set of possible solutions. This infinite set consists of solutions satisfying the system of m inequalities and the conditions given in section 1.1.

This discussion can be more succinctly presented using matrix notation. This we will proceed to do.

Let

$$X = \begin{bmatrix} X_1 \\ \cdot \\ \cdot \\ X_i \\ \cdot \\ \cdot \\ X_m \end{bmatrix}$$

be the <u>solutions vector</u>, i.e., the set of values of dollar flows into each sector which maximizes or minimizes the objective function, which-ever the case may be. We can call these values <u>optimum activity levels</u>.

Let

$$Y = \begin{bmatrix} Y_1 \\ \cdot \\ \cdot \\ Y_i \\ \cdot \\ \cdot \\ Y_m \end{bmatrix}$$

be the <u>external demand vector</u>. This has also been called such things as "final bill of goods" and "exogenous demand."

Let

$$A = \begin{bmatrix} a_{11} & \cdots & a_{1j} & \cdots & a_{1m} \\ \cdot & & & & \cdot \\ \cdot & & & & \cdot \\ a_{i1} & \cdots & a_{ij} & & \cdot \\ \cdot & & & & \cdot \\ \cdot & & & & \cdot \\ a_{m1} & \cdots\cdots\cdots\cdots & a_{mm} \end{bmatrix}$$

$$= (a_{ij})$$

This is the input-output coefficients matrix.

Remembering that the identity matrix I is defined as

$$I = \begin{bmatrix} 1 & & & 0 \\ & 1 & & \\ & & \ddots & \\ 0 & & & 1 \end{bmatrix}$$

we obtain the so-called Leontief Matrix

$$(I - A) = \begin{bmatrix} 1-a_{11} & -a_{12} & \cdots & -a_{1m} \\ -a_{2i} & 1-a_{22} & & \vdots \\ \vdots & & \ddots & \vdots \\ \vdots & & & \vdots \\ -a_{m1} & \cdots\cdots & & 1-a_{mm} \end{bmatrix}$$

Using the above definitions, we can denote the conditions of section 1.1 and the syste. of inequalities by means of the following matrix equations.

$$X \geq 0$$

$$(I - A)X \leq Y \tag{6}$$

On the other hand, for our convenience we can add a positive "slack" variable to each of the m inequalities making each one an equality. Typically we would have

$$- a_{i1}X_1 - a_{i2}X_2 \cdots + (1 - a_{ii})X_i + \cdots - a_{im}X_m + b_i = Y_i \tag{7}$$

where b_i is the slack variable for the i th equation. In matrix notation we would have, then, a slack vector

$$
B = \begin{bmatrix} b_1 \\ \cdot \\ \cdot \\ b_i \\ \cdot \\ \cdot \\ b_m \end{bmatrix}
$$

Finally, we define the <u>objective function coefficients vector</u>

$$
c = (c_1, \ c_2, \ \ldots, \ c_i, \ \ldots, \ c_m)
$$

Using the slack vector and the objective function coefficients vector, we can expand the matrix formulation of (6) to the form below.

To maximize

$$
cX
$$

Subject to

$$
X \geq 0 \tag{8}
$$

$$
(I - A)X + B = Y \tag{9}
$$

The first set of constraints (8) merely indicates that the activity level of any sector must be positive or zero. This eliminates the possibility of a negative activity level, which is meaningless and impossible in this formulation. The second set (9) represents the fact that a given sector cannot produce outputs which will exceed total internal and external demand for them. This is also characteristic of this model. More elaborate versions of the model, however, can be formulated in which sector outputs do exceed internal and external de-

mands. This gives us, of course, a production for inventory. This elaboration of the model will not be considered at present.

For purposes of the present discussion, we will consider only one more elaboration in the structure of the model. This is the fact that certain regional sectors will have capacity constraints. For example, there may be only so many workers available in a given region, and that sector whose output is labor will have a finite upper limit on the amount of labor it can provide. In the same manner, an industry is capable of producing only that amount which is possible with the given plant and equipment, and production cannot exceed this capacity. Where applicable, such capacity limits can be placed on appropriate sectors of the region.

Let us consider such a sector, say the i th sector. We can express this constraint on the i th sector by the following relation:

$$X_i \leq k_i \tag{10}$$

where

k_i = the capacity limit for the i th sector and $k_i \geq 0$

We can write (10), using slack variables to make it an equality, in the form

$$X_i + l_i = k_i \tag{11}$$

where

$$l_i = \text{unused capacity of the i th sector}$$

Equations for the sectors of the region of the form of equation (11) lead us to the following matrix representation.

Letting

$$K = \begin{bmatrix} k_1 \\ \vdots \\ k_i \\ \vdots \\ k_m \end{bmatrix}$$

and

$$L = \begin{bmatrix} l_1 \\ \vdots \\ l_i \\ \vdots \\ l_m \end{bmatrix}$$

we have, finally, the following portrayal of the input-output analysis as a linear programming problem:

To maximize

$$CX$$

Subject to

$$X \geq 0$$

$$(A - I)X + B = Y \tag{12}$$

$$X + L = K$$

The system of matrix relations given in (12) has been called a static Leontief model. The "static" term refers to the fact that the region is considered only over a single time period T. As we will see, this can be used in a more dynamic sense by successive use of the model over several time periods.

The Clinton County study was carried out, in general, without explicit capacity constraints on the various sectors. Therefore, the system of equations solved in this investigation were of the form given in equations (8) and (9) above. Specifically, in order to determine the solutions for vector X, which gives the activity levels for each of the sectors of our region, we solved equation (9), i.e.,

$$(I - A)X + B = Y$$
$$(I - A)X = Y - B$$
$$X = (I - A)^{-1} (Y - B) \tag{13}$$

As is well known, the Leontief matrix $(I - A)$ is square and non-singular and, therefore, its inverse $(I - A)^{-1}$ exists. In f ct, t⁺is means that

$$X = (I -)^{-1} Y \tag{14}$$

is a solution to the system of equations of the type shown in (3). Further, this solution is unique for the given external demand ec ι Y. Equating the right hand sides of (13) and (14), we obtain the condition that

$$B = 0 \tag{15}$$

In other words, the slack variables are all zero. This is tantamount to saying that the region, if sector capacities are unrestricted, must be able to meet any external demand as given by the external demand vector Y. This follows, for if any element of the slack vector B were greater than zero, this would mean that the corresponding sector had that much <u>unmet</u> demand. The fact that we require equation (15) to hold for all Y, Y > 0, means that there will never be unmet external demand with this particular version of our model. However, by adding appropriate sector capacity constraints, we can produce a system of equations whose solution will involve unmet external demands, i.e., where B > 0. Such a development will be left for a later discussion.

It is perhaps important to explain the requirement of the preceding discussion. The fact that our model does not permit unmet demand is a consequence of the method used to solve the system of equations as presented in (8) and (9). Here the Leontief system is presented in the form of a linear programming problem in which the objective function cX is maximized. The problem, in this case, is solved using the simplex algorithm. Since what we are maximizing is total economic activity, the objective function coefficients vector is positive, i.e., c > 0. In other words, at least one of the coefficients is greater than zero. This means that at least this one sector, under maximization, will meet all its available demand including its external demand from the final bill of goods. Further, maximization will require that it meet the largest possible internal demand from other sectors of the model. This fact, in turn, requires that other sectors achieve the maximum income

possible so that their expenditures in the original sector will be maximal. This leads, finally, to the fact that all available income from the final bill of goods must be obtained. Thus, no matter what the levels of external demand vector Y, it will be met, and the condition of equation (15) will, therefore, be satisfied.

Thus, we see that, for the given external demand vector Y, the model produces a unique solution vector X. This solution is determined by means of $(I - A)^{-1}$, the inverse of the Leontief matrix. We let

$$(I - A)^{-1} = \begin{bmatrix} \alpha_{11} & \cdots & \alpha_{1j} & \cdots & \alpha_{1m} \\ \vdots & & & & \vdots \\ \alpha_{i1} & \cdots & \alpha_{ij} & & \vdots \\ \vdots & & & & \vdots \\ \alpha_{m1} & \cdots\cdots\cdots\cdots & \alpha_{mm} \end{bmatrix} \tag{16}$$

Entries of this inverse matrix are called "interdependency coefficients." The product of one of them with the external demand associated with its column sector yields the direct and indirect response in terms of economic activity of its row sector to this particular external demand input. For example, $\alpha_{ij}Y_j$ is total direct and indirect response of the i th sector of our model to the external demand input of Y_j units by the j th sector of the model.

Logically, if all direct and indirect responses of a given sector are added together, the sum must equal total economic activity of that sector, i.e.,

$$X_i = \alpha_{i1}Y_1 + \alpha_{i2}Y_2 + \ldots + \alpha_{im}Y_m \tag{17}$$

Equation (17) demonstrates how the Leontief inverse is used to determine the entries of the solution vector X.

In order to obtain total response R_j by all sectors of the model to a given external demand input Y_j, we add together the total responses of each individual sector to that input, i.e.,

$$
\begin{aligned}
R_j &= \alpha_{1j}Y_j + \alpha_{2j}Y_j + \ldots + \alpha_{mj}Y_j \\
&= [\sum_{i=1}^{m} \alpha_{ij}] \, Y_j \\
&= m_j Y_j
\end{aligned}
\tag{18}
$$

where

$$
m_j = \sum_{i=1}^{m} \alpha_{ij}
\tag{19}
$$

The number obtained in equation (19) is called the _multiplier_ for the sector involved, i.e., m_j is the multiplier for the j th sector of the model and equation (18) yields the total response of the region simulated by our model to the j th sector external demand Y_j. It is important to note that this response includes both direct _and indirect_ activity of all sectors. Obviously, the quantity

$$
\sum_{j=1}^{m} m_j y_j
$$

which is the sum of direct and indirect responses of the region to all various external incomes, must equal total economic activity of the

region.

In order to understand how this model, developed in general by the preceding discussion, can actually be used for regional analysis, it is necessary to turn to a concrete example.

Numerical Example (5-sector hypothetical model)

Given a region and the desire to represent this region by the type of model just developed, how does one go about it? The problem is essentially one of estimating the necessary parameters of our model from historical data. In this particular example, the data were invented but could have been obtained from actual records over some historical time period of length T. In this example we let T equal one year.

Basic numbers which must be estimated are the input-output coefficients a_{ij}. Here

$$i,j = 1,2,3,4,5$$

To do this, values of x_{ij} for the historical study period are obtained, i.e., the actual flow of funds from sector j to sector i is recorded. Also, values of Y_j, the amount of income from outside the region into each sector, are recorded. From these we can obtain the total of transactions X_i for each sector of our region. In our 5-sector example we have the following transactions matrix.

	S_1	S_2	S_3	S_4	S_5	Y	TOTAL INPUT
S_1	21	0	5	2	0	70	98
S_2	1	5	4	20	0	30	60
S_3	3	12	0	35	5	3	58
S_4	30	1	22	0	2	15	70
S_5	10	7	15	10	3	25	70
Y	33	35	12	3	60		
TOTAL OUTPUT	98	60	58	70	70		

Here the entries are, say, in \$100,000 units. To demonstrate how these numbers relate to our model we give the following examples:

$$x_{34} = 35 \qquad Y_2 = 30 \qquad X_1 = 98$$

To lend realism to the model we identify the sectors as follows:

S_1 Industry

S_2 Agriculture

S_3 Retail and Service

S_4 Households

S_5 Government

Y   Rest of the World

Thus, $x_{34} = 35$ means that \$3,500,000 was spent by households for retail goods and services over the year under study, $Y_2 = 30$ means that farmers sold \$3,000,000 worth of goods outside the region and $X_1 = 98$ means that industry in the region had a gross annual income of \$9,800,000.

By taking the money flow from the j th sector to the i th sector

and dividing by the total flow into the j th sector, we obtain the proportion of the total transactions of the j th sector which flow to the i th sector. In symbols

$$a_{ij} = \frac{x_{ij}}{X_j}, \quad i,j, = 1,2,3,4,5$$

for example,

$$a_{31} = \frac{x_{31}}{X_1} = \frac{3}{98} = .03$$

These are _estimates_, based on historical data, of the input-output coefficients of our model. Calculating these estimates as indicated we obtain a _coefficients matrix_.

	S_1	S_2	S_3	S_4	S_5
S_1	.21	.00	.09	.03	.00
S_2	.01	.08	.07	.29	.00
S_3	.03	.20	.00	.50	.07
S_4	.31	.02	.38	.00	.03
S_5	.10	.25	.26	.01	.04

We demonstrate how these operate in the same manner as the input-output coefficients of our model. Following from equation (2) of our model, we have for the first sector S_1 of our example,

$$X_1 = a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + a_{14}X_4 + a_{15}X_5 + Y_1$$

Substituting our actual values, we have

$$X_1 = (.21)98 + (.00)60 + (.09)58 + (.03)70 + (.00)70 + 70$$

$$= 20.58 + 5.22 + 2.10 + 70.00$$

$$= 97.90$$

which, except for rounding error, is the expected number 98.

Note that each row of the coefficients matrix gives the proportion of each column sector's total money flow which results as income to the sector identified with that row. Also, that each column provides the proportions of that column sector's total income which is disbursed to each sector of the region.

Remember that we have _estimated_ the values of the input-output coefficients. We further assume that the estimated values for these coefficients will describe the relationships between sectors for any future time period. Using these values we have the input-output coefficients matrix for our 5-sector example.

$$A = \begin{bmatrix} .21 & .00 & .09 & .03 & .00 \\ .01 & .08 & .07 & .29 & .00 \\ .03 & .20 & .00 & .50 & .07 \\ .31 & .02 & .38 & .00 & .03 \\ .10 & .25 & .26 & .01 & .04 \end{bmatrix}$$

and the related Leontief matrix

$$(A - I) = \begin{bmatrix} .79 & .00 & -.09 & -.03 & .00 \\ -.01 & .92 & -.07 & -.29 & .00 \\ -.03 & -.20 & 1.00 & -.50 & -.07 \\ -.31 & -.02 & -.38 & 1.00 & -.03 \\ -.10 & -.25 & -.26 & -.01 & .96 \end{bmatrix}$$

The external demand or bill of goods vector, using values from the transactions matrix, can be given initially as follows:

$$Y = \begin{bmatrix} 70 \\ 30 \\ 3 \\ 15 \\ 25 \end{bmatrix}$$

i.e., initially we assume that external demand for each sector in some future time period will be the same as that for the time period supplying the historical data. Of course, external demand can be fixed at any desirable level for a specific time period.

It is the solutions vector

$$X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix}$$

whose values we wish to determine. This is done by adding slack variables to the system of equations and constructing an appropriate objective function. A convenient one that is also useful with respect to deriving information from the model is one in which the objective function coefficients vector is as follows:

$$C = (1,1,1,1,1),$$

i.e., all the coefficients are 1. When the system is solved for the external demand vector Y above by means of the simplex algorithm, we

immediately have a large amount of information available in the simplex
tableau. The solution tableau for our 5-sector example is shown in
Table 1. The solutions stub indicates that each sector of our model is

TABLE 1

FINAL SIMPLEX TABLEAU – 5-SECTOR REGION EXAMPLE

			1	1	1	1	1	0	0	0	0	0
C_j	Basis	X	S_1	S_2	S_3	S_4	S_5	b_1	b_2	b_3	b_4	b_5
1	S_1	98	1	0	0	0	0	1.33	.05	.18	.15	.02
1	S_2	60	0	1	0	0	0	.23	1.17	.30	.50	.04
1	S_3	58	0	0	1	0	0	.40	.36	1.41	.82	.13
1	S_4	70	0	0	0	1	0	.58	.19	.61	1.38	.09
1	S_5	70	0	0	0	0	1	.31	.41	.48	.38	1.09
		356	0	0	0	0	0	2.85	2.18	2.98	3.23	1.37

in solution and the third column from the left yields activity levels
for each sector which make up the solution vector X. Just below the
solution column is given the value of our objective function, 356 units.
Since all objective function coefficients are 1, this is merely the sum
of activity levels for each sector yielding the total economic activity
of the region as a whole. In the body of the table, in the slack
variable columns (b_1, b_2, b_3, b_4, b_5) is found the inverse of the
Leontief matrix of our model. Entries in these columns are the inter-

dependency coefficients. Again, because of the objective function
chosen, the entry at the bottom of each slack variable column is the
sum of the interdependency coefficients in that column. In other
words, they are the multipliers for the sector associated with that
slack variable.

We demonstrate how the entries of our solution tableau provide
various sorts of information. For the input vector

$$Y = \begin{bmatrix} 70 \\ 30 \\ 3 \\ 15 \\ 25 \end{bmatrix}$$

of external demands, Table 1 gives economic activity levels generated
by this demand in the column marked X. The values are, of course,
entries of the solution vector X. At the bottom of the column is found
the sum of all individual sector activity levels, in this case 356
units. This is the total regional economic activity. Interdependency
coefficients can yield the economic response, both direct and indirect,
to external demand of some sector of our region. For example, the
interdependency coefficient for response of S_3 Retail-Service to
external income into the S_1 Industry sector is $\alpha_{31} = .40$. External
demand being met directly by S_1 is $Y_1 = 70$ units. Response of the
Retail-Service sector to this input is $\alpha_{31}Y_1 = (.40)(70) = 28$ units of
direct and indirect economic activity. Total response of the Retail-
Service sector of our example is found by adding the responses to each
individual sector's external demand, i.e., by using all interdependency

coefficients of the S_3 row of Table 1. Thus, total direct and indirect response of the Retail-Service sector is

$$X_3 = \alpha_{31}Y_1 + \alpha_{32}Y_2 + \alpha_{33}Y_3 + \alpha_{34}Y_4 + \alpha_{35}Y_5$$

$$= (.40)(70) + (.36)(30) + (1.41)(3) + (.82)(15) + (.13)(25)$$

$$= 28.00 + 10.80 + 4.23 + 12.30 + 3.25$$

$$= 58.58 \text{ units}$$

The amount calculated is, of course, the activity level for the Retail-Service sector. The answer above is slightly larger than the original activity level for our example of 58 units. This is entirely due to rounding error, since the coefficients used in our example were rounded to two decimal places.

If we desire to know direct and indirect response by the whole region to a given sector's external demand, it is only necessary to find the product of that sector's multiplier and its external demand. These multipliers appear at the bottom of the columns of interdependency coefficients which make up the inverse columns in Table 1. For example, external demand and, therefore, external income for S_2 Agriculture is $Y_2 = 30$ units. The economic multiplier for the Agriculture sector is $m_2 = 2.18$. Thus, total <u>regional</u> direct and indirect response to this input is

$$m_2 Y_2 = (2.18)(30)$$

$$= 65.40 \text{ units}$$

We have tried to demonstrate by means of the foregoing example how

the model used in this study can be utilized for a descriptive analysis of the money flows through a region. As can be seen, the model accurately reproduces the data used to derive it. In addition, information as to direct and indirect money flows can be determined by appropriate use of available input-output coefficients, interdependency coefficients, and sector multipliers. How these are employed will be demonstrated in the discussions which follow.

The modification and/or augmentation of the model in order to simulate economic changes and conduct various economic impact analyses will be found in the section on impact analyses as well as in Volume I. This material has been repeated so that the discussion could take place in the actual context of the 54-sector Clinton County model.

Basic Assumptions of the Model and Implications for Economic Theory

The model developed in this study differs from most other regional input-output models primarily in composition of the endogenous and exogenous variables. Sectors representing households (including labor), governmental activities, and nonprofit organizations are structured, in most models, in the final demand (exogenous) sectors. In other words, they are not considered producing units of the local economy. In the Clinton County model, on the other hand, most of these activities are considered as providing services of one kind or another and so are structured into the internal or endogenous sectors.

By considering labor as a producing activity, and thus including it in the internal sectors, one of the crucial assumptions of the

original Leontief model was dropped -- that labor for production
activity was a scarce factor. All other local resource inputs in the
Clinton County model are also entered under a "no scarcity" concept.
Extreme care must be exercised when introducing new activities into the
model or expanding present ones so that resource capabilities are not
exceeded. For a small region such as a county, exceeding the present
labor supply by a small margin may present no particular problems since
in all likelihood there would be a reserve of labor available in sur-
rounding counties to fill the gap. Reasoning along such lines would
also be applicable to many other factor inputs as well, such as power,
certain raw materials, transportation, intermediate products, food and
other household consumption goods, and most services. For models of
large multistate regions and for national models this assumption can be
very restrictive. The smaller the region incorporated into the model,
however, the less onerous this assumption becomes. It is not clear how
capital resources would be affected by the assumption of no scarcity in
a small region. Local capital may be plentiful but unavailable to local
entrepreneurs. On the other hand, it seems reasonable to expect that
outside capital would invest locally if a particular endeavor appears
profitable. Fortunately, the model is capable of reflecting a distinc-
tion between activities financed with local capital and those financed
with outside capital.

There are four assumptions associated with the structure of the
internal producing sectors. These are:

1) Factors required to produce any good must be used in fixed

proportions.

2) Returns to scale are constant at unity; i.e., the activity operates with a homogeneous production function.

3) There is no joint production. Each activity is assumed to make a single product. The finer the model is sectorized, the less restrictive this assumption becomes.

4) The economic system is in equilibrium, at given prices.

An assumption inherent in the exogenous sectors is that the supply of each export good or service (those produced locally) is perfectly elastic and all prices are given.

There are several basic relationships inherent in the model used in this study. These are:

1) Total quantity of output of an activity is either consumed locally (becomes a factor input to some other local activity), is sold to final demand, or goes into inventories which must, however, maintain a constant proportion to total sector output.

2) Capital expenditures for producers' goods, consumer durables, maintenance of plant and equipment, replacement of capital equipment, and new construction are included in the production functions of business sectors and consumption functions of households. Thus the model is gross of investment expenditures in the current period.

3) The model is net of any capital consumption allowances (depreciation).

4) Household consumption functions are gross of saving. Saving is reflected as a factor payment to the overflow sector.

5) Total value of a sector's sales, whether sold (consumed) internally or externally, is equal to total payments made by that sector for factor inputs, whether purchased internally or externally.

6) It must follow from (5) then, that total external income to the region is equal to total external expenditures by the region. This means that the value of all imports is equal to the value of all exports, leaving the region with a zero net balance of trade for the time period. This follows from the mathematical formulation of the model, where all receipts and expenditures must be accounted for, just as they are in the more familiar double entry accounting procedures. Only under a barter form of economic system and under very primitive living standards could a small sub-national region exist in the absence of trade with the outside world. The primary economic justification for exporting goods and services is to obtain "outside" money with which to buy "outside" goods. If the money coming into the region from the outside is not ultimately spent in this way, but is used instead to augment the supply of "domestic" money, then an inflationary pressure will be generated. This may have the effect of promoting internal activity and raising the level of employment, but once full employment of local factors is reached, further exports not balanced by imports would lead only to inflation within the region. The converse may also hold. An excess of imports over exports (of goods and services) may lead to a decrease in employment of regional factor inputs and a decline of economic activity within the region. It appears perfectly reasonable to expect, then, that over a period of time, for a microregion within a

developed economy, the flow of money into the regional economic system
is approximately equal to the flow of money out of that system.

CHAPTER II

DEVELOPMENT OF THE CLINTON COUNTY MODEL

Data Collection

Virtually all data in this study reflecting money transactions was obtained by field interviewing of randomly selected and/or pre-selected firms and households.[1] This necessitated a knowledge beforehand of the population of business places in the county. The Lock Haven Chamber of Commerce provided a complete listing of industrial firms, but did not have a current listing of retail and service establishments. Yellow pages of the one phone directory for the county were quite helpful, but not all businesses were listed there. The most complete and reliable sources of information of this kind were obtained from lists of all businesses classified by type as compiled by two electric utilities serving the county -- the Pennsylvania Power and Light Company and West Penn Power Company.

A compilation of the above lists provided the "master list" of all business activity in the county. This composite list was then broken down into lists of 89 different kinds of business activities. Because the county is so diverse in its socio-economic structure, these lists were further broken down into four "area" lists for each type of activity. These sub-areas included (1) the greater Lock Haven city

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[1] Most transactions data on governmental activities was obtained from secondary sources.

area, (2) the northern mountainous section of the county including Renovo,[1] (3) the residential and business area along the Susquehanna River valley from Lock Haven to the eastern border of the county, and (4) the southern ridge and valley section of the county, which is largely devoted to agriculture, predominantly dairy farming. In some cases, a particular activity occurred in only one or two sub-areas. The Lock Haven area was the only one containing representative activities for all 89 sectors.

All industrial activity sectors were sampled 100 percent, along with financial institutions, department and variety stores, utilities, and governmental units. For those sectors containing a large number of individual firms (such as gas stations, churches, and the like) a random sampling of 20 percent of all firms in each sub-area was made. Sectors that contained only a few individual firms (such as wholesale distributors) were sampled at a 50 percent rate. Other sectors were sampled at rates varying between 20 and 50 percent. The decision as to the size of the interview sample for each activity sector was largely an arbitrary one and was based on two considerations: (1) the number of individual firms comprising that particular sector and (2) the importance or significance of the sector to the economy of the region. The latter was mainly an intuitive judgement; e.g., farm equipment dealers were thought to exercise a greater economic role in the commu-

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[1] This portion of the county is typical of the Appalachian section of the state and includes about three-fourths of the area of the county, although only a small proportion of the population. It contains a disproportionately large share of the low income families in the county.

nity than shoe repair shops. Therefore, they should be sampled at a higher rate, even though the number of firms in both sectors was the same.

In some sectors, firms were pre-selected for interviewing. As an example, large chain stores in the food stores category, two large automobile dealers in the auto dealers sector, and a dominant contractor in the construction sector. When pre-selection of firms occurred in a sector, a random selection of the remaining firms was made. Tabulation of data for these sectors, following completion of the interviewing, incorporated a separate accounting procedure for pre-selected firms. In all sectors where random selections were made, a table of random numbers was used to select the firms to be interviewed.

A prior listing of the universe of households in Clinton County was clearly impractical and, of course, unnecessary. Selection of households for interviewing in the incorporated municipalities[1] was accomplished by using a table of random numbers and the telephone directory for each municipality. Five percent of the households on each page were randomly selected. These provided only a base address, because use of these households for interviewing would have biased the sampling against homes without telephone service. Interviewers were instructed to actually contact and interview the household located two doors away from the base address in a predetermined direction. If this was impossible (e.g., the end of a street) the interviewer then went in

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[1] City of Lock Haven and Boroughs of Flemington, Mill Hall, Renovo, South Renovo, Avis, Beach Creek, and Loganton.

the opposite direction. In the case of apartment or multiple dwelling units, each apartment within a building was considered as a separate address, so that it was possible to interview a household within the building despite the "two doors away" rule.

Households not located in municipalities -- primarily rural households -- were selected for interviewing in an entirely different fashion. A grid of approximately one mile square blocks was drawn on a large 1962 general highway map of the county, which showed all cultural features, including private dwelling units. Four sub-areas were then delineated conforming to the three major valley systems in the southern portion of the county and the northern mountainous portion (Allegheny Plateau section). Blocks were then numbered consecutively for each of the four stratifications, and, by means of a table of random numbers, blocks were selected until approximately 5 percent of all households indicated on the map for each sub-area had been chosen. Every occupied household in each selected block was then visited and interviewed. In these areas, some households were farm households, and, along with the regular household data gathered, information was sought in connection with farming activities. This latter information was compiled to provide data for the agricultural sector.

If a household refused to cooperate in the survey, another household was chosen by the interviewer. If in a municipality, the interviewer contacted the household two doors away from the base address, but in the opposite direction. If in a rural block, the interviewer selected the nearest household located outside the block on the same

road. When a business firm rejected an interviewer, another firm in that same sector and sub-area was randomly selected. In all cases -- for both firms and households -- attempts were made to maintain the sampling rate previously decided upon. Towards the end of the survey period, time did not permit replacing last minute rejections of business firms, so in some sectors the desired sampling rate was not achieved.

All governmental units were sampled, including federal, state, and local. For all local governmental units, except the county government, data on income and expenditures was obtained from Harrisburg, where these units file detailed annual reports on their finances. For the county government and the state and federal activities in Clinton County, data was gathered by personal interviewing of each office.

Prior to field contact by the interviewer, a letter was sent to all firms and nonprofit organizations selected for interviewing. This letter explained the purpose of the study and solicited the cooperation of the recipient. A sample of the letter sent to industrial firms is included in the Appendix, Figure A. Letters sent to commercial and nonprofit respondents followed much the same format.

Concurrent with the sending of letters, two local newspapers serving the county provided excellent cooperation in publicizing the study, explaining its purpose, and asking local merchants and residents to cooperate. This was done on several occasions during the data gathering period.

The business and nonprofit questionnaires originally devised were

tested on a number of selected firms and organizations in Clinton County prior to the main interviewing. Weaknesses and omissions that became apparent were remedied in subsequent questionnaires. There were 13 different types of questionnaires used. Samples of these appear in the Appendix, Figures B through N inclusive.

Some weaknesses appeared only after a substantial number of returns had been received or after the data had been compiled. The question asking for employment data and payroll (question number 3 on the Industrial Survey) proved to be poorly worded and designed, resulting in some confusion. The payroll information portion (referring to wages and salaries paid in dollars) should have been more explicit or should have been contained in a separate question. Once this fault became obvious, interviewers were instructed to point this out to respondents and to be alert for questionnaires improperly completed. Questions 10 and 11 on the Industrial Survey (also appearing as other numbers on other types of questionnaires) proved to be superfluous and served no useful purpose for this study.

Interviewers were given a short training session in the use of the questionnaires and carefully instructed as to the meaning of each question and the specific information desired. Questionnaires were not mailed -- all firms and households selected for interviewing were contacted personally by the interviewers. In the case of business firms, nonprofit organizations, and governmental units, questionnaires were usually left with the respondent to fill out at his convenience, the interviewer stating when he would return to collect the form. This,

perhaps, gave a little too much leeway for the respondent, because call-backs for uncompleted questionnaires proved to be a major effort and source of frustration for the interviewers toward the end of the survey period.

There were two household questionnaires -- one for municipal households and one for rural households. Since the municipal question-naire is embodied in the rural form, only a sample of the latter is given (see Figure O, Appendix). Question numbers 20 to 40 inclusive, Figure O, comprise the entire municipal household questionnaire. To answer question 40, a small slip of paper (Figure P, Appendix) was handed to the respondent by the interviewer, and the respondent was asked to merely give the letter corresponding to the total annual 1963 household income. Household questionnaires were not left with the household; the interviewer completed them during the course of the interview.

In very few cases did households have firm data for many of the questions -- they were largely estimates. This is why, for example, in question 20 (Figure O) expenses per trip were requested rather than annual expenditures. It was felt a better estimate could be made by households on this basis. A shopper usually knows about how much money he started off with and about how much he had upon returning, whereas if asked to state his purchases on a yearly basis his estimate would probably be much less reliable. For the same reason, question 22 was structured in the same manner. In asking question number 23, inter-viewers were instructed to use weekly or monthly figures for some of

the items if this provided an easier estimating basis for the respond-
ent. In all cases where data reflected expenditures of less than a
year's time period, values were corrected to annual figures for incor-
poration into the matrix.

Interviewing of businesses, nonprofit organizations, and nonurban
households was done by six graduate students at The Pennsylvania State
University. All initial contacts were completed in about three months,
but it required another month to secure the return of all outstanding
questionnaires. A total of 622 industrial, business, nonprofit, and
governmental establishments were included on the interview lists
(Table 2). Of this number, 62 were governmental offices whose data
were secured direct from Harrisburg. Table 2 shows sampling rates,
number of completed returns, and percentage of completed returns by the
major groups of establishments.

TABLE 2

NUMBER OF INTERVIEWS AND NUMBER OF
COMPLETED RETURNS BY TYPE OF ACTIVITY

Type of Activity	Number of Establishments	Sampling Rate %	Number Contacted	Number of Completed Returns	Completed Returns %
Industrial	75	100	75	62	83
Business	954	40	383	250	65
Nonprofit	176	35	62	47	76
Governments	102	100	102	102	100
Total	1,307	48	622	461	74

In addition to the above, there were 476 household interviews, of which 295 were from municipal areas and 181 from rural areas. Most of the municipal household interviewing was done by five wives of faculty members of Lock Haven State College. These women also interviewed beauty shops in the Lock Haven area. They completed their interviewing in about one month.

Matrix Construction

Compilation of data from all 937 returned questionnaires (476 household and 461 nonhousehold) was a time consuming and tedious procedure. Household data was processed by computer, but it was felt that more realistic results could be obtained by "hand" processing nonhousehold data.

All business, nonprofit, and governmental data was transferred to data processing cards. Print-outs of these data by sectors and sub-areas were used as work sheets for expansion of the data by appropriate "expansion" factors. Expansion factors varied from one sector to another due to variation in sampling rates between sectors. Furthermore, expansion factors varied between sub-areas within each sector because of differences in the number of acceptable and completed returns for each sub-area and pre-selection of some firms for interviewing. Data from these latter firms were not expanded for inclusion into the matrix. Totals were obtained for sub-areas for each sector and finally a summation was made of all data by sectors for the entire county. These latter totals showed amounts of expenditures for various

kinds of inputs and amounts of income from various sources, both internally and externally, for each sector. These data were then transferred to the matrix.

The 89 different kinds of business activities that were delineated for data-gathering purposes were aggregated into 54 activities or sectors for the final matrix. For example, the original master list of Professional Personal Services was broken down into separate lists for Doctors, Lawyers, Morticians, Accountants, and the like. Interview selection was then made from these lists. For the matrix, however, these were all combined into one sector.

In allocating data from the work sheets into various sectors of the matrix, judgement had to be exercised in many instances. For example, firms were requested to show total expenditures, both internally and externally, for maintenance and repair of buildings. The total value of this internal expenditure item for any one sector could be shown as a payment to either the Hardware and Building Materials sector or the Construction sector or both. An arbitrary allocation between the two sectors was first made in a "trial" matrix. When all data from the work sheets had been entered, total income as reported by the receiving sector was compared to total expenditures into that sector as allocated from the work sheets. In some cases, expenditures into a sector exceeded income as reported by that sector. In other cases the reverse was true. Adjustments were then made to reconcile differences. To continue our example, if expenditures into the Hardware and Building Materials sector exceeded total income as reported by

these firms, and the opposite existed for the Construction sector, then
adjustments in the payments for building repair and maintenance were
made between these two sectors. In most all instances where adjust-
ments of this type had to be made, total internal income as reported by
sectors was given preferential weight. In other words, to achieve a
balancing of internal flows between sectors, reported internal income
was changed only when such adjustments could not reasonably be made on
the expenditures side.

No such "balancing" could, of course, be made for external incomes
and expenditures. For this reason, these values by sectors were
assumed to be reliable estimates. Only as a very last resort were
these changed to achieve a balancing of the matrix. Again, preference
was given to reported income rather than expenditures.

A total of approximately nine man-months was required for coding,
aggregation and compilation of the data, and for matrix construction.

Sectoral Description of the Clinton County Matrix

Several industrial sectors in the original 54 by 54 matrix had to
be aggregated in order to avoid disclosure of data on individual firms.
The condensed matrix is shown in Table 3; the sectors being numbered to
conform to the original matrix. All subsequent problems and impact
analyses, however, were processed on the full 54 by 54 matrix.

Table 4 shows the matrix of technical coefficients and Table 5 the
matrix of interdependency coefficients. Interpretation and meaning of
these three tables is described elsewhere in this volume and in

TABLE 3: TRANSACTIONS MATRIX - CLINTON COUNTY, PENNSYLVANIA - 1963. ($1000 units)

Sector Producing	Total Internal	Recreation 55	State B 56	Fed B 57	All other Ex-ternal 58	Total Ex-ternal	Total Income	Sectors
Mining 1	187				1,723	1,723	1,910	1
Food Processing 2	1,569				2,691	2,691	4,260	2
Textiles 3	110				16,626	16,626	16,736	3
Mat'l Proc. 4,5,10	2,930			1826	37,793	37,793	40,723	4,5,10
Prntg., Publ. 6	601			2	149	149	750	6
Fabr. & Assem. 9,11	140				38,752	38,752	38,892	9,11
Chemicals 12	308				9,199	9,199	9,507	12
Sawmills 14	85			5	30	30	115	14
Pulpwood 15	226				226	226	226	15
Agr. Feeds, Fert. 16	525			21	138	159	684	16
Misc. Ind. 7,8,13,17	361				1,511	1,511	1,872	17
Agriculture 18	1,365			144	1,701	1,845	3,210	18
Education 19	140	993		61	668	1,722	1,862	19
Food Stores 20	9,164	96			469	565	9,729	20
Gas Stations 21	3,196	1061			458	1,519	4,715	21
Auto Dealers 22	7,590	43	3		3,306	3,352	10,942	22
Clothing 23	2,623	127			513	640	3,263	23
Bars, Restaurants 24	2,398	299			139	438	2,836	24
Jwlry, Drgs, Sprt. 25	1,361	68			232	300	1,661	25
Furn. & Appl. 26	2,850	10			490	500	3,350	26
Hrdwr, bld Mat 27	3,401	134			444	578	3,979	27
Dep't & Variety 28	4,513	98	2	4	750	854	5,367	28
Farm Equipment 29	893				335	335	1,228	29
All other Retail 30	1,553	28			446	474	2,027	30
Hotels, Motels 31	140	354			502	856	996	31
Ent. & Recr. 32	469	8			21	29	498	32
Finance 33	1,805		533		137	670	2,475	33
El. Est. Insur. 34	3,183				152	152	3,335	34
Laundry 35	318	5			104	109	427	35
Prof.Pers.Serv. 36	1,538	5	1		678	684	2,222	36
NonProf.Per.Serv. 37	1,001	16			1,122	1,138	2,139	37
Transportation 38	3,757			1	3,126	3,127	6,884	38
Construction 39	3,896		13	130	1,084	1,227	5,123	39
Wholesale 40	7,142	117			4,852	4,972	12,114	40
Electric 41	2,600	70	2	3	75	2,675	41
Phone 42	1,526	17	1		21	1,547	42
Water,TV,Radio 43	852			3	67	70	922	43
Nonprofit 44	3,969	33	22	43	1,428	1,526	5,495	44
Local Gov't 45	974		252		252	1,226	45
Public Schools 46	1,622		2398	40	179	2,617	4,239	46
County Gov't 47	593	79			13	92	685	47
State A Gov't 48	565	16	847		863	1,428	48
Federal A Gov't 49	431		47		47	478	49
Labor 50	49,454	194	8	311	7,328	7,800	57,254	50
Rent 51	2,704	97	11	3	27	138	2,842	51
Transfer 52	1,690		987	4723	5,710	7,400	52
Proprietary 53	6,959				1,285	1,285	8,244	53
Overflow 54	1,944				788	788	2,732	54
Total Internal	147,211	2702	5771	6074	141,456	156,003	303,214	
External Labor 55	6,944				309	14	41	45	55
State B Gov't 56	3,509				3138	148	414	452	56
Fed. B Gov't 57	16,470				7407	348	977	1067	57
All other External 58	129,080				7972	449	997	1149	58
Total External	156,003				15,688	791	2015	2261	
Total Expenditures	303,214							

TABLE 4: MATRIX OF TECHNICAL COEFFICIENTS - CLINTON COUNTY, PENNSYLVANIA - 1963.

		Mining 1	Food Proc. 2	Tex- tiles 3	Mat'l Proc. 4,5,10	Prntg Publ. 6	Fabr. Assem. 9,11	Chem- icals 12	Saw- mills 14	Pulp- wood 15	Agri. Feeds Fert 16	Misc. Ind. 7,8, 13,17	Agri- cltr 18	Educ- ation 19	Food Stores 20	Gas Stns 21	Auto Dlrs 22	Cloth- ing 23	Bars Rstrnt 24	Jwlry, Drugs, Spring 25	Furn. Appl. 26	Hrdwr Bldg. Mat. 27	Dept. Varty 28	Farm Equip. 29	All Other Rtl. 30	Hotel Motel 31	Ent. Rec. 32	Fin- ance 33	Real Est. Ins. 34	Laun- dry 35	Prof. Pers. Serv. 36	Non- Prof. Pers. Serv. 37	Trans- port 38	Const- ruct 39	Whole- sale 40	Elec- tric 41	Phone 42	Water TV Radio 43	Non- Prft 44	Local Govt 45	Public Schools 46	County Govt 47	State A Govt 48	Fed. A Govt 49	Labor 50	Rent 51	Tran- sfer 52	Pro- prie- tary 53	De- ple- tion 54	Sec- tor

[Table 4: Matrix of Technical Coefficients — Clinton County, Pennsylvania — 1963. A 54 × 54 input-output matrix of technical coefficients. The rows are the 54 sectors (Mining; Food Processing; Textiles; Mat'l Proc.; Prntg., Publ.; Fabr. & Assem.; Chemicals; Sawmills; Pulpwood; Agr. Feeds, Fert.; Misc. Ind.; Agriculture; Education; Food Stores; Gas Stations; Auto Dealers; Clothing; Bars, Restaurants; Jwlry, Drgs, Sprt.; Furn. & Appl.; Hrdwr, Bldg. Mat'l; Dep't & Variety; Farm Equipment; All other Retail; Hotels, Motels; Ent. & Recr.; Finance; Real Est. & Ins.; Laundry; Prof.Pers.Services; Non-Prof.Pers.Serv.; Transportation; Construction; Wholesale; Electric; Phone; Water, T-V, Radio; Non-Profit; Local Govt.; Public Schools; County Gov't; State A Gov't; Federal A Gov't; Labor; Rent; Transfer; Proprietary; Overflow), followed by Total Internal, Total External, and Sector summary rows.]

TABLE 5: MATRIX OF INTERDEPENDENCY COEFFICIENTS - CLINTON COUNTY, PENNSYLVANIA - 1963

Volume I. The remainder of this portion of the report will deal with a brief description of each of the sectors.

Sectors 1 through 17 comprise the industrial activities in the county. All manufacturing and processing occurs in these sectors and they are the largest sellers of goods to the outside world. They can, therefore, be considered the county's basic economic activities.

Sector 1, Mining. Eight firms are included in this sector, of which six are coal producers (bituminous), one a fire clay producer and one firm the operator of a stone quarry. Two coal mining firms have annual production in excess of 100,000 tons. The smallest coal producer has a production of only several hundred tons per year.

Sector 2, Food Processing. Included in this sector are four meat processing firms, four dairy products firms, two bakeries, two flour mills, a fish hatchery, and a bottling plant. One flour mill is unique in that it is still run entirely by water power.

Sector 3, Textiles. Three mills are included in this sector. Two of these are branch or division plants. The third mill is locally owned and manufactures nationally known products.

Sectors 4, 5, 10, Material Processing. A diverse group of firms comprises this aggregated sector. Three woodworking plants, one of which manufactures chair frames, were contained in the original sector 4. Sector 5 included the New York and Pennsylvania Company, a large pulp and paper mill which at the time of the survey was a subsidiary of the Curtis Publishing Company. (More recently the mill has been acquired by the Hammermill Paper Company.) A paper converting firm,

Clinton Paper Company, was also included in this sector. Sector 10 was made up of two firms -- General Armature (subsidiary of Maremont Corporation) and a small family operated machine shop.

Sector 6, Printing and Publishing. Seven firms are included in this sector, two of which publish daily newspapers -- the Lock Haven Express and the Renovo Daily Record. Four of the remaining printing firms are small family operated businesses.

Sectors 9, 11, Fabrication and Assembly. Sector 9 originally comprised a steel fabricating firm -- the Jersey Shore Steel Company. Sector 11 contained the Piper Aircraft Corporation and a mobile homes manufacturer, Capital Coach Company. All three firms are largely locally owned. During 1963 Capital Coach Company operated a branch plant in the Renovo area. This plant has recently been acquired by another mobile homes manufacturer (Divco Wayne Corporation).

Sector 12, Chemicals. Four chemical plants are included in this sector plus a branch plant of a firm making a bituminous road paving material. Three of the chemical firms are locally owned. The fourth is a branch plant of American Aniline Company.

Sector 14, Sawmills. Four small locally owned and operated sawmills utilizing local timber are included in this sector.

Sector 15, Pulpwood. Twelve pulpwood producers supplying the local paper mill comprise this sector.

Sector 16, Agricultural Feeds, Fertilizers. Four feed mills that grind and mix livestock feeds and one fertilizer producer make up the firms in this sector.

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Sectors 7, 8, 13, 17, Miscellaneous Industries. Sector 7 includes
a clay products manufacturing firm utilizing locally mined fire clay.
Sector 8 includes a cement products firm manufacturing cesspools and
other concrete products. Sector 13 includes two aircraft instrument
repair firms. Sector 17 includes a firm manufacturing a specialty item
made of fur for the textile industry, and a firm making fishing lures.

Sector 18, Agriculture. All farming activities are included in
this sector. Data from 25 farms were obtained from the rural household
survey. All farming activity takes place in the southern portion of
the county, and, except for an area east of Lock Haven in the Susque-
hanna River valley, dairying provides the largest source of income. In
the Lock Haven area there are a number of large truck farms raising
potatoes and other produce.

Sector 19, Education. The Lock Haven State College, a state sup-
ported institution, is the only activity incorporated into this sector.
Since the bulk of its revenue, either from tuition or public funds,
comes from nonlocal sources, it can be considered as an important basic
activity.

Sectors 20 through 30 are made up of all retail activities in the
county. Most of the income for each of these sectors is derived from
purchases by local firms, organizations, and households, primarily the
latter. Each sector does make some sales to outside buyers, however.
This latter portion of income can be considered basic in nature,
although in the aggregate these sectors must be considered nonbasic.

Sector 20, Food Stores. There were 91 food stores in Clinton

County in 1963. Of these, five were branch stores of major chains, and data on these stores was processed separately, except in the case of one store which refused to cooperate. Many of the remaining stores were located in rural areas and sold items other than food and groceries, particularly gasoline. In such cases, food and grocery sales comprised the larger share of total income.

Sector 21, Service Stations. As in the case of food stores, some of the 108 gas stations that comprised this sector sold items other than gasoline and oil products and car servicing. Unless these other sales (primarily food and grocery items) were greater than gasoline sales, the firm was classified in this sector.

Sector 22, New and Used Car Dealers. Thirty firms were included in this sector, of which two were pre-selected for interviewing because of their size.

Sector 23, Clothing Stores. There were a total of 29 stores in this sector. Total sales of all these stores does not reflect the total income received in the county during the year from the sale of clothing items, however. Many department and variety stores also sold substantial amounts of clothing; these sales are not included in this sector. This same reasoning is also applicable to sales of other retail items, such as household furnishings, hardware materials, and the like.

Sector 24, Bars and Restaurants. These establishments, of which there were 102 in 1963, are included in the retailing sectors primarily because a commodity that exchanges hands is involved. It was felt a

distinction was necessary between retailing and service establishments, and the basic criteria was whether a good of some kind was involved in the transaction, as opposed to a service function in which there is no commodity exchange. Some bars and restaurants were located in hotels (particularly in the rural areas) and consequently a portion of the total sales for this sector represents income from lodging.

Sector 25, Jewelry, Drug and Sporting Goods Stores. There were too few firms in each of these three retailing categories to make a meaningful separation. There were 21 establishments in this combined grouping in 1963.

Sector 26, Furniture and Appliance Stores. Out of a total of 34 establishments in this sector, two were pre-selected for interviewing. For some of the establishments in this category, servicing charges make up a large share of the income. But as long as the retailing of consumer durables occurred, the firms were included in this sector.

Sector 27, Hardware and Building Materials Dealers. Twenty-three hardware stores and other retail outlets for building materials, such as lumber supply firms, are included in this sector. In addition, there were 12 coal yards also incorporated in the sector. Much of the income to these establishments originates from contractors in the construction sector and is wholesale in nature. But unless only a very minor share of total income came from retail sources, the firm was considered a part of sector 27.

Sector 28, Department and Variety Stores. There were 12 firms in this sector, including such nationally known chains as F. W. Woolworth,

Sears Roebuck, Montgomery Ward, and others. Three firms were locally owned establishments.

Sector 29, Farm Equipment Dealers. These firms primarily sell farm equipment to the agricultural sector. In addition, some sell garden tools and supplies to nonfarm households and construction equipment to contractors. There were a total of six firms in this sector.

Sector 30, All Other Retail Stores. Retail establishments not fitting any of the above descriptions were all grouped together into this miscellaneous retailing sector. Such businesses as florists, gift shops, stationery stores, nurseries, hobby shops, music stores, a livestock auction, and other specialty stores were included in this sector. There were a total of 51 such firms.

Sector 31, Hotels and Motels. This and the next six sectors comprise the service sectors portion of the model. In 1963 there were a total of 30 hotels and motels which were included in sector 31. Although a number of these establishments also had bars and/or restaurants in conjunction with the hotel or motel, the main business activity appeared to be that of providing rooming services.

Sector 32, Entertainment and Recreation. Movie theatres, a playhouse for stage productions, bowling alleys, minature golf, and other such forms of recreational services comprised this sector. A total of 12 firms are represented in the matrix.

Sector 33, Finance. Six banks, five consumer credit firms, and a savings and loan association are included in this sector. Numbers in the matrix do not reflect the values of new deposits, new loans, or

payments on the principal of outstanding loans. They only reflect income (interest and other service charges) earned from loans or amount of interest paid to owners of time deposits, plus current operating costs of the institutions themselves. Therefore, there are no transactions included in this sector's income row or expenditures column that reflect absolute values of the transfer of capital resources.

Sector 34, Real Estate and Insurance. A total of 32 firms are included in this sector. Most real estate firms are locally owned, but only one insurance company is locally owned with head offices within the county. The remainder of the insurance offices are agents for national insurance firms. Matrix values show only premium payments for insurance, not amount of claims paid, except in the case of hospitalization. Hospitalization claims paid to clients are included in values shown in the expenditures column for this sector. For the real estate transactions portion of this sector, only commissions and fees are shown in the income row. Capital values of real estate transfers are not included.

Sector 35, Cleaning and Laundry. Ten firms, including coin operated laundromats, are included in this group.

Sector 36, Professional Personal Services. There were 99 professionally trained persons running their own businesses included in this sector. A breakdown shows 43 doctors and dentists, seven lawyers, nine morticians, five accountants, two veterinarians, and four miscellaneous professions (engineers, surveyors). In addition, 29 nurses available for private nursing duty were included. As a group, this sector had

the poorest rate of response to field interviewing.

Sector 37, Nonprofessional Personal Services. This sector in-
cluded all those business services that required skills at a less than
professional level. Included were 24 barber shops, 35 beauty shops,
plus about 60 metal, woodworking, radio and television repair, shoe
repair, refrigeration repair, watch repair, and upholstery repair
shops, and music and dance studios.

Sector 38, Transportation. This sector included 13 trucking
firms, two railroads (Pennsylvania and New York Central), three gas
transmission pipelines, two taxi firms, and one bus firm. Although one
of the gas transmission firms operates extensive underground gas stor-
age facilities in the county (Leidy Field), it was included in this
sector. Also included in this sector are the Pennsylvania Railroad
repair shops at Renovo, the principal industry of this community.

Sector 39, Construction. Eleven general contractors and 24
specialized contractors, such as electrical, plumbing, roofing, mason-
ry, and excavating, were included in this sector. This sector receives
as income the new internal capital construction expenditures from other
sectors of the model, plus some of the building maintenance and repair
costs of these sectors.

Sector 40, Wholesalers and Distributors. This sector is comprised
of eight beverage distributors, 11 oil and gasoline distributors, four
food wholesalers, four salvage and second-hand parts establishments,
and seven miscellaneous wholesalers.

Sector 41, Electric Utilities. Two power companies (The Pennsyl-

vania Power and Light Company and West Penn Power Company) serve the Clinton County area and were included in this sector.

Sector 42, Telephone Utilities. Two locally owned telephone companies serving small areas of the county plus the Bell Telephone Company of Pennsylvania and Western Union Telegraph Company were the firms included in this sector.

Sector 43, Water, Gas, Television, and Radio Utilities. Included in this sector were nine local water and sewage utilities, some of them very small; 14 television cable companies; one radio broadcasting firm; and two gas utilities.

Sector 44, Nonprofit Organizations. This was the largest non-household sector in the model, insofar as number of units was con-cerned, and contained 176 different organizations. Included were 97 churches, 42 fraternal organizations, 16 social agencies, 16 volunteer fire companies, and five unions.

Sector 45, Local Governments. These included 21 township ac-counts, seven borough accounts, and four separate accounts for the City of Lock Haven (City account, water fund, library fund, and highway aid fund).

Sector 46, Public Schools. Included in this sector were the accounts of four school jointures and 27 school districts.

Sector 47, County Government. All accounts for the various activ-ities of the Clinton County government were included in this sector.

Sector 48, State A Government. All agencies of the state govern-ment carrying on business activities through a local office were

included in this sector. Such activities as the Pennsylvania Department of Forest and Waters, the State Game Commission, the Fish Commission, the Pennsylvania Department of Highways, the State Liquor Control Commission, the State Employment Service, the State Board of Public Assistance, the State Department of Health, and the Pennsylvania National Guard all maintained local offices or stores in the county.

Sector 49, Federal A Government. This sector is the federal counterpart of state sector A and included 18 United States Post Offices, the local accounts of the Veterans Administration office, the Extension Service, a Federal Fish Hatchery, and a local office of the Army Corps of Engineers.

Sectors 50 through 53, the Households Sectors. Households were disaggregated into these four sectors in order to show more explicitly sources of household income. Sector 50 shows all income earned from wages, salaries, and commissions, whether from local or nonlocal employment. The nonlocal income reflects the earnings of those county residents commuting to jobs outside the county. Sector 51 shows all rental payments for residences and places of business. It was assumed that when such payments were made locally these were to households rather than to firms engaged in the business of rental of real property. Sector 52 shows all transfer income received by households. For the internal portion of the model, this income reflects dividend payments from incorporated enterprises, retirement or pension payments, and interest payments from local banks for time deposits. From external sources, this form of household income would include all of

the above forms of payments but only those from nonlocal firms, plus government transfer payments such as social security, unemployment compensation, public assistance, Veterans Administration payments, and the like. It also included an imputed value for surplus food distributed to local households. Sector 53 shows the proprietary income or profits accruing to local households from unincorporated business enterprises. It was, in affect, the "balancing" sector of the model. After summing up all income and expenditures of local unincorporated businesses by sectors, any excess of income was assigned to this sector as a net return to the owners. Within any sector, some firms may have shown a net loss while others indicated a net profit. A value shown in this sector row is the net balance of profits and losses for all individual firms in that sector.

Household expenditures (columns 50 through 53) reflect a single household consumption function, but apportioned among the four sectors based on the contribution each sector makes to total household income. This may not be too realistic, as there may be significant differences in average household incomes according to the four sources of household income.[1] This was not tested in the model, but it can be shown that there are both high and low income households in all four sectors. Refinement of the model to include household consumption functions reflecting varying levels of household incomes may be an improvement.

Sector 54, Overflow and Depletion. This sector was introduced

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[1] High income households would not show the same consumption function as low income households.

into the model to account for sectors which, on balance, showed negative profits (depletion column) and to show the retained profits of locally owned corporate enterprises, or the net savings of local households (overflow row). Some sectors, due to unusually high capital expenditures for new construction, showed a net loss in their monetary transactions for the year. Since the internal sum of this capital expenditures column was greater than the sum of retained earnings and household savings, money was introduced into the model to make up for the deficiency. This amounted to $788,000 and is shown as an external "investment" in the local economy. It is to be hoped that in future models this crude handling of capital accounts can be refined so as to more accurately portray the vital role capital investment plays in economic development within a region.

Sector 55, External Labor (row) and Recreation (column). Since a disaggregation of the independent variables is not necessary for the mathematical solution of the model, rows and columns in this portion of the matrix need not coincide with each other as they must in the internal or dependent variable portion. Row 55 (external labor) shows amounts paid by local firms for labor commuting into Clinton County from outside the region. These are nonresidents of the county working in local establishments. Column 55 (recreationists) shows the expenditures made by nonresident outdoor recreationists in Clinton County during the year. These are primarily tourists, people owning summer vacation homes in the county, and hunters and fishermen.

Sectors 56 and 57, State B and Federal B Governments. These are

the nonlocal government agencies that take taxes, fees, license costs, and other payments from the local economy and make payments into the local economy for such things as transfer payments, educational support, price support payments for agricultural commodities, locally produced goods and services, and the like. Local business firms paid business taxes, sales taxes, excise taxes, employers share of social security payments, unemployment compensation, and so forth. Households paid their share of social security payments, income taxes, sales taxes, license and registration fees, fines, and the like into these two sectors.

Sector 58, All Other External. This sector included all nonlocal purchasers of Clinton County goods and users of services sold to the outside world, other than the purchases by recreationists and the state and federal governments. It also included those firms or individuals selling goods and services to Clinton County firms and households other than those mentioned above. These external private buyers constituted the main market for the products of the county. Virtually all the goods and services not available locally were purchased from external suppliers. Proximity of these nonlocal buyers and sellers had no relevance insofar as this model was concerned -- they could be located in an adjoining county or in a foreign country.

CHAPTER III

MULTIPLIER ANALYSIS

The column sum of interdependency coefficients for any given sec-
tor shows the amount of direct and indirect economic activity that will
be generated by the economic system as a whole in order for that sector
to meet one dollar of final demand. These sums have been called
"export demand multipliers" and are shown in the bottom row of the
interdependency coefficients matrix (they are also shown in column 2,
Table 1, of Volume I). These multipliers have value in showing the
interdependency of any one sector with other internal sectors of the
system and the relative contributions to the economy from basic exter-
nal income of each sector. They can be somewhat misleading, however,
if one is primarily concerned with the benefits accruing to the people
of a region as a result of the exporting of goods and services. Much
of the money flowing through a regional economy does not end up or is
not "available" for use by the people. Many times multiple accounting
of the same dollar occurs as it passes from one sector to another.

A more meaningful and realistic estimate of economic returns to
the residents of a region as a result of export activities would be the
sum of the direct and indirect returns to households (sectors 50
through 53), local governments (sectors 45 through 47) and nonprofit
organizations (sector 44). These returns may be appropriately called
the "residual county income." They would approximate the net economic

returns to the county and would be somewhat analagous to a value added figure for a regional economy. They may be computed by individual sectors or for the economy as a whole.

Multiplier values for each of the three components of residual county income for any sector can be obtained directly from the interdependency matrix, Table 5. Summing these would give a residual income multiplier by sectors. Taking sector 3 (textiles) for example, the sum of the four household interdependency coefficients is .355, the sum of the three local government coefficients is .013, and the nonprofit interdependency coefficient is .018. The sum of these three residual income component multipliers is .386. This is the residual income multiplier for this sector. Multiplying each of these multipliers by the level of export demand for sector 3 ($16,626,000) gives the absolute value of the components and the total direct and indirect amount that textile firms in the county contribute to residual county income. This latter figure would be $6,418,000. For the household component alone, the absolute value is $5,902,000 (.355 x $16,626,000). Since sector 3 contributed directly to households $4,391,000 (sum of rows 50 through 53, column 3, transactions matrix), the indirect portion amounts to $1,511,000. This indirect portion represents the value of economic activity that households not directly employed in textile firms earned in "supporting" those households who received direct income from these firms. These "indirect" households would be primarily engaged in retailing and servicing activities in the county from which "textile" households made purchases. This illustrates the interdepend-

ency of basic and nonbasic activities in the economy. Households provide the major link between basic and nonbasic activity through their expenditures for the goods and services needed to sustain the well-being of the home and family.

Table 6 shows, by sectors, the residual income component multipliers, the total residual county income multiplier, and the absolute value of residual county income. It must be remembered that Table 6 is interpreted in terms of final demand; i.e., values shown in column 5 are direct and indirect contributions to residual income made by the sectors named at the left. Direct contributions from final demand for any sector are obtained by multiplying the appropriate technical coefficients times final demand for that sector. The indirect portion only from final demand is then the difference between this product and the absolute sector value shown in column 5, Table 6.

One of the most striking features of Table 6 is the comparatively low residual income multipliers of the retail sectors group as compared to the industry sectors group and the service sectors group. A composite residual income multiplier for the 11 retail sectors is .301, while the 11 industry sectors shows a composite multiplier of .412, and the seven service sectors a composite multiplier of .766. This follows the same trend as does the export demand multipliers for these three groups, although the trend in the case of the latter multipliers is not as pronounced (see Table D, Appendix, Volume I). Comparing the absolute values of the contributions of each of these three groups to direct and indirect residual income originating from final demand, we find industry

TABLE 6

RESIDUAL COUNTY INCOME MULTIPLIERS AND VALUES BY SECTORS

Activity Sector		Household Multi- plier	Local Gov't Multi- plier	Non- profit Multi- plier	Residual Income Multi- plier	Absolute Value of Residual Income ($1,000)
		1	2	3	4	5
Industrial						
Mining	1	.510	.020	.023	.553	$ 953
Food Processing	2	.414	.018	.019	.451	1,214
Textiles	3	.355	.013	.018	.386	6,418
Mat'l Process'g	4,5,10	.412	.018	.019	.449	16,969
Printing	6	.741	.035	.034	.810	121
Fab & Assembly	9,11	.349	.015	.022	.386	14,958
Chemicals	12	.329	.014	.015	.358	3,293
Sawmills	14	.712	.067	.041	.820	25
Pulpwood	15	.726	.041	.038	.805	---
Agr Feeds	16	.181	.009	.008	.198	31
Misc Mfg	7,8,13,17	.449	.018	.020	.487	736
Agriculture	18	.583	.034	.027	.644	1,188
Education	19	.901	.032	.040	.973	1,676
Retail Trades						
Food Stores	20	.194	.011	.010	.215	121
Gas Stations	21	.354	.020	.019	.393	597
Auto Dealers	22	.213	.009	.010	.232	778
Clothing	23	.286	.013	.016	.315	202
Bars, Restnts	24	.318	.021	.016	.355	155
Jwl,Drgs,Sprtg	25	.360	.016	.017	.393	118
Furn & Appl	26	.289	.014	.018	.321	161
Hdw, Bldg Mat	27	.348	.019	.016	.383	221
Dep't & Var	28	.304	.012	.017	.333	284
Farm Equipment	29	.199	.012	.009	.220	74
All Other Rtl	30	.308	.020	.019	.347	164
Service Trades						
Hotels,Motels	31	.423	.063	.028	.514	440
Ent, Recr	32	.505	.027	.033	.565	16
Finance	33	.883	.041	.052	.976	654
Rl Est & Ins	34	.207	.009	.012	.228	35

TABLE 6 (Continued)

		1	2	3	4	5
Service Trades (cont)						
Laundry	35	.788	.036	.040	.864	$ 94
Prof Prs Srvs	36	.981	.047	.063	1.091	746
Nnprf Prs Srvs	37	.643	.029	.033	.705	802
Transportation	38	.659	.028	.031	.718	2,245
Construction	39	.515	.021	.026	.562	689
Wholesale	40	.235	.010	.011	.256	1,273
Utilities						
Electric	41	.093	.004	.004	.101	8
Phone	42	.265	.011	.013	.289	6
Water,TV,Radio	43	.588	.038	.027	.653	46
Nonprofit	44	.666	.031	1.044	1.741	2,657
Local Governments						
Municipal	45	.785	1.131	.036	1.952	492
Schools	46	.672	1.024	.040	1.736	4,543
County	47	.828	1.198	.045	2.071	190
State A Government	48	.635	.053	.029	.717	619
Fed A Government	49	1.254	.043	.056	1.353	64
Households						
Labor	50	1.289	.045	.057	1.391	10,850
Rental	51	1.290	.042	.064	1.396	193
Transfer	52	1.289	.045	.054	1.388	7,925
Proprietary	53	1.289	.045	.057	1.391	1,787
Ovdep	54	.481	.025	.273	.779	614
Total		.485	.039	.035	.559	$87,445

contributing $47.7 million, retail $2.9 million, and services $2.8 million. This emphasizes the crucial role of industrial activities in providing the economic base for the regional economy.

The comparatively high residual income multiplier of the service sectors group can be easily explained. Payments to households make up a significantly greater share of costs of these activities than is the case for many other kinds of activities. Service trades have little need for raw materials, wholesale goods, power, and other inputs that are necessary to industrial and retail sectors. This becomes apparent when one compares the residual income multiplier of 1.091 for the professional personal services sector with the multiplier of .233 for auto dealers or .358 for chemicals. In other words, most expenditures by service sectors are made locally and are comprised of payments to households. Many expenditures by industrial and retail firms, on the other hand, are external and go for goods not available locally. If these latter firms were able to purchase more of their inputs from local sources, they would show a higher residual income multiplier.

Residual income multipliers for those sectors comprising the components of residual income must, of course, exceed 1.000. But it is surprising to see the residual income multiplier for Federal A sector being so high (1.353). Examination of Table 4 (technical coefficients matrix) provides the answer. Out of every expenditure dollar by this sector, nearly 97 cents went directly as a payment to households.[1]

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[1] It should be remembered that only local expenditures are shown for this sector. External purchases by the Post Offices in the county are made by the district office in Philadelphia or the head offices in Washington and, therefore, are not reflected in Table 4.

Five sectors out of the 48 shown in Table 6 contribute, directly and indirectly, about 65 percent of the total residual county income. These are:

Material Processing	$16,969,000 - 19.4%
Fabrication and Assembly	14,958,000 - 17.1
Labor Households	10,850,000 - 12.4
Transfer Households	7,925,000 - 9.1
Textiles	6,418,000 - 7.3

The residual income multiplier for any particular sector is determined not only by the amount of internal expenditures out of final demand by that sector, but also by the distribution of these expenditures among various internal sectors. This is also true for the export demand multiplier for any sector. Thus, it is possible for two sectors to have about the same value for their export demand multipliers but different values for residual income multipliers. Comparison of the multipliers for mining, food processing, and miscellaneous manufacturing, shown below, illustrates these divergencies.

	Export Demand Multiplier	Residual Income Multiplier
Mining	2.172	.553
Food processing	2.159	.451
Miscellaneous manufacturing	1.963	.487

Mining, with about the same export demand multiplier as food processing, returns to the people in the region about $100,000 more in

benefits than does food processing for every $1 million of export demand. Food processing would contribute more to total direct and indirect economic activity in the county than miscellaneous manufacturing, but returns to the people about $36,000 less in benefits than does miscellaneous manufacturing for the same value of exports. This use of the multipliers can be of significant value to local planners and others charged with the responsibility of bringing new industry into an area or furthering development of already existing industries. If concern is primarily for the local people in the region, one criteria used to judge the desirability of an activity should be the benefits that the people derive from this activity. It is important, therefore, that appropriate multipliers be used for such evaluative purposes.

The total export demand multiplier for the entire economic system is 1.9437. This is derived by dividing total economic activity by total export demand, or $303,224,000 by $156,003,000. It shows the amount of direct and indirect economic activity generated by each dollar of final or export demand for all sectors. By itself, however, this multiplier is not very indicative of what takes place within the system nor is it capable of reflecting the diversity of economic activities of a particular system. A study made by Gamble (19) in Sullivan County, Pennsylvania, shows the economy of this county to have virtually the same value for its total export demand multiplier (1.9440). Yet the structure of the economies of these two counties are very dissimilar. Sullivan County, with a total economic activity of only $25,432,000, is very rural. Industrial activity makes up only

17 percent of total activity, whereas for Clinton County it comprises
38 percent of total activity or more than double the rate for Sullivan
County. Out of a total external income of $13,082,000 for Sullivan
County, 27 percent results from sales by agricultural and sawmill
activities. The comparable figure for Clinton County is 1 percent.
Households in Sullivan County spend 24 cents of their income dollar in
local retail stores, whereas in Clinton County households spend 44
cents of their income dollar in local retailing sectors. Intuitively,
one would expect county multipliers to reflect this diversity in the
"mix" of internal activities.

The total export demand multiplier tells us nothing about the
proportion of the external income dollar spent internally and the pro-
portion spent externally. For each sector, some of the receipts from
sale of goods and services to the outside world will be spent within
the region and some outside. It is only that portion of external
income spent inside the region that will generate additional income to
the region. Generally speaking, the more complex the internal struc-
ture of a regional economy -- i.e., the more varied the economic activ-
ities -- the more additional or indirect income will be generated.
What we are saying, in effect, is that the more opportunities the
dollar spent locally has of being respent or reused in the region, the
greater will be the total economic activity level of the regional
economy. Regional multipliers should be able to reflect the degree of
complexity of internal economic activities in a region.

It is possible to disaggregate total economic activity for Clinton

County into a number of components. To begin with, there is the direct
component, or total export income, and the indirect component. These
two components were $156,003,000 and $147,211,000, respectively, in
1963. But only a portion of the $156,003,000 of export income was
spent inside the region. This portion can be found by multiplying the
sum of all internal technical coefficients for each sector by the level
of export demand for that sector, and then summing these products for
all sectors. Doing this we find that of the $156,003,000 of export
income, $65,928,000 was spent initially within the region. We could
call this the "primary internal expenditure." The remainder of total
external income, or $90,075,000, was spent initially outside the re-
gion. This could be called the "primary external expenditure." Togeth-
er they make up the direct portion of total economic activity for the
county.

It was the expenditure of the primary internal component, or
$65,928,000, not the total direct portion ($156 million), that gener-
ated the indirect portion of total economic activity ($147.2 million).
But we know from the mathematical formulation of the model that the
primary internal component itself will ultimately flow back to the out-
side world (i.e., be spent externally). For any dollar of external
income to a particular sector, it will, eventually, indirectly find its
way back outside the region through expenditures by a number of differ-
ent sectors, not just the one originally receiving it. With respect to
all sectors, all of the primary internal component will, ultimately, be
spent externally. This could be called the "indirect external

component" of total indirect income. The remainder of the indirect portion of total economic activity, or $147,211,000 minus $65,928,000, could be called the "indirect internal component."

Aligning these four components in sequence may better portray the disaggregation of total economic activity discussed above.

Primary internal component	- $ 65,928,000	} $156,003,000	Total direct activity
Primary external component	- 90,075,000		
Indirect internal component	- 81,293,000	} 147,221,000	Total indirect activity
Indirect external component	- 65,928,000		
Total economic activity	$303,224,000	$303,224,000	

The indirect internal component appears to be a more realistic estimate of the true amount of indirect activity generated by the system, since it does not recount the dollars originally spent inside the region that will ultimately be spent outside the region.

The indirect internal component originates entirely from the expenditure of the primary internal component. Dividing the first by the second, we get:

$$\frac{81,283}{65,928} = 1.233$$

This could be called the "indirect internal multiplier." It means that for every dollar of final demand income spent within the region, an additional $1.23 of indirect income will be generated internally by the system. It is perhaps interesting to compare this multiplier with the "indirect internal multiplier" for the Sullivan County study (19) where

we have a "rural" regional economy rather than the somewhat more "industrial" regional economy of Clinton County.

The comparable values and multiplier for the Sullivan County economy are:

$$\frac{5,312}{7,038} = .755$$

Thus, it appears that the use of an indirect internal multiplier will be more reflective of the complexity of the internal structure of a regional economy than will the use of a total export demand multiplier.

Disaggregation of total county economic activity into the four components discussed above may be achieved from data provided in the transactions matrix. Disaggregation on the sectoral level into the same four components, however, is not possible from data provided only by this matrix. One must first obtain the inverse of the technical coefficients matrix; i.e., the interdependency coefficients matrix $[1 - A]^{-1}$.

This disaggregation by sectors has been done in Table 7. The original 17 industrial sectors are shown individually since they comprise such an important part of basic income (70 percent). The remaining 37 sectors have been grouped in the same manner as is shown in Table B, Appendix, Volume I. Rather than use absolute values, multiplier values and technical coefficient values are used so as to avoid disclosure of data on individual firms. Use of these values rather than absolute values in no way alters the interpretation of the data.

Columns 1 and 2 in Table 7 are obtained directly from the tech-

TABLE 7

TOTAL ECONOMIC ACTIVITY COMPONENTS AND
INDIRECT INTERNAL MULTIPLIERS, BY SECTORS –
CLINTON COUNTY, PENNSYLVANIA

Sectors		Direct		Indirect			Indirect Internal Multiplier	Rank
		Primary Internal	Primary External	Internal	Total	Rank		
		1	2	3	4	5	6	7
Industry								
Mining	1	.528	.472	.644	1.172	17	1.220	24
Food Processng	2	.499	.501	.661	1.160	18	1.325	10
Textiles	3	.308	.692	.406	.714	23	1.318	14
Wood Products	4	.546	.454	.743	1.289	15	1.361	3
Paper Products	5	.377	.623	.498	.875	21	1.321	11
Printing	6	.653	.347	.880	1.533	10	1.348	5
Clay Products	7	.568	.432	.742	1.310	14	1.306	17
Cncrt Prdcts	8	.870	.130	.968	1.838	4	1.113	26
Steel Fabrctn	9	.133	.867	.178	.311	30	1.338	6
Machining	10	.439	.561	.604	1.043	20	1.376	2
Trans Eqpmt	11	.346	.654	.490	.836	22	1.416	1
Chemicals	12	.307	.693	.390	.697	24	1.270	22
Instrmt Repr	13	.473	.527	.641	1.114	19	1.355	4
Sawmills	14	.887	.113	1.176	2.063	2	1.326	9
Pulpwood	15	.770	.230	1.006	1.776	5	1.306	16
Ag Feeds, Frt	16	.224	.776	.279	.503	27	1.246	23
Misc Mfg	17	.214	.786	.282	.496	28	1.318	13
Agriculture	18	.837	.163	.869	1.706	9	1.038	29
Education	19	.809	.191	1.078	1.887	3	1.333	7
All Retail	20-30	.333	.667	.358	.691	25	1.075	28
All Service	31-37	.560	.440	.727	1.287	16	1.298	18
Transportation	38	.605	.395	.793	1.398	11	1.311	15
Construction	39	.646	.354	.740	1.386	13	1.146	25
Wholesale	40	.231	.769	.297	.528	26	1.286	19
Utilities	41-43	.216	.784	.277	.493	29	1.282	20
Nonprofit	44	.748	.252	.995	1.743	6	1.330	8
Local Govts	45-47	.737	.263	.972	1.709	8	1.319	12
State & Fed	48,49	.762	.238	.971	1.733	7	1.274	21
Households	50-53	.726	.274	.671	1.397	12	.924	30
Ovdep	54	1.000	--	1.111	2.111	1	1.111	27

nical coefficients matrix and are merely the sum of the internal and external coefficients, respectively, for each sector. Together they sum to 1.000. Column 4 is the total activity multiplier for the sector named at the left (or the sum of the sector's interdependency coefficients) minus 1.000. This means that the original dollar of final demand income -- the direct income -- is subtracted, leaving only the indirect portion as represented by the values in column 4. Subtracting column 1 from column 4 gives column 3, the indirect internal component. Since the indirect external component is the same as the primary internal component (column 1), it is not repeated in this table. To clarify what has been presented thus far in Table 7, take mining, sector 1, as an illustration. Out of every dollar of income received by this sector from the sale of its products to the outside world, it will spend about 53 cents within the region (column 1) and about 47 cents outside the region (column 2). The 53 cents spent internally, however, will generate an additional 64.4 cents of indirect activity within the region (column 3).

Column 5 ranks the 30 values appearing in column 4 (the total indirect activity multipliers) in order of magnitude. Column 6 is derived by dividing column 3 by column 1. In the case of sector 1 (mining), the value in column 6 tells us that every dollar of final demand income spent inside the region by this sector will generate an additional $1.22 worth of indirect economic activity within the region. Column 7 ranks the 30 sectoral indirect internal multipliers in order of magnitude.

Comparison of the rankings of the values in columns 4 and 6 is quite revealing. The multiplier values in column 6 are more realistic indicators of a sector's interdependency on other internal sectors than are total activity multipliers by sectors. For example, sector 11 (transportation equipment) spent only about one-third of its export income dollar locally and stood 22nd out of 30 in the size of its total activity multiplier. Yet it had the highest indirect internal multiplier of all. This means that dollars spent internally by this sector had greater indirect income generative power for the region's economic system than had dollars spent internally by any of the other 29 sectors. An almost parallel situation exists for sector 9 -- which occupies last position in ranking of total multiplier and sixth position in ranking of indirect internal multiplier. Similar examples can be found in the cases of sectors 10, 4, and 13. This reversal in rankings can be explained, at least in part, by relatively large shares of internal payments going to local households. As was stated earlier, household sectors are the major "link" between industrial or basic activities and nonbasic activities of the economy. It is this linkage that accounts for much of the interdependency among internal sectors.

By the same token, the lack of significantly large internal payments to local household sectors explains the opposite trend in comparative rankings for sectors 8 and 18. Sector 8 spent about 87 percent of its external income locally and had the fourth largest total multiplier, but dropped to 26th position for its indirect internal multiplier. Sector 18 stood ninth and 29th, respectively, in the rankings

for these two multipliers. Both of these sectors had only a small

proportion of their local expenditure dollar going to households.

The importance of local households in providing the basis for

interdependency among sectors is dramatically illustrated in the low

value of the indirect internal multiplier for households themselves.

It is the lowest multiplier of the 30 shown in Table 6 and the only

one less than 1.000. In the case of households, they themselves are

direct recipients of external income and their primary payments are

largely made to nonhousehold activities. In other words, households

purchase only a very small proportion of their local needs from other

households.

It is felt that the indirect internal multiplier for any sector

is a more meaningful multiplier than the total export demand multi-

plier for that sector. It is a more realistic indicator of a sectors

interdependency on the rest of the economic system in order for that

sector to meet its commitments to final demand. It is the best measure

of the power of a dollar spent internally by a sector to generate

additional economic activity within the region.

CHAPTER IV

IMPACT ANALYSES

In this chapter we wish to present, in specific detail, the various impact studies discussed in Volume I of this report. For a general discussion of the methodology, the reader is directed to the appropriate section of Volume I. As spelled out there, our procedure will be to present the particular changes made in the Clinton County model parameters in order to simulate desired economic changes in the region. Following this, changes in economic activity levels will be presented in tabular form and compared with activity levels for the basic Clinton County model.

A note is perhaps appropriate at this point concerning interpretation of data to be presented in this section. There are several assumptions implicit in the model used here. Therefore, there are limitations on the accuracy of estimates of economic impacts derived from the model's use. These have been discussed in Volume I (pp. 41-42) and the reader should be familiar with them as he examines and interprets the following material. Of these points, one deserves repetition for emphasis. This is the spurious exactitude of our impact predictions. An increase or decrease in economic activity is only as accurate as the parameter changes introduced to produce it. Since these changes are only approximations and, in many instances, educated guesses, the impacts registered by our model are only rough measures or estimates.

Even though our model shows an exact amount of increase or decrease in economic activity, it should only be viewed as a first approximation to what might occur in the region under the impact of the economic changes which have been simulated.

All of the impact analyses have been described in Volume I. The reader should refer to them when examining the impact data which follows. We shall confine ourselves to a presentation of specific changes made in each case and a presentation of actual impacts of these changes.

A. Fluctuations in the National
Economy — the "PRAG" Decade

Since it was felt that the various changes forecast for the 54 sectors of the Clinton County model over a 10-year period would be too voluminous for presentation, these forecasts and their economic impacts were aggregated and summarized for the 10-year period of the "PRAG" decade. The four aggregated sectors are now Industry, Retail and Service, Government, and Households. The fluctuations in external income to each of these sectors caused by fluctuations in the national economy are shown in Table 8, along with their effects on the total activity levels of these sectors. Note that there has been no internal change made in the Clinton County model. Changes in economic activity levels are attributed solely to fluctuations in export sales and external transfer income flows reflecting changes occurring in the national economy.

TABLE 8

PRAG DECADE ACTIVITY LEVELS –
CLINTON COUNTY, PENNSYLVANIA
($1,000 UNITS)

Activity Sector		Year										
		1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Industry	Ext. Act.	108633	108452	118992	107905	99897	97927	99794	107407	116507	123911	127414
	Total Act.	115676	116645	126591	114975	106565	104508	106489	114526	124088	131873	135570
Retail-Service	Ext. Act.	28566	29456	30386	27877	26115	26332	27616	29499	31457	32919	33696
	Total Act.	103754	106850	111186	103712	98000	97484	100117	106400	113129	118447	121346
Government	Ext. Act.	3871	4149	4175	4255	4337	4337	4271	4255	4246	4275	4304
	Total Act.	8055	8466	8691	8500	8364	8326	8337	8564	8815	9054	9198
Households	Ext. Act.	14933	15176	15426	15586	15460	15412	15490	16010	16364	16628	16893
	Total Act.	75739	77787	81322	76541	72769	72022	73281	77688	82419	86251	88383
Total Region	Ext. Act.	156003	157233	168979	155623	145809	144008	147171	157171	168574	177733	182307
	Total Act.	303224	309749	327790	303729	285697	282341	288224	307177	328451	345625	354496

B. The Removal or "Closing Down"
    of an Economic Activity

The "closing down" of two industries in Clinton County were simu-
lated with the model. The railroad maintenance and repair shop facili-
ty was removed from the Clinton County economy in a single step. This
resulted in two basic adjustments of the model. Technical coefficients
for the repair shop's sector of the economy were adjusted to account
for this removal, and adjustments were made in external income to those
sectors affected by this "closing down." The nature and derivation of
these adjustments are discussed in Volume I of this report. The specif-
ic technical coefficient changes are given in Table 9. These are the
actual changes made in the coefficients of the Transportation Service
sector of our model. Following this are Tables 10 and 11 where changes
in external income (export activity) of the sectors involved in this
simulation are shown. In addition, these tables show changes in total
economic activity for various sectors of the region. Here, for reasons
of brevity, the 54 sectors of the economy have been aggregated into 14
sectors. Again, these results are discussed at some length in Volume I.
These two impact tables present data for the two cases discussed,
namely: the case when a purchase of railroad ties in the amount of
$40,000 formerly made with a local sawmill by the local railroad facili-
ty was dropped (Table 10) and the case when the purchase was continued
with the local sawmill but was made by a railroad purchasing office
outside Clinton County (Table 11). In this case, the $40,000 amount
appears as an external income (export activity) to the Industry sector
in Table 11.

TABLE 9

TECHNICAL COEFFICIENT CHANGES –
TRANSPORTATION SERVICE SECTOR –
REMOVAL OF RAILROAD SERVICE AND REPAIR FACILITY

Sector Number	Sector Name	Basic Coefficients	Adjusted Coefficients
6	Printing-Publishing	.00102	.00124
14	Sawmills	.00581	--
21	Gas Stations	.00726	.00797
22	Auto Dealers	.01569	.01914
24	Bars, Restaurants	.00029	.00035
26	Furniture and Appliances	.00073	.00089
27	Hardware, Building Materials	.00436	.00532
28	Department and Variety	.00073	.00089
29	Farm Equipment	.00305	.00372
30	All Other Retail	.00058	.00071
33	Finance	.00015	.00018
34	Real Estate and Insurance	.00276	.00337
36	Professional Personal Service	.00073	.00089
37	Nonprof. Personal Service	.00087	.00106
38	Transportation	.03733	.04554
39	Construction	.00930	.00744
40	Wholesale	.03632	.03810
41	Electric	.00261	.00071
42	Telephone	.00320	.00354
43	Water, TV, Radio	.00015	.00018
44	Nonprofit	.00145	.00177
45	Local Government	.00073	.00089
46	Public Schools	.00291	.00354
47	County Government	.00073	.00089
49	State-Federal A	.00073	.00053
50	Labor	.43997	.10668
51	Rent	.00015	.00018
52	Transfer	.00145	.00177
53	Proprietary	.02353	.02871

TABLE 10

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N5   Description: STRAN Reduced - Sawmill Ext. Income Unchanged

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,468	− 206	− .2	108,633	108,633		
Agriculture	3,210	3,180	− 30	− .9	1,845.	1,845		
Education	1,862	1,857	− 5	− .3	1,722	1,722		
All Retail	49,097	47,852	−1,245	− 2.5	9,555	9,555		
All Service	12,093	11,837	− 256	− 2.1	3,638	3,638		
Transportation	6,884	5,221	−1,663	−24.2	3,127	1,507	−1,620	−51.8
Construction	5,123	5,012	− 111	− 2.2	1,227	1,227		
Wholesale	12,114	11,896	− 218	− 1.8	4,972	4,972		
Utilities	5,144	5,015	− 129	− 2.5	166	166		
Nonprofit	5,494	5,358	− 136	− 2.5	1,526	1,526		
Local Government	6,150	6,058	− 92	− 1.5	2,961	2,961		
State-Federal A	1,906	1,874	− 32	− 1.7	910	910		
Households	75,740	73,188	−2,552	− 3.4	14,933	15,510	+ 577	+ 3.9
Ovdep Candidate	2,732	5,358	+2,626	+96.1	788	788		
Total	303,223	299,174	−4,049	− 1.3	156,003	154,960	−1,043	− .7

#38 Sector Multiplier 2.671027   Total Multiplier −3.8821

#38 Basic Multiplier 2.3975

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TABLE 11

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N5A Description: STRAN Reduced - Sawmill Ext. Income + 40

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,510	− 164	− .1	108,633	108,673	+ 40	
Agriculture	3,210	3,187	− 23	− .7	1,845	1,845		
Education	1,862	1,857	− 5	− .3	1,722	1,722		
All Retail	49,097	47,873	−1,224	− 2.5	9,555	9,555		
All Service	12,093	11,840	− 253	− 2.1	3,638	3,638		
Transportation	· 6,884	5,221	−1,663	−24.16	3,127	1,507	−1,620	−51.8
Construction	5,123	5,015	− 108	− 2.1	1,227	1,227		
Wholesale	12,114	11,902	− 212	− 1.8	4,972	4,972		
Utilities	5,144	5,016	− 128	− 2.5	166	166		
Nonprofit	5,494	5,360	− 134	− 2.4	1,526	1,526		
Local Government	6,150	6,060	− 90	− 1.5	2,961	2,961		
State-Federal A	1,906	1,878	− 28	− 1.5	910	910		
Households	75,740	73,215	−2,525	− 3.3	14,933	15,510	+ 577	+ 3.9
Ovdep Candidate	2,732	5,358	+2,626	+96.1	788	788		
Total	303,223	299,292	−3,931	− 1.3	156,003	155,000	−1,003	− .6

Sector Multiplier _____   Total Multiplier −3.9192

In addition, the more complex case in which a large manufacturing facility was "phased out" over a three year period is represented in Tables 12, 13, and 14. This "phase out" was of a more complex nature. Rather than close down this industry in one step following the base year of 1963, the closing was accomplished over a three year period of the PRAG decade, from 1964 to 1967. Economic characteristics of this period with respect to Clinton County are summarized in Table 8. The phasing out procedure in this context and its hypothetical results on the region are discussed on pages 51 to 54 in Volume I. Impact analysis data upon which this discussion is based will be found in Tables 12, 13, and 14. The notation U-11 refers to the manufacturing, fabrication, and assembly sector of the model. What is happening can be seen quickly by comparing the U-11 entries in these tables for the standard decade years and the table for the new activity situation in which the industry being "phased out" has been reduced in activity or removed. This comparison should be done for both total and export activity levels over the PRAG standard decade years 1965, 1966, and 1967.

C. Automation of an Industry

As discussed in Volume I, the next economic change simulated with the Clinton County model was the automation of a paper mill. The specific adjustments reported in Volume I are given in Table 15. These were three: reductions in the Laundry sector and Labor sector coefficients and an increase in the Electric Utilities sector coefficient.

TABLE 12

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N3A-1965   Description: U-11 Out Over Three Years - (1965)

Activity	Total Activity Levels				Export Activity Levels			
	1965 Standard Decade	New Activity	Absolute Change	Percent Change	1965 Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	126,592	106,254	-20,338	-.1607	118,992	99,950	-19,042	-.1600
Agriculture	3,366	3,309	- 57	-.0169	1,920	1,920		
Education	2,048	2,037	- 11	-.0054	1,898	1,898		
All Retail	52,618	49,433	- 3,185	-.0605	10,148	10,148		
All Service	13,089	12,253	- 836	-.0639	4,007	3,857	- 150	-.0374
Transportation	7,218	7,096	- 122	-.0169	3,254	3,254		
Construction	5,467	5,137	- 330	-.0604	1,302	1,302		
Wholesale	13,057	12,541	- 516	-.0395	5,377	5,377		
Utilities	5,513	5,102	- 411	-.0746	166	166		
Nonprofit	5,803	5,235	- 568	-.0979	1,526	1,526		
Local Government	6,713	6,448	- 265	-.0395	3,265	3,265		
State-Federal A	1,978	1,908	- 70	-.0354	910	910		
Households	81,323	75,242	- 6,081	-.0748	15,426	16,180	+ 754	+.0489
Ovdep	3,005	1,784	- 1,221	-.4063	788	788		
Candidate								
Total	327,790	293,779	-34,011	-.1038	168,979	150,541	-18,438	-.1091
U-11	39,174	20,073	-19,101	-.4876	39,025	19,983	-19,042	-.4879

Sector Multiplier _____   Total Multiplier _____

TABLE 13

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N3A-1966   Description: U-11 Out Over Three Years - (1966)

Activity	Total Activity Levels				Export Activity Levels			
	1966 Standard Decade	New Activity	Absolute Change	Percent Change	1966 Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	114,977	94,885	−20,092	−.1747	107,905	88,959	−18,946	−.1756
Agriculture	3,246	3,187	− 59	−.0182	1,862	1,862		
Education	2,134	2,123	− 11	−.0052	1,993	1,993		
All Retail	48,675	45,395	− 3,280	−.0674	8,701	8,701		
All Service	12,112	11,398	− 714	−.0589	3,586	3,574	− 12	−.0033
Transportation	7,145	7,031	− 114	−.0160	3,254	3,254		
Construction	5,231	4,876	− 355	−.0679	1,315	1,315		
Wholesale	11,951	11,431	− 520	−.0435	4,839	4,839		
Utilities	5,186	4,772	− 414	−.0798	166	166		
Nonprofit	5,357	4,845	− 512	−.0956	1,373	1,373		
Local Government	6,586	6,315	− 271	−.0411	3,345	3,345		
State-Federal A	1,914	1,842	− 72	−.0376	910	910		
Households	76,543	70,241	− 6,302	−.0823	15,586	16,201	+ 615	+.0395
Ovdep Candidate	2,676	1,713	− 963	−.3599	788	788		
Total	303,733	270,054	−33,679	−.1109	155,623	137,280	−18,343	−.1179
U-11	30,191	11,165	−19,026	−.6302	30,049	11,103	−18,946	−.6305

Sector Multiplier _____   Total Multiplier _____

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TABLE 14

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N3A-1967   Description: U-11 Out Over Three Years - (1967)

	Total Activity Levels				Export Activity Levels			
Activity	1967 Standard Decade	New Activity	Absolute Change	Percent Change	1967 Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	106,565	82,578	-23,987	-.2251	99,897	77,047	-22,850	-.2287
Agriculture	3,157	3,085	- 72	-.0228	1,825	1,825		
Education	2,227	2,213	- 14	-.0063	2,093	2,093		
All Retail	46,095	42,205	- 3,890	-.0844	8,111	8,111		
All Service	11,427	10,538	- 889	-.0778	3,332	3,298	- 34	-.0102
Transportation	6,786	6,662	- 124	-.0183	3,091	3,091		
Construction	4,829	4,479	- 350	-.0725	1,118	1,118		
Wholesale	11,064	10,451	- 613	-.0554	4,355	4,355		
Utilities	4,918	4,431	- 487	-.0990	166	166		
Nonprofit	5,009	4,473	- 536	-.1070	1,236	1,236		
Local Government	6,502	6,227	- 275	-.0423	3,427	3,427		
State-Federal A	1,862	1,777	- 85	-.0456	910	910		
Households	72,768	65,106	- 7,662	-.1053	15,460	16,602	+ 1,142	+.0739
Ovdep	2,487	1,699	- 788	-.3168	788	848	+ 60	+.0761
Candidate								
Total	285,696	245,924	-39,772	-.1392	145,809	124,127	-21,682	-.1487
U-11	25,678	2,765	-22,913	-.8923	25,542	2,692	-22,850	-.8946

Sector Multiplier _____   Total Multiplier _____

TABLE 15

TECHNICAL COEFFICIENT CHANGES –
MATERIAL PROCESSING SECTOR –
AUTOMATION OF A PAPER MILL

Sector Number	Sector Name	Basic Coefficients	Adjusted Coefficients
35	Cleaning-Laundry	.00028	.00006
41	Electric Power	.01378	.01654
50	Labor	.25299	.12397

The net effect of these changes produced a large reduction in operating expenditures, especially that to the Households–Labor sector. These savings made it possible to discontinue the provision of $788,000 to this industry of operating funds from external sources as was being done in the basic study year. It could now supply them from internally available funds. Table 16, which presents detailed impact data for this simulation, shows this adjustment as a reduction of $788,000 of external income.

D. The Introduction of New Economic Activities

Four different new economic activities were introduced into Clinton County by simulation using the 54–sector Clinton County model. This was done by augmenting the 54-sector model with a new "candidate" sector. Typical technical coefficients were derived from appropriate sources such as The Skier Market in Northeastern North America (20).

TABLE 16

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N4B   Description: I PAPR Automated   (Ovdep = 0 Balanced Thru Ext. D With Overflow)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	114,577	-1,097	- .9	108,633	108,633		
Agriculture	3,210	3,155	- 55	- 1.7	1,845	1,845		
Education	1,862	1,850	- 12	- .6	1,722	1,722		
All Retail	49,097	46,158	-2,939	- 6.0	9,555	9,555		
All Service	12,093	11,469	- 624	- 5.2	3,638	3,638		
Transportation	6,884	6,781	- 103	- 1.5	3,127	3,127		
Construction	5,123	4,934	- 189	- 3.7	1,227	1,227		
Wholesale	12,114	11,728	- 386	- 3.2	4,972	4,972		
Utilities	5,144	4,963	- 181	- 3.5	166	166		
Nonprofit	5,494	5,211	- 283	- 5.2	1,526	1,526		
Local Government	6,150	5,932	- 218	- 3.5	2,961	2,961		
State-Federal A	1,906	1,843	- 63	- 3.3	910	910		
Households	75,740	69,526	-6,214	- 8.2	14,933	14,933		
Ovdep Candidate	2,732	1,855	- 877	-32.1	788	0	-788	-100.0
Total	303,223	289,982	-13,241	- 4.4	156,003	155,215	-788	- .5

#5 Sector Multiplier __1.5587__   Total Multiplier _____

#5 Sector Basic Multiplier __1.8754__

This publication was the major source of data for our simulation of a ski and water resort in Clinton County. The manner of this derivation is discussed in Volume I for all four economic activities (pp. 57-65) along with the derivation of estimates of internal and external income related to the new enterprises. Technical coefficients for the ski and water resort appear in Table 17, while the new external income sector (C1) with its relevant values, together with the regional impact data, are shown in Table 18. Similar information is given for the meter factory simulation in Tables 19 and 20.

TABLE 17

NEW SECTOR TECHNICAL COEFFICIENTS –
C1 SKI AND WATER RESORT

Sector Number	Sector Name	Technical Coefficient
2	Food Processing	.06289
6	Printing, Publishing	.03145
20	Food Stores	.01887
22	Auto Dealers	.01258
27	Hardware, Building Material	.00629
28	Department and Variety	.00629
33	Finance	.07547
34	Real Estate, Insurance	.03145
36	Professional Personal Service	.00629
37	Nonprof. Personal Service	.01258
40	Wholesale	.03145
41	Electric Power	.00629
44	Nonprofit	.00629
45	Local Government	.00629
46	Public Schools	.02516
47	County Government	.00629
50	Labor	.15094
53	Proprietary	.26415

TABLE 18

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N6   Description: Ski and Water Resort

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,682	+ 8		108,633	108,633		
Agriculture	3,210	3,213	+ 3	+ .1	1,845	1,845		
Education	1,862	1,862			1,722	1,722		
All Retail	49,097	49,190	+ 93	+ .2	9,555	9,583	+ 28	+ .3
All Service	12,093	12,134	+ 41	+ .3	3,638	3,645	+ 7	+ .2
Transportation	6,884	6,884			3,127	3,127		
Construction	5,123	5,127	+ 4	+ .1	1,227	1,227		
Wholesale	12,114	12,135	+ 21	+ .2	4,972	4,972		
Utilities	5,144	5,152	+ 8	+ .2	166	166		
Nonprofit	5,494	5,496	+ 2		1,526	1,526		
Local Government	6,150	6,161	+ 11	+ .2	2,961	2,961		
State-Federal A	1,906	1,908	+ 2	+ .1	910	910		
Households	75,740	75,857	+117	+ .2	14,933	14,933		
Ovdep	2,732	2,713	- 19	- .7	788	788		
Candidate C1		159	+159			129	+129	
Total	303,223	303,673	+450	+ .1	156,003	156,167	+164	+ .1

Sector Multiplier 2.7647   Total Multiplier 2.7439

TABLE 19

NEW SECTOR TECHNICAL COEFFICIENTS –
C2 METER FACTORY

Sector Number	Sector Name	Technical Coefficients
6	Printing, Publishing	.00412
13	Instruments	.01020
20	Food Stores	.00098
21	Gas Stations	.00118
22	Auto Dealers	.00098
24	Bars, Restaurants	.00059
27	Hardware, Building Material	.01039
33	Finance	.02706
34	Real Estate, Insurance	.00490
35	Laundry	.00020
37	Nonprof. Personal Service	.00314
38	Transportation	.02333
41	Electric Power	.01235
42	Telephone	.00118
43	Water, TV, Radio	.00216
44	Nonprofit	.00196
45	Local Government	.00235
46	Public Schools	.00588
47	County Government	.00235
50	Labor	.24941
54	Ovdep	.04804

There were three variations incorporated with the introduction of a textile mill into the region, based on whether the new activity was a branch plant under outside ownership, an autonomous division, or a locally owned enterprise. Different sets of technical coefficients covering these variations are presented in Table 21 while external income (export activity) and impact information are presented in Tables 22, 23, and 24 for the branch, division, and locally owned

TABLE 20

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N7   Description: Meter Factory

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	116,007	+ 333	+ .3	108,633	108,633		
Agriculture	3,210	3,229	+ 19	+ ..6	1,845	1,845		
Education	1,862	1,866	+ 4	+ .2	1,722	1,722		
All Retail	49,097	50,207	+ 1,110	+ 2.3	9,555	9,555		
All Service	12,093	12,496	+ 403	+ 3.3	3,638	3,638		
Transportation	6,884	7,037	+ 153	+ 2.2	3,127	3,127		
Construction	5,123	5,216	+ 93	+ 1.8	1,227	1,227		
Wholesale	12,114	12,259	+ 145	+ 1.2	4,972	4,972		
Utilities	5,144	5,327	+ 183	+ 3.6	166	166		
Nonprofit	5,494	5,662	+ 168	+ 3.1	1,526	1,526		
Local Government	6,150	6,286	+ 136	+ 2.2	2,961	2,961		
State-Federal A	1,906	1,929	+ 23	+ 1.2	910	910		
Households	75,740	77,842	+ 2,102	+ 2.8	14,933	14,933		
Ovdep	2,732	3,007	+ 275	+10.1	788	788		
Candidate C2		5,100	+ 5,100			5,100	+5,100	
Total	303,223	313,470	+10,247	+ 3.4	156,003	161,103	+5,100	+ 3.3

Sector Multiplier 2.0092   Total Multiplier 2.0092

TABLE 21

NEW SECTOR TECHNICAL COEFFICIENTS –
C8 TEXTILE MILL –
BRANCH PLANT, DIVISION AND LOCAL OWNERSHIP VARIATIONS

Sector Number	Sector Name	Technical Coefficients		
		Branch	Division	Local Owners
6	Printing, Publishing	----	.00066	.00058
21	Gas Stations	.00139	.00098	.00088
22	Auto Dealers	----	----	.00058
24	Bars, Restaurants	----	.00033	.00029
27	Hardware, Building Material	.01385	.00819	.00876
28	Department, Variety	----	.00328	.00351
30	All Other Retail	----	.00033	.00029
31	Hotels, Motels	----	.00033	.00088
33	Finance	----	.00328	.00906
34	Real Estate, Insurance	----	.00491	.00438
36	Professional Personal Service	----	.00164	.00175
37	Nonprof. Personal Service	.00277	.00066	.00088
38	Transportation	----	.01016	.00906
39	Construction	.01385	.00328	.00292
40	Wholesale	----	.00164	.00234
41	Electric Power	.03047	.00721	.00643
42	Telephone	.02216	.00524	.00467
43	Water, TV, Radio	.00693	.00164	.00146
44	Nonprofit	.00277	.00229	.00263
45	Local Government	.00139	.00033	.00029
46	Public Schools	.00277	.00066	.00058
47	County Government	.00139	.00033	.00029
50	Labor	.90028	.22051	.20537

variations respectively.

Finally, the particle board mill coefficients will be found in
Table 25. The external income (export activity) and impact information
for the particle board mill will be found in Table 26.

TABLE 22

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N8   Description: Textile Mill - Branch Plant

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,710	+ 36		108,633	108,633		
Agriculture	3,210	3,218	+ 8	+ .2	1,845	1,845		
Education	1,862	1,864	+ 2	+ .1	1,722	1,722		
All Retail	49,097	49,548	+ 451	+ .9	9,555	9,555		
All Service	12,093	12,187	+ 94	+ .8	3,638	3,638		
Transportation	6,884	6,892	+ 8	+ .1	3,127	3,127		
Construction	5,123	5,164	+ 41	+ .8	1,227	1,227		
Wholesale	12,114	12,172	+ 58	+ .5	4,972	4,972		
Utilities	5,144	5,230	+ 86	+1.7	166	166		
Nonprofit	5,494	5,537	+ 43	+ .8	1,526	1,526		
Local Government	6,150	6,187	+ 37	+ .6	2,961	2,961		
State-Federal A	1,906	1,915	+ 9	+ .5	910	910		
Households	75,740	76,661	+ 921	+1.2	14,933	14,933		
Ovdep	2,732	2,745	+ 13	+ .5	788	788		
Candidate C8		773	+ 773			722	+722	
Total	303,223	305,803	+2,580	+ .9	156,003	156,725	+722	+ .5

Sector Multiplier   3.3438   Total Multiplier   3.5734

TABLE 23

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N8A   Description: Textile Mill - Division

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,714	+ 40		108,633	108,633		
Agriculture	3,210	3,219	+ 9	+ .3	1,845	1,845		
Education	1,862	1,864	+ 2	+ .1	1,722	1,722		
All Retail	49,097	49,591	+ 494	+1.0	9,555	9,555		
All Service	12,093	12,221	+ 128	+1.1	3,638	3,638		
Transportation	6,884	6,924	+ 40	+ .6	3,127	3,127		
Construction	5,123	5,166	+ 43	+ .8	1,227	1,227		
Wholesale	12,114	12,181	+ 67	+ .6	4,972	4,972		
Utilities	5,144	5,229	+ 85	+1.7	166	166		
Nonprofit	5,494	5,544	+ 50	+ .9	1,526	1,526		
Local Government	6,150	6,189	+ 39	+ .6	2,961	2,961		
State-Federal A	1,906	1,915	+ 9	+ .5	910	910		
Households	75,740	76,684	+ 944	+1.2	14,933	14,933		
Ovdep	2,732	2,745	+ 13	+ .5	788	788		
Candidate C8A		3,052	+3,052			3,052	+3,052	
Total	303,223	308,238	+5,015	+1.7	156,003	159,055	+3,052	+2.0

Sector Multiplier 1.6435   Total Multiplier 1.6432

94

TABLE 24

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N8B   Description: Textile Mill - Local Ownership

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,718	+ 44		108,633	108,633		
Agriculture	3,210	3,219	+ 9	+ .3	1,845	1,845		
Education	1,862	1,864	+ 2	+ .1	1,722	1,722		
All Retail	49,097	49,631	+ 534	+1.1	9,555	9,555		
All Service	12,093	12,255	+ 162	+1.3	3,638	3,638		
Transportation	6,884	6,925	+ 41	+ .5	3,127	3,127		
Construction	5,123	5,168	+ 45	+ .9	1,227	1,227		
Wholesale	12,114	12,189	+ 75	+ .6	4,972	4,972		
Utilities	5,144	5,233	+ 89	+1.7	166	166		
Nonprofit	5,494	5,549	+ 55	+1.0	1,526	1 526		
Local Government	6,150	6,190	+ 40	+ .7	2,961	2,961		
State-Federal A	1,906	1,917	+ 11	+ .6	910	910		
Households	75,740	76,749	+1,009	+1.3	14,933	14,933		
Ovdep	2,732	2,746	+ 14	+ .5	788	788		
Candidate C8B		3,423	+3,423			3,423	+3,423	
Total	303,223	308,776	+5,553	+1.8	156,003	159,426	+3,423	+2.2

Sector Multiplier 1.6219   Total Multiplier 1.6223

TABLE 25

NEW SECTOR TECHNICAL COEFFICIENTS –
C9 PARTICLE BOARD MILL

Sector Number	Sector Name	Technical Coefficients
6	Printing, Publishing	.00228
15	Pulpwood	.00856
18	Agriculture	.00285
21	Gas Stations	.00057
27	Hardware, Building Material	.00114
28	Department, Variety	.00057
33	Finance	.00114
34	Real Estate, Insurance	.00114
36	Professional Personal Service	.00034
37	Nonprof. Personal Service	.00034
39	Construction	.00160
40	Wholesale	.01166
41	Electric Power	.03872
42	Telephone	.00228
43	Water, TV, Radio	.00320
44	Nonprofit	.00023
45	Local Government	.00091
46	Public Schools	.00240
47	County Government	.00091
50	Labor	.09261

E. Shortway Impact

In the same manner as above, coefficients and external incomes
relevant to the impact study of effects of a new highway through the
lower portion of Clinton County will be presented. There were three
individual studies made at first. These included two in which three
new sectors were added to the model to account for three types of
business enterprises forecast to be located at four new interchange
sites in Clinton County. These three types of enterprises were

TABLE 26

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N9   Description: Praglog - Particle Board Mill (Internal Sales)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,828	+ 154	+ .1	108,633	108,633		
Agriculture	3,210	3,250	+ 40	+1.2	1,845	1,845		
Education	1,862	1,864	+ 2	+ .1	1,722	1,722		
All Retail	49,097	49,748	+ 651	+1.3	9,555	9,555		
All Service	12,093	12,255	+ 162	+1.3	3,638	3,638		
Transportation	6,884	6,897	+ 13	+ .2	3,127	3,127		
Construction	5,123	5,186	+ 63	+1.2	1,227	1,227		
Wholesale	12,114	12,307	+ 193	+1.6	4,972	4,972		
Utilities	5,144	5,592	+ 448	+8.7	166	166		
Nonprofit	5,494	5,554	+ 60	+1.0	1,526	1,526		
Local Government	6,150	6,237	+ 87	+1.4	2,961	2,961		
State-Federal A	1,906	1,920	+ 14	+ .7	910	910		
Households	75,740	77,004	+ 1,264	+1.7	14,933	14,933		
Ovdep	2,732	2,750	+ 18	+ .7	788	788		
Candidate C9		8,758	+ 8,758			8,708	+8,708	
Total	303,223	315,150	+11,927	+3.9	156,003	164,711	+8,708	+5.6

Sector Multiplier 1.3623   Total Multiplier 1.3697

motels, restaurants, and service stations. These three were introduced under two variations: (1) outside ownership and (2) local ownership of the firms. Technical coefficients for these new sectors will be found in Table 27.

The third study concerned an increase in external income to local retail sectors brought about by improved access into Clinton County. This increase and the resulting impact information are given in Table 28.

New external incomes (export activities) and impact data for the new Shortway economic sectors are shown in Tables 29 a d 30. Each of the two Shortway sector variations were combined with he study involving the increase in external retail sales. Data for these two combined impact studies are presented in Tables 31 and 32.

At this point in the report we shall discuss a rather interesting characteristic of our model. This is the method of tracing the flow of money, entering a given sector, as it passes through the region from sector to sector until it finally leaves the regional economy. What we propose to do is demonstrate how the model can be made to yield the step by step proportional response of a given sector of our model to any input of external income flowing into some other sector of our model.

To do this we employ a particular method of computing the inverse of the Leontief matrix of our model. This inverse is, of course, the matrix of interdependency coefficients.

TABLE 27

NEW SECTOR TECHNICAL COEFFICIENTS - CMOTEL, CREST, CSRVST
SHORTWAY MOTELS, RESTAURANTS AND SERVICE STATIONS

Sector Number	Sector Name	Motel Coefficients		Restaurant Coefficients		Service Station Coefficients
		Outside	Local	Outside	Local	Outside and Local
2	Food Processing	----	----	.15564	.19455	----
6	Printing, Publishing	.00358	.00358	.00156	.00778	.00592
20	Food Stores	----	----	.06226	.11673	----
21	Gas Stations	----	----	.00078	.00078	----
22	Auto Dealers	.00358	.06810	----	----	.00410
26	Furniture and Appliances	----	----	.00389	.00389	----
27	Hardware, Building Material	.00538	.00538	.01012	.01012	.00273
28	Department, Variety	.01434	.03226	.03191	.03191	.00228
33	Finance	----	.01792	----	----	----
34	Real Estate, Insurance	----	.01792	.00623	.00623	.00273
36	Professional Personal Service	.00538	.00538	.00233	.00233	.00182
37	Nonprof. Personal Service	----	----	.00545	.00545	.00182
40	Wholesale	.03584	.03584	.00311	.00311	.53279
41	Electric Power	.02688	.02688	.00467	.00467	----
42	Telephone	.03584	.03584	.00078	.00078	.00182
43	Water, TV, Radio	.02688	.02688	.00156	.00156	.00911
44	Nonprofit	.01792	.01792	.00156	.00156	.00091
45	Local Government	.01434	.01434	.00778	.00778	.00046
46	Public Schools	.02509	.02509	.01012	.01012	----
47	County Government	.01434	.01434	.00778	.00778	----
48	State A	----	----	.15564	.15564	----
50	Labor	.25441	.13441	.12685	.12685	.07058
51	Rent	----	----	.01556	----	----
53	Proprietary	----	.12000	----	----	.05965

TABLE 28

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N11   Description: Shortway Impact - New External Sales

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,677	+ 3		108,633	108,633		
Agriculture	3,210	3,210			1,845	1,845		
Education	1,862	1,862			1,722	1,722		
All Retail	49,097	49,201	+104	+ .2	9,555	9,645	+ 90	+ .9
All Service	12,093	12,096	+ 3		3,638	3,638		
Transportation	6,884	6,884			3,127	3,127		
Construction	5,123	5,124	+ 1	+ .02	1,227	1,227		
Wholesale	12,114	12,118	+ 4	+ .03	4,972	4,972		
Utilities	5,144	5,147	+ 3	+ .1	166	166		
Nonprofit	5,494	5,496	+ 2	+ .04	1,526	1,526		
Local Government	6,150	6,152	+ 2	+ .03	2,961	2,961		
State-Federal A	1,906	1,906			910	910		
Households	75,740	75,765	+ 25	+ .03	14,933	14,933		
Ovdep	2,732	2,732			788	788		
Candidate								
Total	303,223	303,370	+147	+ .04	156,003	156,093	+ 90	+ .1
Direct Only			+ 90					
Indirect Only			+ 57					

Sector Multiplier _____   Total Multiplier 1.6333

TABLE 29

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N10   Description: Shortway Impact - CMOTEL - CREST - CSRVST (Outside Ownership)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,870	+ 196	+ .2	108,633	108,633		
Agriculture	3,210	3,242	+ 32	+1.0	1,845	1,845		
Education	1,862	1,863	+ 1	+ .1	1,722	1,722		
All Retail	49,097	49,602	+ 505	+1.0	9,555	9,555		
All Service	12,093	12,194	+ 101	+ .8	3,638	3,638		
Transportation	6,884	6,894	+ 10	+ .1	3,127	3,127		
Construction	5,123	5,173	+ 50	+1.0	1,227	1,227		
Wholesale	12,114	12,627	+ 513	+4.2	4,972	4,972		
Utilities	5,144	5,241	+ 97	+1.9	166	166		
Nonprofit	5,494	5,538	+ 44	+ .8	1,526	1,526		
Local Government	6,150	6,232	+ 82	+1.3	2,961	2,961		
State-Federal A	1,906	2,046	+ 140	+7.3	910	910		
Households	75,740	76,466	+ 726	+1.0	14,933	14,933		
Ovdep	2,732	2,743	+ 11	+ .4	788	788		
Candidate CMOTEL		455	+ 455			455	+ 455	
CREST		850	+ 850			850	+ 850	
CSRVST		**800**	**+ 800**			**800**	**+ 800**	
Total	303,223	307,836	+4,613	+1.5	156,003	158,108	+2,105	+1.3
Direct Only			+2,105					
Indirect Only			+2,508					

Sector Multiplier _____   Total Multiplier 2.1914

Motel - 2.0828   Restaurant - 2.3775   Gas Station - 2.0550

TABLE 30

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N12   Description: Shortway Impact - CMOTEL - CREST - CSRVST (Local Ownership)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,914	+ 240	+ .2	108,633	108,633		
Agriculture	3,210	3,249	+ 39	+1.2	1,845	1,845		
Education	1,862	1,863	+ 1	+ .1	1,722	1,722		
All Retail	49,097	49,705	+ 608	+1.2	9,555	9,555		
All Service	12,093	12,215	+ 122	+1.0	3,638	3,638		
Transportation	6,884	6,894	+ 10	+ .1	3,127	3,127		
Construction	5,123	5,174	+ 51	+1.0	1,227	1,227		
Wholesale	12,114	12,635	+ 521	+4.3	4,972	4,972		
Utilities	5,144	5,245	+ 101	+2.0	166	166		
Nonprofit	5,494	5,540	+ 46	+ .8	1,526	1,526		
Local Government	6,150	6,234	+ 84	+1.4	2,961	2,961		
State-Federal A	1,906	2,046	+ 140	+7.3	910	910		
Households	75,740	76,493	+ 753	+1.0	14,933	14,933		
Ovdep	2,732	2,742	+ 10	+ .4	788	788		
Candidate CMOTEL		455	+ 455			455	+ 455	
CREST		850	+ 850			850	+ 850	
CSRVST		800	+ 800			800	+ 800	
Total	303,223	308,054	+4,831	+1.6	156,003	158,108	+2,105	+1.3
Direct Only			+2,105					
Indirect Only			+2,726					

Sector Multiplier _____   Total Multiplier 2.2950

Motel - 2.2859   Restaurant - 2.5261   Gas Station - 2.0550

TABLE 31

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N13   Description: Hiway Impact N10 + N11   (None Locally Owned)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,873	+ 199	+ .2	108,633	108,633		
Agriculture	3,210	3,242	+ 32	+1.0	1,845	1,845		
Education	1,862	1,863	+ 1		1,722	1,722		
All Retail	49,097	49,705	+ 608	+1.2	9,555	9,645	+ 90	+ .9
All Service	12,093	12,195	+ 102	+ .8	3,638	3,638		
Transportation	6,884	6,894	+ 10	+ .1	3,127	3,127		
Construction	5,123	5,174	+ 51	+1.0	1,227	1,227		
Wholesale	12,114	12,631	+ 517	+4.3	4,972	4,972		
Utilities	5,144	5,244	+ 100	+1.9	166	166		
Nonprofit	5,494	5,540	+ 46	+ .8	1,526	1,526		
Local Government	6,150	6,234	+ 84	+1.4	2,961	2,961		
State-Federal A	1,906	2,046	+ 140	+7.3	910	910		
Households	75,740	76,493	+ 753	+1.0	14,933	14,933		
Ovdep	2,732	2,743	+ 11	+ .4	788	788		
Candidate 55 Motel		455	+ 455			455	+ 455	
56 Rest		850	+ 850			850	+ 850	
57 Gas Sta.		800	+ 800			800	+ 800	
Total	303,223	307,982	+4,759	+1.57	156,003	158,198	+2,195	+1.4
Direct Only			+2,195					
Indirect Only			+2,564					

Sector Multiplier _____   Total Multiplier 2.1681

TABLE 32

NEW ACTIVITY ANALYSIS EVALUATION

Run No. N14   Description: N11 + N12   (Locally Owned)

Activity	Total Activity Levels				Export Activity Levels			
	Standard Decade	New Activity	Absolute Change	Percent Change	Standard Decade	New Activity	Absolute Change	Percent Change
All Industry	115,674	115,917	+ 243	+ .2	108,633	108,633		
Agriculture	3,210	3,249	+ 39	+1.2	1,845	1,845		
Education	1,862	1,863	+ 1		1,722	1,722		
All Retail	49,097	49,807	+ 710	+1.4	9,555	9,645	+ 90	+ .9
All Service	12,093	12,217	+ 124	+1.0	3,638	3,638		
Transportation	6,884	6,895	+ 11	+ .2	3,127	3,127		
Construction	5,123	5,176	+ 53	+1.0	1,227	1,227		
Wholesale	12,114	12,639	+ 525	+4.3	4,972	4,972		
Utilities	5,144	5,247	+ 103	+2.0	166	166		
Nonprofit	5,494	5,541	+ 47	+ .9	1,526	1,526		
Local Government	6,150	6,235	+ 85	+1.4	2,961	2,961		
State-Federal A	1,906	2,048	+ 142	+7.5	910	910		
Households	75,740	76,519	+ 779	+1.0	14,933	14,933		
Ovdep	2,732	2,743	+ 11	+ .4	788	788		
Candidate Motel		455	+ 455			455	+ 455	
Rest		850	+ 850			850	+ 850	
Gas Sta.		800	+ 800			800	+ 800	
Total	303,223	308,201	+4,978	+1.64	156,003	158,198	+2,195	+1.4
Direct Only			+2,195					
Indirect Only			+2,783					

Sector Multiplier _____   Total Multiplier 2.2679

If

A = (a_{ij}) = technical coefficients matrix and

(I - A) = the Leontief matrix,

then we wish to find

$$(I - A)^{-1}$$

which is needed to determine economic activity levels of various sectors of our regional model. It can be shown that, if

$$\sum_{i=1}^{m} |a_{ij}| < 1,$$

the Leontief inverse can be written

$$(I - A)^{-1} = I + A + A^2 + A^3 + \ldots \tag{1}$$

This is the so called Neumann expansion. Defining

$$A^0 = I$$

this can be written

$$(I - A)^{-1} = \sum_{k=0}^{\infty} A^k \tag{2}$$

Obviously, the series in (2) converges to the inverse of the Leontief matrix. Each matrix of the sequence $\{A_k\}_{k=0}^{\infty}$ can be given a specific economic interpretation with respect to the flow of funds. We discuss

several of these.

A^0 = I, the identity matrix.

This accounts for the initial direct input of external income

into a given sector. The typical entry

$$a_{ij}^{(0)} = \{ \begin{matrix} 1 \text{ when } i=j \\ 0 \text{ when } i \neq j \end{matrix}$$

allows external income to flow only into its own sector, i.e.,

the external income identified with a particular row sector is

initially all transferred into that sector's column.

A, the technical coefficients matrix.

This provides the first distribution and transfer of funds

from the original sectors to others; i.e., $a_{ij}^{(1)}$ = the propor-

tion of external income of the j sector transferred to the i th

sector on the first transfer.

A^k, the k th transfer response matrix.

This distributes the original sector external income still re-

maining in the region to various sectors of the region. This

income arrives at the sectors after k internal transfers. It

does so as a proportion of the original external income into

each sector, i.e., $a_{ij}^{(k)}$ = the proportion of the original exter-

nal income into the j th sector which will be transferred from

other sectors of the model to the i th sector on the k th

transfer. In other words, it is the proportional k th transfer

response of the i th sector to the original j th sector input

of external income.

Since at every transfer there is a "leakage" to the rest of the
world, we would expect that these transfer proportions or responses
would become increasingly smaller, approaching zero, this last being
the condition when all but a negligible proportion of the input funds
will finally have left the region. In other words, given $\delta > 0$, there
exists an N such that A^N will have entries

$$a_{ij}^{(N)} < \delta$$

for δ chosen as small as we want. Though this is, in general, true,
there will be local fluctuations of these proportions before they
"settle down" monotonically toward zero.

At this point, it is perhaps best to turn to a concrete example.
Expansion of equation (2) was calculated for the 14-sector version of
the Clinton County model. The technical coefficients matrix and the
interdependency coefficients matrix for this version will be found in
the Appendix of Volume I of this report. Table 33 presents some
selected entries from the first eight matrices of the Neumann expansion
for the 14-sector Clinton County model. The entries shown are those
for the Industry sector (column 1, Table C, Appendix Volume I). They
give the transfer proportions from the Industry sector to the Industry,
Retail, Households, and Agriculture sectors respectively.

Examining Table 33 we see that initially all Industry external in-
come went into the Industry sector. The Transfer 0 row shows a

TABLE 33

CLINTON COUNTY INDUSTRY SECTOR
RESPONSE PROPORTIONS FOR EIGHT TRANSFERS –
INDUSTRY, RETAIL, HOUSEHOLDS, AND AGRICULTURE SECTOR RESPONSES

Transfer Number	Response Proportions			
	Industry	Retail	Households	Agriculture
0	1.0000	.0000	.0000	.0000
1	.0165	.0101	.2618	.0052
2	.0099	.1194	.0319	.0006
3	.0072	.0207	.0481	.0013
4	.0021	.0238	.0157	.0004
5	.0016	.0086	.0107	.0003
6	.0007	.0055	.0048	.0001
7	.0004	.0025	.0027	.0001
8	.0002	.0014	.0013	.0000
Total	1.0386	.1920	.3770	.0080
Interdependent Coefficient	1.0386	.1934	.3783	.0081

response proportion of 1.00 for Industry and 0 for all the others. The Transfer 1 row gives the initial distribution of these funds over the four sectors listed. These are actually technical coefficients relating the Industry sector with these four sectors. This can be verified by comparing entries in this row with the corresponding entries in the 14-sector model technical coefficients matrix which can be found in the Volume I Appendix.

Looking down each column we see that the proportional response is converging on zero as the funds gradually "leak" out of the region over

successive transfers. There is, however, some initial fluctuation of these transfers proportions. This is indicated by the circled maximum response proportions. This behavior can be seen graphically in Figure 1, and can be traced by examining successive entries in each column of Table 33. We shall now interpret this behavior in somewhat greater depth.

Equation (2) implies that the sum of corresponding entries of the matrices of the Neumann expansion should yield interdependency coefficients of the inverse matrix $(I - A)^{-1}$, i.e.,

$$\sum_{k=0}^{\infty} a_{ij}^{(k)} = \alpha_{ij},$$

where α_{ij} is the interdependency coefficient associated with the total i th sector response to the j th sector input. Thus, we would expect that finite sums of such corresponding entries would converge to the value of the interdependency coefficient as the sums include increasingly larger numbers of entries. The bottom two rows consider this possibility. Here are found totals for only the first eight transfers. Below these sums are given the values of the corresponding interdependency coefficients. These are taken from the interdependency coefficients matrix of the 14-sector model (Table 1 Appendix, Volume I). We note that the Industry total is already identical with its coefficient to the fourth decimal place and that the Agriculture total differs only by .0001. On the other hand the Retail and Households totals still differ from their coefficients by .0014 and .0013 respectively. The

fact that the convergence is somewhat less rapid probably reflects the fact that these sectors are involved in much more internal economic activity than the others. It is characteristic that the totals shown in Table 33 are less than the interdependency coefficients since the total response given by the interdependency coefficient constitutes an upper limit.

Successive responses are shown graphically in Figure 1 for the Industry, Households, and Retail sectors. Here we see that the initial Industry input goes entirely to the Industrial sector; none of it goes to the Households or Retail sectors. The first transfer shows a large response by the Households sector to this Industrial input and only a small response by the Retail sector. This is largely due to the transfer of funds to Households by Industry for wages and salaries. This money is now in the hands of consumers. During the second transfer we see a much larger response by the Retail sector to the initial Industry input. Consumers are now spending their wages and salaries for retail goods and services. After a large drop in response by Households in the second transfer, we see a modest rise in the third transfer. In all likelihood, this is largely due to wages and salaries paid by retail establishments out of receipts from expenditures of part of the household income in the previous transfer.

The above discussion should suffice to show how the flow of particular money inputs through the model can be portrayed. We note, finally, that responses subside and approach zero over successive transfers, reflecting the gradual outflow of the original external
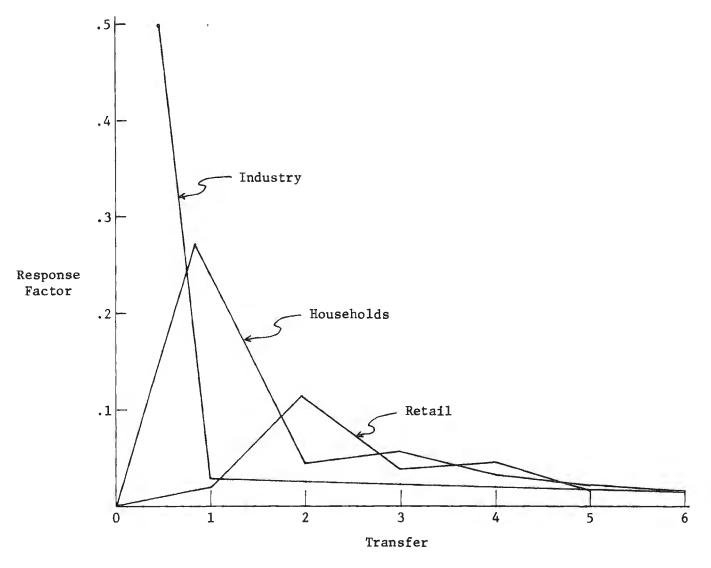
Figure 1. Selected sector responses to external income
flows into the Clinton County Industry sector.

income input.

In order to show what successive response patterns are like for a different sector, Figure 2 was prepared. Here is portrayed the response patterns of the same three sectors as those shown in Figure 1. In this case, it is the response of these three sectors to the external income into the Households sector. This is income to Households coming from such things as wages for jobs held outside Clinton County, social security pensions, dividends, and the like. The fluctuations portrayed can be given a similar interpretation as that given previously for Industry external income. This is left to the reader.
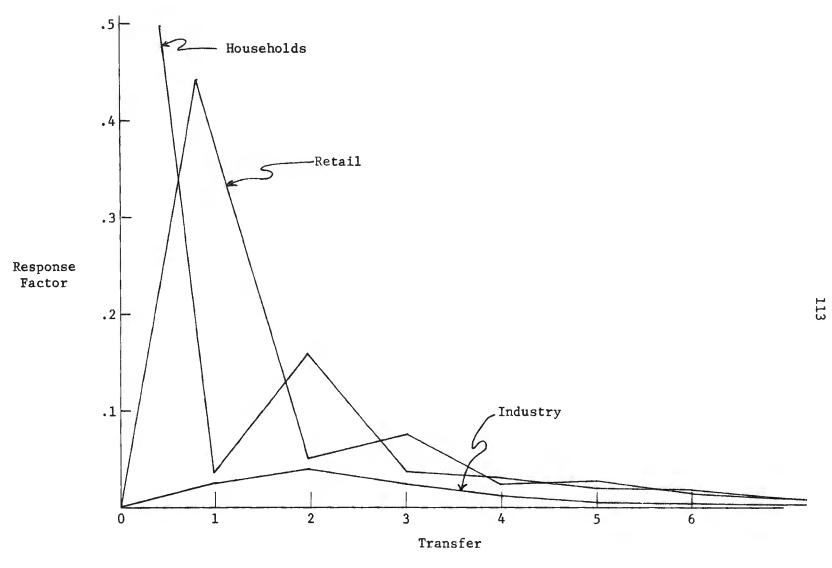
Figure 2. Selected sector responses to external income
flows into the Clinton County Households sector.

CHAPTER V

AN INTERREGIONAL MODEL OF CLINTON COUNTY[1]

Introduction

Geographically and economically Clinton County may be divided into two sub-regions. In area, the southern one fourth, approximately, of the county lies in the ridge and valley section of the state and is dominated, economically, by the industrial activity centered around the city of Lock Haven. This has been denoted as the southern region (region 1) of the county for purposes of this analysis. The northern region (region 2), encompassing the remainder of the area of the county, lies in the Allegheny Plateau section of the state and is characterized by the rough terrain of the Allegheny Mountains. Virtually no agricultural activity takes place in the northern region, and this area is mostly in forest cover and largely under the ownership of several state agencies, primarily the Department of Forests and Waters. The Boroughs of Renovo and South Renovo are the only communities of any appreciable size in this northern region. Economic activity centers largely around the Pennsylvania Railroad repair shops in Renovo and some coal mining (bituminous) and some natural gas storage and transmission activities.

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[1] Volume I of this study did not contain any discussion of an Interregional Model of Clinton County. The authors felt that because of the technical nature of such a discussion it could best be handled in the present volume. The primary value of the interregional model presented here is the interest in such an approach that may be engendered among researchers in the field of regional analysis.

The southern region contains about 81 percent of the total county pop-
ulation, or 30,471 persons, based on the 1960 Census of Population.
The remainder, or 7,148 persons (19 percent), lives in the northern re-
gion, mostly in the boroughs previously mentioned. Households in the
northern region received about 14.7 percent of the total County house-
hold income, and southern households 85.3 percent, based on data col-
lected in 1964 during the survey of households. The northern region
can be considered as rather typical of many depressed areas in the
Appalachian section of Pennsylvania.

An Interregional Model

Besides the political tie-in of the northern region to the southern
region (Lock Haven is the county seat), there is a considerable degree
of economic tie-in as well. Quite a few people from the northern region
find employment in the industries and commercial establishments in the
southern region. Further, northern households purchase quite a few of
their necessities from stores in the Lock Haven area. It was felt de-
sirable to express this economic interrelationship of a relatively de-
pressed area with a relatively stable or prosperous area by means of an
interregional money-flows model.

Data from the field survey were gathered and compiled on a regional
basis with the thought in mind of depicting the interdependence of the
two regions. Due to the rather limited diversity of economic activity
in the northern region, however, only 11 sectors were used for each of
the two regions in construction of the interregional input-output model.

These 11 sectors aggregated the 54 sectors of the full county model in the following manner:

Sector 1, Primary Activities. Includes mining (1), sawmills (14), pulpwood (15), and agriculture (18) of the original model.

Sector 2, Manufacturing. Includes original sectors 2 through 13 and sectors 16 and 17.

Sector 3, Retail. Includes original sectors 20 through 30.

Sector 4, Service. Includes original sectors 31 through 37 plus education (19) and nonprofit (44).

Sector 5, Transportation. This sector is the same as the original sector 38.

Sector 6, Construction. Same as the original sector 39.

Sector 7, Wholesale. Same as the original sector 40.

Sector 8, Utilities. Includes original sectors 41 through 43.

Sector 9, Government. Includes original sectors 45 through 49.

Sector 10, Households. Includes original sectors 50 through 53.

Sector 11, Ovdep. Same as the original sector 54.

Each of the two regions is represented by a system of 11 equations showing sources of revenue from within the region, from the other adjoining region, and from final demand outside the combined regions. Thus, the interregional model consists of 22 equations and 528 unknowns. The balance equations for this model are as follows:

$$X_1^1 = x_{11}^{11} + x_{12}^{11} + \ldots + x_{1\,11}^{11} + x_{11}^{12} + x_{12}^{12} + \ldots + x_{1\,11}^{12} + Y_1^1$$

$$X_2^1 = x_{21}^{11} + x_{22}^{11} + \ldots + x_{2\,11}^{11} + x_{21}^{12} + x_{22}^{12} + \ldots + x_{2\,11}^{12} + Y_2^1$$

$$\vdots$$

$$X_{11}^1 = x_{11\,1}^{11} + x_{11\,2}^{11} + \ldots + x_{11\,11}^{11} + x_{11\,1}^{12} + x_{11\,2}^{12} + \ldots + x_{11\,11}^{12} + Y_{11}^1$$

$$X_1^2 = x_{11}^{21} + x_{12}^{21} + \ldots + x_{1\,11}^{21} + x_{11}^{22} + x_{12}^{22} + \ldots + x_{1\,11}^{22} + Y_1^2$$

$$X_2^2 = x_{21}^{21} + x_{22}^{21} + \ldots + x_{2\,11}^{21} + x_{21}^{22} + x_{22}^{22} + \ldots + x_{2\,11}^{22} + Y_2^2$$

$$\vdots$$

$$X_{11}^2 = x_{11\,1}^{21} + x_{11\,2}^{21} + \ldots + x_{11\,11}^{21} + x_{11\,1}^{22} + x_{11\,2}^{22} + \ldots + x_{11\,11}^{22} + Y_{11}^2$$

where X is regional output, x is regional intersectoral purchases and Y regional final demand shipments to the outside world. Superscripts denote regions and regional flows and subscripts denote commodities and commodity flows. For example, X_2^1 is the total value (in dollars) of output of manufacturing in the southern region; x_{21}^{12} is the total value of manufactured goods produced by the southern region and purchased by northern primary activities; and Y_1^2 is the final demand or sales to the outside world by northern primary activities.

The model may be considered as consisting, basically, of six major blocks or components as shown in the following diagram:

	Southern Region	Northern Region	Final D
Southern Region	1	2	3
Northern Region	4	5	6

Block 1 represents sales from the southern region to itself (x^{11}); block 2 represents sales from the southern region to the northern region (x^{12}); block 3 represents sales from the southern region to final demand (Y^1); block 4 represents sales from the northern region to the southern region (x^{21}); block 5 represents sales from the northern region to itself (x^{22}); and block 6 represents sales from the northern region to final demand (Y^2).

In deriving the actual monetary values for the various cells of the interregional matrix, the 54-sector model was first aggregated into an 11-sector model for the entire county as a single region. Data from the individual interview forms for all northern businesses, nonprofit organizations, governmental units, and households were then compiled and entered into the appropriate cells in blocks 2, 4, 5, and 6. The values for the cells in blocks 1 and 3 were then obtained by subtraction from the 11-sector total county matrix. The transactions matrix for the 22 by 22 interregional model is shown in Table 34.

The technical coefficients (a) are calculated in a straightforward manner, the same as for other Leontief input-output matrices. That is, a_{32}^{11} is the amount of purchases by southern retail stores from every unit of output of southern manufacturing establishments and is derived from the equation:

$$a_{32}^{11} = \frac{x_{32}^{11}}{x_2^1}$$

Likewise, a_{32}^{21} is the amount of purchases by northern retail stores from

TABLE 34.   TRANSACTIONS MATRIX - INTERREGIONAL MODEL.   CLINTON COUNTY, PENNSYLVANIA. 1963. ($1000 units)

	\ SOUTHERN — pri-mary 1	mfg 2	retail 3	ser-vice 4	trans 5	con-str 6	whlsl 7	util 8	govt 9	hshlds 10	ovd 11	Total 12	NORTHERN — pri-mary 13	mfg 14	re-tail 15	ser-vice 16	trns 17	cons 18	whls 19	util 20	gov 21	hshlds 22	ovd 23	Total 24	Total internal 25	Total external 26	Total activity 27
S. Primary 1	175	801	432			116	100			50		1,674			49		36				5			90	1,764	2,289	4,053
S. Mfg 2	433	1,613	1,343	104	7	12	67	13	283	710	1826	6,411		1	2				1		64	50		118	6,529	105,125	111,654
S. Retail 3	840	984	1,078	895	115	871	311	18	216	28,117	219	33,664	32	17	74	94	60		12	26	21	2,522		2,858	36,522	8,661	45,183
S. Service 4	102	487	362	558	22	105	66	38	117	7,766	532	10,155	30		31	86	14		2	3	16	808		990	11,145	6,155	17,300
S. Transprt 5	30	215	26	2	254	40		9	210	250		1,036			16							20		36	1,072	2,434	3,506
S. Constrctn 6	18	271	142	1122	39	350	120	9	783	712		3,566	10	10	13	139	25			20	25	83		325	3,891	1,227	5,118
S. Wholesale 7	127	556	3,489	205	191	74	68	17	103	1,637		6,467	10		137	19	10		2	6	14	131		329	6,796	4,944	11,740
S. Utility 8	39	1,211	510	316	19	41	84	60	85	1,554		3,919	3	6	25	20	16		1	2	5	688		766	4,685	166	4,851
S. Gov't 9	44	300	277	220	13	12	25	22	264	2,296	8	3,481		1	1	1	5					69		77	3,558	3,371	6,929
S. Hshlds 10	1255	27,571	7,058	7475	725	1440	1,831	718	3085	1,588		52,746								·*		11		11	52,757	11,876	64,633
S. Ovdep 11		931		9						857		1,797													1,797	788	2,585
Total 12	3063	34,940	14,717	10,906	1385	3061	2,672	904	5146	45,537	2585	124,916	85	35	348	359	166		18	57	150	4,382		5,600	130,516	147,036	277,552
N. Primary 13		73	5								5	83	5	2		4						5		16	99	1,309	1,408
N. Mfg 14			2					2		2		6			2	1			1	1		4		9	15	1,755	1,770
N. Retail 15						79			18			97	44	12	30	27	50	1		13	36	2,710		2,923	3,020	894	3,914
N. Service 16													3	1	6	6	5	1	3	8		1,238	147	1,418	1,418	731	2,149
N. Transprt 17	10	2,457	30			100						2,597	30	10	10		3	1			34			88	2,685	693	3,378
N. Constrct 18																						5		5	5		5
N. Wholesale 19						16		5				21	39		187	6	49			1		43		325	346	28	374
N. Utility 20														4	33	19	6			1	13	217		293	293		293
N. Gov't 21	10											10	78	1	49	8	17		1	4	1	458		617	627	500	1,127
N. Hshlds 22		1,503	267	117	31	49	47	38	36			2,088	608	412	634	943	2446	2	57	78	550	232		5,962	8,050	3,057	11,107
N. Ovdep 23																						147		147	147		147
Total 24	20	4,033	304	117	31	244	47	45	54	7		4,902	802	445	953	1010	2580	5	62	106	634	5,059	147	11,803	16,705	8,967	25,672
Tot. Intrnl 25	3083	38,973	15,021	11,023	1416	3305	2,719	949	5200	45,544	2585	129,818	887	480	1301	1369	2746	5	80	163	784	9,441	147	17,403	147,221		
Tot. Extrnl 26	970	72,681	30,162	6,277	2090	1813	9,021	3902	1729	19,089		147,734	521	1290	2613	780	632		294	130	343	1,666		8,269		156,003	
Total Actvty 27	4053	111,654	45,183	17,300	3506	5118	11,740	4851	6929	64,633	2585	277,552	1408	1770	3914	2149	3378	5	374	293	1127	11,107	147	25,672			303,224

every unit of production of southern manufacturing establishments, and
is calculated from the equation:

$$a_{32}^{21} = \frac{x_{32}^{21}}{x_2^1}$$

Table 35 shows the matrix of technical coefficients for the 22 by 22
interregional model.

The problem is programmed and elements of the inverse matrix cal-
culated the same as for other matrices presented in this study; that
is, through use of the simplex algorithm by means of a digital computer.
The model is structured as a linear programming problem, and the output
provides us with activity levels for each sector of each region as well
as the total activity level for the county as a whole. Elements of the
inverse of the Leontief matrix, or the interdependency coefficients,
for the 22 by 22 interregional model are shown in Table 36.

Comparison of the Two Regions

The strong economic tie-in of the northern region to the southern
region becomes readily apparent from examination of Table 34. One need
merely compare block 2 of the Transactions Matrix (northern region
purchases from southern region) with block 4 (southern region purchases
from northern region). Many cells in block 2 have entries, whereas in
block 4 only a few cells show transactions taking place. Comparison of
the Household sector rows and columns for these two blocks is particu-
larly revealing. Northern Households purchased heavily from southern

TABLE 35. TECHNICAL COEFFICIENTS MATRIX, INTERREGIONAL MODEL - CLINTON COUNTY, PENNSYLVANIA. 1963.

	SOUTHERN											NORTHERN										
	Prim 1	Mfg 2	Retail 3	Servic 4	Trans 5	Const 6	Whlsl 7	Util 8	Gov't 9	Hshlds 10	Ovdep 11	Prim 12	Mfg 13	Retail 14	Serv 15	Trans 16	Const 17	Whlsl 18	Util 19	Govt 20	Hshlds 21	Ovdep 22
Primary 1	.04318	.00717	.00956			.02267	.00852			.00077				.01252		.01066				.00444		
S Mfg 2	.10683	.01445	.02972	.00601	.00200	.00234	.00571	.00268	.04084	.01098	.70639		.00056	.00051				.00267		.05679	.00450	
O Retail 3	.20725	.00881	.02386	.05173	.03280	.17018	.02649	.00371	.03117	.43503	.08472	.02273	.00961	.01891	.04374	.01776		.03208	.08874	.01863	.22707	
U Service 4	.02517	.00436	.00801	.03226	.00627	.02052	.00562	.00783	.01689	.12016	.20580	.02131		.00792	.04002	.00414		.00535	.01024	.01420	.07276	
T Transp 5	.00740	.00193	.00058	.00011	.07245	.00782		.00186	.03031	.00387				.00409							.00180	
H Const 6	.00444	.00243	.00314	.06485	.01112	.06839	.01022	.00186	.11300	.01102		.00710	.00565	.00332	.06468	.00740		.06826	.02218	.00747		
E Wholesl 7	.03133	.00498	.07722	.01185	.05448	.01446	.00579	.00350	.01486	.02533		.00710		.03500	.00884	.00296		.00535	.02048	.01242	.01179	
R Utility 8	.00962	.01085	.01129	.01826	.00542	.00801	.00716	.01237	.01227	.02404		.00213	.00339	.00638	.00931	.00474		.00267	.00682	.00444	.06194	
N Gov't 9	.01086	.00269	.00613	.01271	.00371	.00234	.00213	.00453	.03810	.03552	.00309		.00056	.00026	.00046	.00148					.00621	
Hshlds 10	.30966	.24693	.15621	.43210	.20679	.28136	.15596	.14801	.44523	.02457											.00099	
Ovdep 11		.00834		.00052						.01326												
Primary 12		.00065	.00011							.00008		.00282	.00051		.00118						.00045	
N Mfg 13			.00004					.00041		.00003				.00051	.00047			.00267	.00341		.00036	
O Retail 14				.01544					.00260			.03125	.00678	.00766	.01256	.01480	.2000	.04438		.03194	.24399	
R Service 15												.00213	.00057	.00153	.00279	.00148	.2000	.00802	.02730		.11146	1.000
T Transp 16	.00247	.02201	.00066			.01954						.02131	.00565	.00255		.00089	.2000			.03017		
H Const 17																					.00045	
E Whlsl 18						.00312		.00103				.02770		.04779	.00279	.01451			.00341		.00387	
R Utility 19													..00226	.00843	.00884	.00178			.00341	.01154	.01954	
N Gov't 20	.00246											.05539	.00056	.01252	.00372	.00503		.00267	.01365	.00089	.04124	
Hshlds 21			.01346	.00592	.00676	.00884	.00957	.00400	.00784	.00519		.43182	.23277	.16199	.43882	.72410	.4000	.15242	.26621	.48802	.02089	
Ovdep 22																					.01323	
Internal	.76067	.34906	.33245	.63716	.40388	.64576	.23160	.19563	.75046	.70466	1.00	.62997	.27118	.33240	.63704	.81291	1.000	.21390	.55631	.69566	.85001	1.000
External	.23933	.65094	.66755	.36284	.59612	.35424	.76840	.80437	.24954	.29534		.37003	.72882	.66760	.36296	.18709		.78610	.44369	.30434	.14999	
Total	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

TABLE 36. INTERDEPENDENCY COEFFICIENTS MATRIX, INTERREGIONAL MODEL - CLINTON COUNTY, PENNSYLVANIA. 1963.

		SOUTHERN											NORTHERN										
		Prim 1	Mfg. 2	Retl 3	Serv 4	Trns 5	Cnst 6	Whls 7	Util 8	Govt 9	Hshld 10	Ovdp 11	Prim 12	Mfg. 13	Retl 14	Serv. 15	Trns 16	Cnstr 17	Whlsl 18	Util 19	Govt 20	Hshld 21	Ovdep 22
	Primary	1	1.0531	.0109	.0133	.0073	.0037	.0320	.0113	.0017	.0093	.0090	.0104	.0068	.0029	.0162	.0078	.0194	.0126	.0022	.0075	.0126	.0099	.0078
S	Mfg.	2	.1440	1.0363	.0434	.0349	.0170	.0314	.0169	.0114	.0737	.0494	.7431	.0194	.0081	.0105	.0184	.0237	.0216	.0091	.0163	.0766	.0277	.0184
O	Retail	3	.4856	.1830	1.1510	.3668	.1944	.4277	.1382	.1030	.3873	.5909	.3035	.2346	.1090	.1144	.2719	.3199	.2971	.1030	.2600	.2576	.3898	.2719
U	Service	4	.1046	.0563	.0444	1.1218	.0523	.0926	.0374	.0366	.1165	.1698	.2748	.0902	.0321	.0376	.1111	.1017	.1010	.0285	.0630	.0902	.1272	.1111
T	Transp	5	.0128	.0047	.0028	.0054	1.0805	.0129	.0018	.0036	.0398	.0080	.0048	.0034	.0016	.0060	.0040	.0048	.0053	.0011	.0032	.0040	.0059	.0039
H	Const	6	.0269	.0150	.0137	.0931	.0246	1.0922	.0188	.0095	.1495	.0368	.0314	.0319	.0164	.0145	.0943	.0392	.0456	.0081	.0921	.0493	.0400	.0943
E	Wholesl	7	.0889	.0310	.0979	.0612	.0844	.0663	1.0240	.0181	.0709	.0829	.0430	.0461	.0177	.0534	.0506	.0557	.0581	.0196	.0572	.0551	.0654	.0506
R	Utility	8	.0350	.0263	.0226	.0436	.0192	.0314	.0163	1.0207	.0409	.0437	.0296	.0492	.0259	.0256	.0553	.0730	.0670	.0183	.0397	.0559	.0906	.0553
N	Gov't	9	.0374	.0182	.0179	.0413	.0185	.0252	.0123	.0137	1.0706	.0537	.0262	.0114	.0057	.0058	.0136	.0170	.0150	.0040	.0101	.0132	.0194	.0135
	Hshlds	10	.5420	.3427	.2510	.6301	.3208	.4723	.2241	.2037	.6930	1.2671	.3951	.1151	.0494	.0635	.1511	.1494	.1432	.0426	.1234	.1436	.1760	.1511
	Ovdep	11	.0084	.0132	.0037	.0092	.0044	.0066	.0031	.0028	.0099	.0173	1.0116	.0017	.0007	.0009	.0022	.0022	.0021	.0007	.0018	.0026	.0026	.0022
	Primary	12	.0002	.0008	.0002	.0001	.0001	.0002	.0001		.0002	.0002	.0006	1.0004	.0030	.0007	.0004	.0018	.0009	.0001	.0003	.0005	.0008	.0004
N	Mfg.	13	.0001		.0001	.0001		.0001		.0004	.0001	.0001	.0001	.0005	1.0002	.0008	.0009	.0007	.0008	.0028	.0037	.0005	.0009	.0009
O	Retail	14	.0046	.0105	.0033	.0059	.0043	.0277	.0023	.0031	.0101	.0033	.0089	.1789	.0788	1.0633	.1483	.2335	.4077	.0473	.1360	.1890	.2968	.1483
R	Service	15	.0020	.0050	.0015	.0022	.0019	.0053	.0010	.0015	.0025	.0013	.0041	.0755	.0367	.0297	1.0705	.1116	.3022	.0318	.0724	.0787	.1495	1.0705
T	Transp	16	.0067	.0234	.0020	.0029	.0010	.0226	.0009	.0005	.0049	.0022	.0173	.0256	.0069	.0041	.0037	1.0045	.2041	.0009	.0037	.0345	.0042	.0037
H	Const	17												.0003	.0001	.0001	.0002	.0004	1.0004	.0001	.0002	.0003	.0005	.0002
E	Whlsl	18	.0005	.0011	.0003	.0007	.0004	.0053	.0002	.0013	.0012	.0004	.0010	.0393	.0053	.0519	.0126	.0297	.0267	1.0031	.0119	.0125	.0196	.0126
R	Utility	19	.0004	.0010	.0003	.0004	.0004	.0012	.0002	.0003	.0005	.0002	.0008	.0145	.0090	.0138	.0216	.0223	.0226	.0045	1.0125	.0264	.0277	.0216
N	Gov't	20	.0033	.0020	.0006	.0008	.0007	.0023	.0004	.0005	.0010	.0005	.0016	.0823	.0138	.0228	.0283	.0448	.0407	.0112	.0305	1.0297	.0537	.0283
	Hshlds	21	.0154	.0394	.0120	.0170	.0152	.0411	.0077	.0117	.0196	.0101	.0324	.5782	.2854	.2177	.5338	.8700	.7978	.1878	.3549	.6194	1.1838	.5338
	Ovdep	22	.0002	.0005	.0002	.0002	.0002	.0005	.0001	.0002	.0003	.0001	.0004	.0076	.0038	.0029	.0071	.0115	.0105	.0025	.0047	.0082	.0157	1.0071
	Total		2.5722	1.8214	1.6821	2.4452	1.8442	2.3967	1.5169	1.4445	2.7016	2.3472	2.9407	2.6128	1.7126	1.7561	2.6076	3.1368	3.5831	1.5294	2.3053	2.7604	2.7074	3.6076

activities (column 22, rows 1 through 10); the total amounting to almost $4.4 million. On the other hand, Southern Households purchased only $7,000 from northern activities (column 10, rows 13 and 14). Insofar as household income is concerned, Northern Households earned about $2 million from southern activities, whereas Southern Households earned only $11,000 from Northern Households.

Total income, direct and indirect, of all northern sectors was about $25,672,000, or 8.5 percent of the county total of $303,224,000. Of the total income to the northern region, $4.9 million, or 19 percent, was received from the southern region, whereas only $5.6 million, or 2 percent of the total income to the southern region, was received from the northern region. The northern region, in effect, had a negative "balance of payments" with the southern region of about $700,000. Table 37 summarizes much of the data from the transactions matrix to show the economic interrelationships of these two regions.

Comparison by regions of item 5 with item 4 in Table 37 shows the predominance of the southern region in terms of basic activity. This predominance is also reflected in the figures in item 7, and shows the greater importance of the southern region as compared to the northern region in providing basic income for the county economy. It is interesting to note, however, that if one considers the northern region as a separate economic entity, its exports as a percent of its total economic activity would then be in almost the same proportion as for the southern region, or items 7 plus 8. We would have:

TABLE 37

COMPARISON OF INCOMES AND EXPENDITURES
FOR THE NORTHERN AND SOUTHERN REGIONS

		Southern Region %	Northern Region %
1.	Regional population as percent of county total	81.0	19.0
2.	Regional household income as percent of total county household income	85.3	14.7
3.	Regional household income as percent of total regional income	23.3	43.3
4.	Regional total economic activity as percent of county total economic activity	91.5	8.5
5.	Regional primary and manufacturing income as percent of total county primary and manufacturing income	97.3	2.7
6.	Regional government sector income as percent of total regional income	2.5	4.4
7.	Regional exports or basic activity as percent of total regional income	53.0	34.9
8.	Percent of total regional income received from adjoining region	2.0	19.1
9.	Percent of total regional income earned from within own region	45.0	46.0
10.	Percent of total regional household income received from adjoining region	--	19.0
11.	Percent of total regional household income received from within own region	81.6	53.6
12.	Percent of total regional household income received from external sources	18.4	27.4
13.	Percent of total regional household income spent within own region	70.5	45.5
14.	Percent of total regional household income spent in adjoining region	--	39.5
15.	Percent of total regional household income spent externally	29.5	15.0

Northern region - 34.9 plus 18.1 = 54.0%

Southern region - 53.0 plus 2.0 = 55.0%

Item 8 shows the much greater dependence of the northern region on the southern region, rather than the reverse, insofar as income is concerned. Northern Households received, on the average, 19 percent of their total income from the southern region as compared to virtually no household income flowing into the southern region from the north (item 10). Northern Households, on the other hand, realized a considerably larger proportion of their income from sources external to the county than did Southern Households (27.4 percent versus 18.4 percent), as shown in item 12. This was not as a result of more commuting to outside jobs by Northern Households, but rather a greater amount of transfer income, mostly social security, flowing into Northern Households from external governmental sources. At the same time, Northern Households spent a considerably smaller portion of their income outside the county than did Southern Households. This, in part, would probably be because of the relative inaccessibility of external retail markets for Northern Households as compared to Southern Households. Northern Households, however, spent a considerably greater sum in the adjoining southern region (nearly 40 percent), whereas Southern Households spent virtually nothing in the adjoining northern region.

The data presented here illustrate well the strong economic attachment of the northern regional economy to the southern regional economy. The data point sharply to nodal influences of a trading and manufacturing center on the local economies of nearby areas.

A comparison of the partial and total export demand multipliers for various sectors by regions, as shown in Table 38, further reflects the greater economic dependence of the northern region on the southern region. These multipliers, as explained previously, are the interdependency coefficients for various regional activities.

Interpretation of the multiplier values in Table 38 for the interregional model is quite straightforward. Taking Southern Manufacturing (row 3) as an example, and reading across the row from left to right, the values have the following meanings. For every one dollar of export sales by Southern Manufacturing activities, Southern Households (column 1) must produce or generate, directly and indirectly, about 34 cents worth of economic activity; Northern Households (column 2) about 4 cents worth; and all households in the county, northern and southern (column 3), about 38 cents worth of economic activity. The same export dollar will also require, directly and indirectly, about 2 cents worth of economic activity from Northern and Southern Governmental units (column 4), for a total residual county income (column 5) of about 40 cents from each dollar of export demand for Southern Manufacturing activities.[1] In total, for every dollar of sales to final demand, Southern Manufacturing activities generate directly and indirectly about $1.82

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[1] Residual county income in the case of this interregional model does not include the returns to nonprofit organizations as it did in the case of the full 54-sector county model. The direct and indirect returns to nonprofit organizations in the case of the interregional model are buried in the data for the two regional service sectors and cannot be separated out. Nonprofit organizations would have to be treated as individual sectors for both regions in order to derive direct and indirect returns to them.

TABLE 38

PARTIAL AND TOTAL EXPORT DEMAND MULTIPLIERS
FOR INTERREGIONAL MODEL

| | Households | | | Total Government | Residual Income | Export Demand |
	Southern 1	Northern 2	Total 3	4	5	6
Southern Primary	.542	.015	.557	.040	.597	2.572
Northern Primary	.115	.578	.693	.093	.786	2.613
Southern Mfg.	.343	.039	.382	.020	.402	1.821
Northern Mfg.	.049	.285	.334	.020	.354	1.713
Southern Retail	.251	.012	.263	.019	.282	1.682
Northern Retail	.063	.218	.281	.029	.310	1.756
Southern Service	.630	.017	.647	.042	.689	2.445
Northern Service	.151	.534	.685	.042	.727	2.608
Southern Transp.	.321	.015	.336	.019	.355	1.844
Northern Transp.	.149	.870	1.019	.062	1.081	3.137
Southern Const.	.472	.041	.513	.027	.540	2.397
Northern Const.	.143	.798	.941	.056	.997	3.583
Southern Whlsl.	.224	.008	.232	.012	.244	1.517
Northern Whlsl.	.043	.188	.231	.015	.246	1.529
Southern Utility	.204	.012	.216	.014	.230	1.444
Northern Utility	.123	.355	.478	.041	.519	2.305
Southern Governments	.693	.019	.712	1.071	1.783	2.702
Northern Governments	.144	.619	.763	1.043	1.806	2.760
Southern Hshlds.	1.267	.010	1.277	.055	1.332	2.347
Northern Hshlds.	.176	1.184	1.360	.073	1.433	2.707
Southern Ovdep	.395	.032	.427	.028	.455	2.941
Northern Ovdep	.151	.534	.685	.041	.726	3.608
Total County	4.15	.071	.486	.052	.538	1.944

worth of economic activity (column 6) for both the northern and southern regions. The same interpretation is applicable to the other 21 regional sectors shown in Table 38.

Manufacturing is the only activity that has a total multiplier for the establishments in the southern region exceeding in value the multiplier for the northern establishments. All other sector activities show a higher total export demand multiplier for the northern establishments than for the southern establishments (comparison of regional pairs in column 6). This is due to the greater volume of purchases by northern activities in the southern sectors than purchases by southern activities in northern sectors. (It will be remembered that northern households were particularly heavy purchasers in the southern region.) Therefore, the dollar of income from export sales by northern activities will generate a greater amount of economic activity for the county as a whole than a dollar of export sales income to southern activities.

Comparison of multiplier values for Southern Households (column 1) from northern activities with the values for Northern Households (column 2) from southern activities is rather striking. In every case, the multiplier value of the former is greater than the multiplier value of the latter. For example, for every dollar of final demand to the Northern Retail sector, Southern Households must generate about 6 cents worth of economic activity (column 1), whereas Northern Households need only generate about 1 cent of activity for every dollar of final demand to the Southern Retail sector (column 2). In the first instance, the 6 cents the Southern Households must generate is all indirect, result-

ing primarily from purchases by Northern Households from southern
activities. In the second instance, the 1 cent the Northern Households
must generate is mostly all direct, resulting from employment of north-
ern residents in the Southern Retail sector (a total of $267,000 in
wages was paid for such labor services -- see row 22, column 3,
Table 34).

Comparison of total indirect internal multipliers for the two
regions in terms of the interregional model further substantiates the
greater economic attachment of the northern region to the southern
region. Alignment of relevant data for the two regions shows the
following (in terms of $1 million units):

| | Primary | | | Indirect | | | Total | Int. | Ind. Int. |
| | Int. | Ext. | Total | Int. | Ext. | Total | Exp. | Coeff. | Mult. |
	1	2	3	4	5	6	7	8	9
S. Region	59.9	87.2	147.0	70.6	59.9	130.5	277.6	.407	1.180
N. Region	5.6	3.4	9.0	11.1	5.6	16.7	25.7	.622	1.994

The northern region initially spends a considerably larger amount
within the county, about 62 cents, of its aggregate final demand dollar
than does the southern region, which initially spends locally about 41
cents of its aggregate final demand dollar (column 8). For each dollar
spent within the county from final demand to the southern region, an
additional $1.18 in economic activity in the county will be generated.
On the other hand, for each dollar spent within the county from final
demand to the northern region, an additional $1.99 in economic activity
in the county will be generated (column 9).

The situation is altogether different, however, if one considers the regions separately and not within the framework of the county as a whole (by regarding the respective adjoining region as part of the outside world). Alignment of the relevant data in such a situation shows the following:

| | Primary | | | Indirect | | | Total | Int. | Ind. Int. |
	Int. 1	Ext. 2	Total 3	Int. 4	Ext. 5	Total 6	Exp. 7	Coeff. 8	Int. Mult. 9
S. Region	57.9	94.6	152.6	66.9	58.0	124.9	277.6	.380	1.154
N. Region	7.0	6.9	13.9	4.8	7.0	11.8	25.7	.503	.693

Column 8 shows that while a greater share of final demand income will still be initially spent by northern sectors within their own region (.503) than by southern sectors within their own region (.380), the amount of indirect income in each region generated by a dollar of local expenditures is much less for the northern region. This indirect internal income is $1.15 for each locally spent dollar in the southern region and $.69 in the northern region. The lower value in the northern region in this case reflects the lack of diversity of mix of economic activities in the northern region as compared to the southern region. The economy of the northern region is less complex and extensive than is the economy of the southern region. In the previous case, however, where the interregional economy of the entire county was taken into consideration, the higher indirect internal multiplier value for the northern region as compared to the southern region reflected the high dependence of the northern economy on the activities of the

southern economy.

Table 39 shows, in terms of the interregional model, the same analysis extended to individual sectors, but in terms of multipliers rather than absolute values. Indirect external coefficients by sectors are not shown since they are the same as primary internal coefficients by sectors. The total indirect multiplier for each sector is the total export demand multiplier for that sector less 1.000. It will be noted that the indirect internal multipliers for the northern activity sectors are, in every case, larger in value than the corresponding multipliers for the southern activity sectors. Again, this reflects the greater economic dependency of the northern region on the southern region.

Table 40 shows interdependency coefficients by sectors and regions, together with their absolute values, to portray with even more clarity the interdependency of the two regions. Columns 1 and 2 sum by regions the interdependency coefficients for the 22 sectors in Table 36, the interdependency matrix. Columns 3 and 4 in Table 40 show the absolute values, obtained by multiplying the corresponding multipliers in columns 1 and 2 by the appropriate final demand for each sector. Comparison of the northern region multipliers in the upper half of column 2 with the southern region multipliers in the lower half of column 1 shows the greater dependence of the northern region on the economy of the souther region than the reverse. Southern region multipliers for northern activity sectors (column 1, lower half) are all much greater in value than their counterparts in the upper half of column 2.

TABLE 39

INDIRECT INTERNAL MULTIPLIERS BY REGIONAL SECTORS

	Direct		Indirect		Indirect
	Primary Internal 1	Primary External 2	Internal 3	Total 4	Internal Multiplier 5
Southern Primary	.761	.239	.811	1.572	1.066
Northern Primary	.630	.370	.983	1.613	1.560
Southern Manufacturing	.349	.651	.472	.821	1.352
Northern Manufacturing	.271	.729	.432	.713	1.594
Southern Retail	.332	.668	.350	.682	1.054
Northern Retail	.332	.668	.424	.756	1.277
Southern Service	.637	.363	.808	1.445	1.268
Northern Service	.637	.363	.971	1.608	1.524
Southern Transportation	.404	.596	.440	.844	1.089
Northern Transportation	.813	.187	1.324	2.137	1.629
Southern Construction	.646	.354	.751	1.397	1.163
Northern Construction	1.000	--	1.583	2.583	1.583
Southern Wholesale	.232	.768	.285	.517	1.228
Northern Wholesale	.214	.786	.315	.529	1.472
Southern Utility	.196	.804	.248	.444	1.266
Northern Utility	.556	.444	.749	1.305	1.347
Southern Governments	.750	.250	.952	1.702	1.269
Northern Governments	.696	.304	1.064	1.760	1.529
Southern Households	.705	.295	.642	1.347	.911
Northern Households	.850	.150	.857	1.707	1.008
Southern Ovdep	1.000	--	.941	1.941	.941
Northern Ovdep	1.000	--	1.608	2.608	1.608

TABLE 40

REGIONAL INTERDEPENDENCY OF EXPORT DEMAND BY SECTORS

	Multipliers		Values		Percent of Total Sector Activity		Percent of Total Region- al Activity	
	South. Region 1	North. Region 2	South. Region 3	North. Region 4	South. Region 5	North. Region 6	South. Region 7	North. Region 8
So. Primary	2.539	.033	$5,811	$77	99	1	2	--
So. Mfg.	1.738	.084	182,668	8,806	95	5	66	34
So. Retail	1.662	.020	14,392	177	99	1	5	1
So. Service	2.415	.030	14,863	187	99	1	5	1
So. Transp.	1.820	.024	4,430	59	99	1	2	--
So. Const.	2.290	.106	2,810	131	96	4	1	1
So. Whlsl.	1.504	.013	7,436	63	99	1	3	--
So. Utility	1.425	.020	237	3	99	1	--	--
So. Gov't.	2.661	.040	8,971	136	99	1	3	1
So. Hshlds.	2.329	.019	27,655	220	99	1	10	1
So. Ovdep	2.873	.067	2,264	53	98	2	1	--
Total Southern			$271,537	$9,912			98	39
No. Primary	.610	2.003	798	2,622	23	77	--	10
No. Mfg.	.269	1.443	473	2,533	16	84	--	10
No. Retail	.348	1.408	311	1,259	20	80	--	5
No. Service	.780	1.827	570	1,336	30	70	--	5
No. Transp.	.806	2.331	559	1,615	26	74	--	6
No. Const.	--	--	--	--	--	--	--	--
No. Whlsl.	.237	1.292	7	36	16	84	--	--
No. Utility	--	--	--	--	--	--	--	--
No. Gov't.	.761	2.000	380	1,000	28	72	--	4
No. Hshlds.	.954	1.753	2,918	5,358	35	65	1	21
No. Ovdep	--	--	--	--	--	--	--	--
Total Northern			$ 6,016	$15,759			2	61
Total County			$277,553	$25,671			100	100

Columns 5 and 6 show the proportion of each regional sector's total activity attributable to each of the two regions (sector row), while columns 7 and 8 show the proportion of each region's total activity attributable to each sector.

Reading across the Southern Manufacturing sector row may help to clarify the meaning of the data in the different columns. Column 1 shows that for every dollar of final demand to Southern Manufacturing establishments, the southern region as a whole must produce, directly and indirectly, about $1.74 in economic activity while the northern region must produce about 8 cents worth of activity (column 2). In terms of total value, this means that to enable the Southern Manufacturing sector to meet its final demand of $105.1 million, all sectors in the southern region must produce about $182.7 million worth of activity (column 3) and all sectors in the northern region about $8.8 million worth of activity (column 4). The $182.7 million worth of activity for all southern sectors represents 95 percent (column 5) of the total direct and indirect activity generated in the county by Southern Manufacturing final demand and the $8.8 million, or the balance of this total, about 5 percent (column 6). The $182.7 million also represents about 66 percent of the total value of all economic activity in the southern region (column 7). The $8.8 million represents 34 percent of the total value of all economic activity in the northern region (column 8).

From the regional sums in columns 7 and 8 of Table 40 it can be seen that for the southern region about $6 million or 2 percent of its

total income of $277.6 million is generated, directly and indirectly,
by export activity of the northern region. On the other hand, 39
percent or $9.9 million of the total income of about $25.7 million to
the northern region was directly and indirectly attributable to export
demand activity of southern sectors. The disproportionate balance in
income shares between these two regions as shown in these figures lends
support to the type of program suggested by some researchers and planners
whereby development efforts and funding within Appalachia should be con-
centrated in those areas with some degree of nodal influence already
evident and showing the most potential for future growth.

LITERATURE CITED

1. Leontief, W. The Structure of the American Economy, 1919-1939.
   2nd Ed. Rev. Oxford University Press, New York, 1951.

2. Walras, L. Elements of Pure Economics. Translated by W. Jaffe,
   London, Allen and Unwin, 1954, 620 pp.

3. Goldman, M. R., Marimont, M. L. and Vaccara, B. N. "The Inter-
   industry Structure of the United States: A Report on the 1958
   Input-Output Study," Survey of Current Business. U. S. Dept. of
   Commerce, Washington, D. C. Vol. 44, No. 11, Nov. 1964, pp. 10-30.

4. Carter, H. O. and Heady, E. O. An Input-Output Analysis Emphasiz-
   ing Regional and Commodity Sectors of Agriculture. Res. Bull.
   469, Agr. and Home Econ. Exp. Sta., Iowa State University, Ames,
   Iowa, 1959.

5. Moses, L. N. "The Stability of Interregional Trading Patterns and
   Input-Output Analysis," Am. Econ. Rev. Vol. 45, No. 5, Dec. 1955,
   pp. 803-832.

6. Moore, F. T. and Petersen, J. W. "Regional Analysis: An Interin-
   dustry Model of Utah," Rev. of Econ. and Stat. Vol. 37, Nov.
   1955, pp. 368-383.

7. Martin, W. E. and Carter, H. O. A California Interindustry
   Analysis Emphasizing Agriculture, Part 1 and 2. Calif. Ag. Exp.
   Sta. Giannini Foundation Res. Rep. No. 250, Feb. 1962.

8. Hansen, W. L. and Tiebout, C. M. "An Intersectoral Flows Analysis
   of the California Economy," Rev. of Econ. and Stat. Vol. 45,
   No. 4, Nov. 1963, pp. 409-418.

9. Carden, J. G. D. and Whittington, F. B., Jr. Studies in the
   Economic Structure of the State of Mississippi. Vol. 1 and 2.
   Miss. Ind. and Tech. Research Comm., 1964.

10. University of Maryland. "A Regional Interindustry Study of Mary-
    land," Studies in Business and Economics. Bur. of Bus. and Econ.
    Res., College Park, Md. Vol. 8, No. 2, Sept. 1954.

11. Hoch, I. Chicago Area Transportation Study; Forecasting Economic
    Activity for the Chicago Region. Chicago, May, 1959.

12. Hirsch, W. Z. "Interindustry Relations of a Metropolitan Area," Rev. of Econ. and Stat. Vol. 41, No. 4, Nov. 1959, pp. 360-369.

13. Leven, C. L. "Regional Income and Product Accounts: Construction and Application," Design of Regional Accounts. Ed. by W. Hochwald. Resources for the Future, Johns Hopkins Press, Baltimore, Md., 1961, pp. 148-195.

14. Hochwald, W., Striner, H. E. and Sonenblum, S. Local Impact of Foreign Trade: A Study in Methods of Local Economic Accounting. National Planning Association, Washington, D. C., 1960.

15. Jansma, J. D. and Back, W. B. Local Secondary Effects of Water-shed Projects: A Case Study of Roger Mills County, Oklahoma. Econ. Res. Serv. Bull. 178, Resource Dev. Econ. Div., U. S. Dept. Agric., Washington, D. C., May 1964.

16. Lund, R. E. An Analysis of a Local Economy in a Period of Rapid Transition. College of Commerce and Industry, University of Wyoming, Laramie, 1962.

17. Harmston, F. K. A Study of the Resources, People, and Economy of Carbon County, Wyoming, 1962. College of Commerce and Industry, University of Wyoming, Laramie, 1962.

18. Rao, A. S. and Allee, D. J. Analysis of Economic Growth in Agricultural Areas: An Application of Input-Output Analysis With Special Reference to San Benito County, California. Unpublished manuscript. Agric. Exp. Sta., University of Calf., Berkely, not dated.

19. Gamble, H. B. An Input-Output Model Incorporating Impact Analysis to Evaluate the Resources and Economy of a Rural Appalachian Community. Unpublished Doctoral dissertation. The Pennsylvania State University, University Park, Pa., 1965.

20. U. S. Department of Commerce. The Skier Market in Northeastern North America. Area Redevelopment Authority, Washington, D. C., 1964.

SELECTED REFERENCES

Chenery, H. B. and Clark, P. G. Interindustry Economics. John Wiley and Sons, Inc., New York, 1959, 345 pp.

Dorfman, R. "The Nature and Significance of Input-Output," Rev. of Econ. and Stat. Vol. 36, No. 1, May 1954, pp. 121-133.

Fox, K. A. "The Study of Interactions Between Agriculture and the Nonfarm Economy; Local, Regional and National," Journ. Farm Econ. Vol. 44, No. 1, Feb. 1962, pp. 1-34.

Friedman, J. and Alonso, W., Editors, Regional Development and Planning, A Reader. The M.I.T. Press, Cambridge, Mass., 1964, 722 pp.

Hamburg, M. and Langford, T. W., Jr. Selected Methods of Analysis for Urban Economic Planning and Development in Pennsylvania; Commentary on Regional Economic Accounting Systems, Benefit-Cost Analysis and Statistical Decision Theory. Department of Internal Affairs, Commonwealth of Pennsylvania, Release No. S-11c, 1964, 63 pp.

Hirsch, W. Z. (Ed.). Elements of Regional Accounts. Resources for the Future, The Johns Hopkins Press, Baltimore, Md., 1964, 221 pp.

Hochwald, W. (Ed.). Design of Regional Accounts. Resources for the Future, The Johns Hopkins Press, Baltimore, Md., 1961, 281 pp.

Isard, W. Methods of Regional Analysis: An Introduction to Regional Science. John Wiley and Sons, Inc., New York, 1960, 784 pp.

Leontief, W. and others. Studies in the Structure of the American Economy. Oxford University Press, New York, 1953, 561 pp.

Leven, C. L. Theory and Method of Income and Product Accounts. Center for Regional Economic Studies, University of Pittsburgh, Pittsburgh, Pa., reprinted 1963, 293 pp.

Meyer, J. R. "Regional Economics; A Survey," The Am. Econ. Rev. Vol. 53, No. 1, March 1963, pp. 19-54.

Palmer, E. Z. (Ed.) and others. The Community Economic Base and Multiplier. University of Nebraska Publication No. 199, The University of Nebraska, Lincoln, 1958, 144 pp.

Perloff, H. S., Dunn, E. S., Jr., Lampard, E. E., and Muth, R. F. Regions, Resources, and Economic Growth. Resources for the Future, The Johns Hopkins Press, Baltimore, Md., 1960, pp. 87-96.

Petersen, J. W. Regional Economic Forecasting: A Survey of Available Techniques. Report prepared for the National Aeronautics and Space Administration, Washington, D. C., 1964, 58 pp.

Ryan, J. N. "The Leontief System," South. Econ. Journ. Vol. 19, No. 4, 1953, pp. 481-489.

Tiebout, C. M. "Community Income Multiplier: A Population Growth Model," Journ. Reg. Science. Vol. 2, No. 1, 1960, pp. 75-84.

Tiebout, C. M. The Community Economic Base Study. Supplementary Paper No. 16, The Committee for Economic Development, New York, 84 pp.

APPENDIX

Figure A: Advance letter sent to Industrial Firms

<div align="center">

PENNSYLVANIA REGIONAL ANALYSIS GROUP
120 Boucke Building
University Park, Pennsylvania, 16802

</div>

Dear _____.   (Date)

The Pennsylvania Regional Analysis Group of the Pennsylvania State
University is making a detailed study of the economy of Clinton County.
This is a basic research attempt to better understand the kinds of
economic activities taking place in a typical county in Central Pennsyl-
vania. We are hoping to be able to identify and express, in mathematic-
al terms, the various relationships between different business groupings
within the county and also between the county and the rest of the nation.
Much of the study will involve the use of high speed electronic comput-
ers using new techniques never before applied to an economic study of
this kind. We hope to evaluate the effects of new industrial activities
on the economy of the county and to show what industries or business
activities will be most beneficial to the county in years to come.
The results of our work will, of course, be made available without
charge.

The only way a meaningful and useful study of this kind can be
accomplished is to go within the area itself. The best way of collect-
ing the necessary information is to talk directly with the businesses
and firms in the county. Because your organization is one of the
county's major economic units, we would like very much to have an
opportunity to discuss this matter personally with you. Sometime during
the next few weeks you will be contacted in this regard by a member of
our research team. We sincerely hope that you will cooperate with him
as your participation is essential to the success of the study. All
individual data will, of course, be kept strictly confidential and will
be made available only to those individuals authorized by you. The only
data that will be published or released will be composite information
reflecting the activities of the groupings of industries.

If you desire further information about this research study prior to
the visit by our research man, please let me know. If you desire to
check locally, you may contact Richard A. Morse at the Lock Haven
Chamber of Commerce or Edward Ball, Director of the Office of Planning,
Housing and Redevelopment at the Court House. Both of these organ-
izations have endorsed the study and can give you some additional
details.

<div align="right">

Sincerely yours,

Hays B. Gamble,
Research Director

</div>

HBG/ch

Figure B: Industrial Survey Questionnaire

CONFIDENTIAL - For authorized personnel only

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Industrial Survey (1)
The Pennsylvania State University
120 Boucke Building   Code no. (2) _____
University Park, Pennsylvania 16802

1. Is this plant the : a) Head Office (3) _ _____

                          Location of branch plants (5) _____

                          _____

                    b) Branch office or plant (6) _____

                          Location of head office (7) _____

2. (For Head Office only)   What proportion of your company is locally

   owned (owners residing in Clinton County)? (8) _____

3. What was your company's 1963 average employment at this plant?

	number of	employees	total
	part-time	full-time	payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

4. Of your total number of employees at this plant, approximately

   how many are women? (15) _____

5. What trend do you foresee in your labor requirements over the

   next five years (check one)?

      Increasing (16) ___ Decreasing (17) _____ Stable (18) _____

6. What were your approximate 1963 expenditures for new buildings

   or additions, including land and remodeling of existing

   buildings? (19) _____ Approximately how much of this was

   purchased outside Clinton County? (20) _____

7. Approximate 1963 expenditures for new capital equipment, including company cars and trucks

   a) From within Clinton County?

General classification or kind of equipment (21)	Total expenditures (22)

   b) From outside Clinton County?

Source (State) (23)	General kind of equipment (24)	Total expenditure (25)

8. What was your approximate 1963 depreciation in plant

   and equipment? (26) _____

9. What was the approximate value of your 1963 change in inventory?

     gain (27) _____   loss (28) _____

10. What are your primary sources of capital funds?

   a) Internal funding (from within the company (29) _____

   b) From banks within Clinton County (30) _____

   c) From public or private agencies within Clinton County other than banks (31) _____

10. (continued)

    d) From other sources within Clinton County (32) _____

    e) From sources outside of Clinton County but within Pennsylvania (33) _____

    f) From sources outside of Pennsylvania (34) _____

11. Assuming demand for your goods and/or services constant, would you expand your present operations here in Clinton County if capital funds were available at a lower rate of interest?

              Yes (35) _____ No (36) _____

12. What was your total value added by manufacturing for

    1963? (37) _____

13. a) What were your approximate payments to the Federal Government in 1963 for both employer's and employee's share of social security? (38) _____

    b) What were your approximate payments to the Federal Government in 1963 for employee's income taxes withheld? (39) _____

    c) What were your approximate payments of all other kinds to the Federal Government in 1963 (exclusive of the payments in A and B above)? This would include corporate taxes, business taxes, excise taxes, etc. (40) _____

    d) What were your approximate net payments of all kinds during 1963 to the State Government and its agencies? Include unemployment compensation, sales taxes, excise taxes, etc. (41) _____

    e) What were your approximate total payments of all kinds during 1963 to the County and local Government including school districts? (42) _____

14. What were your approximate outlays in 1963 for raw materials, contract work, and component parts?

    a) From within Clinton County

General kind of input	volume or quantity	approximate total cost
(43)	(44)	(45)

14. (continued)

b) From outside Clinton County

General kind of input	Source (State)	Volume or quantity	Approximate total cost
(46)	(47)	(48)	(49)

15. What were your approximate outlays in 1963 for the following?
(Please do not show any expenditure more than once)

	local	outside	total
	(53)	(54)	(55)
a) Costs of general supplies not entering final product			
b) Costs of maintenance and repair of plant and equipment (except motor vehicles	(56)	(57	(58)
c) Rental payments	(59)	(60)	(61)
d) Electric power and light	(62)	(63)	(64)
e) Heat & Fuel--coal, oil, gas (underline those used) (65)	(66)	(67)	(68)
f) Telephone and telegraph	(69)	(70)	(71)
g) Water & sewage	(72)	(73)	(74)
h) Insurance (premium payments only- including hospitalization for employees)	(75)	(76)	(77)
i) Finance (interest payments only)	(78)	(79)	(80)
j) Transportation 1. rail	(81)	(82)	(83)
2. truck (Common & contract carrier	(84)	(85)	(86)
3. Other	(87)	(88)	(89)

15. (continued)

	local	outside	total
	(90)	(91)	(92)

k) Personal Services (accountants, auditing, legal, medical, etc.) _____

l) Maintenance and operating costs of cars, trucks, and other vehicles (except labor) including allowances for business use of personal care _____

	(93)	(94)	(95)

	(96)	(97)	(98)

m) General office expenses (except labor) _____

	(99)	(100)	(101)

n) Sales expenses including advertising (except labor) _____

	(102)	(103)	(104)

o) Contributions to nonprofit organizations _____

	(105)	(106)	(107)

p) Retirement or pension fund payments (employer's share only) _____

	(108)	(109)	)110)

q) Miscellaneous _____

16. What was your approximate total production from this plant during 1963 (in tons, M b.f., or other appropriate physical units.)

Description	Units
(111)	(112)

17. (Head Office only) What were your total dividend payments in 1963, if any? (113) _____ About how much of this was paid: locally? (114) _____ outside? (115) _____

18. What was your approximate 1963 total gross income from your Clinton County operation only? (116) _____

19. What proportion of the total gross income originating at your
    Clinton County operation would you estimate came from the following
    regions, and what principal kinds of economic activities, including
    Defense, would you say the purchasers were engaged in (if final
    consumer, please state "consumer"). For branch plants not making
    direct sales, please place in the column marked "approximate value"
    an estimate instead of the proportion of your total production from
    this plant going to the activities or business you list:

a) Clinton County

Activity or business (117)	Approximate value (118)

b) Pennsylvania

Activity or business (119)	Approximate value (120)

c) Rest of World

Activity or Business (121)	Approximate value (122)

Figure C: Retail Store Survey Questionnaire

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Retail Stores Survey (1)
The Pennsylvania State University
120 Boucke Building   Code no. (2) _____
University Park, Pennsylvania

1. Is this store: (a) the head or main Store (3) _____

    Number of branch stores in Clinton County: (4) _____

    Outside Clinton County? (5) _____

    (b) a branch store (6) _____ . Location of main

    office (7) _____

2. (For head offices only) What proportion of this business is

    locally owned (owners residing in Clinton County)? (8) _____

3. What was the average employment in your store in 1963?

	Number of employees		Total
	part-time	full-time	payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

4. About how many of these enployees were women? (15) _____

5. What were your approximate 1963 expenditures for new buildings or
    additions, including land, and remodeling of existing buildings?

    (19) _____ . Approximately how much of this
    was purchased outside of Clinton County? (20) _____

6. Approximate 1963 expenditures for new capital equipment, in-
    cluding company cars and trucks:

	Kind of Equipment	Total Cost
	(21)	(22)
(a) from within Clinton County		

6. (continued)

	Kind of Equipment (24)	Total Cost (25)
(b) from outside Clinton County		

7. What was your approximate 1963 depreciation in plant and equipment? (26) _____ .

8. What was the approximate value of your 1963 change in inventory?

   Gain (27) _____   Loss (28) _____

9. What are your primary sources of capital funds?
   (a) Internal funding (from within the company) (29) _____

   (b) From banks within Clinton County (30) _____
   (c) From public or private agencies within Clinton County other than banks (31) _____

   (d) From other sources within Clinton County (32) _____
   (e) From sources outside Clinton County but within Pennsylvania (33) _____

   (f) From sources outside of Pennsylvania (34) _____

10. Assuming demand for your goods and/or services constant, would you expand your present operations here in Clinton County if capital funds were available at a lower rate of interest?

    Yes (35) _____   No (36) _____

11. (a) What were your approximate payments to the Federal Government in 1963 for both employer's and employee's share of social security?

    (38) _____

    (b) What were your approximate payments to the Federal Government in 1963 for employee's income taxes withheld? (39) _____

    (c) What were your approximate payments of all other kinds to the Federal Government in 1963 (exclusive of the payments in (a) and (b) above)? This would include corporate taxes, business taxes, excise taxes, etc.

    (40) _____

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(d) What were your approximate net payments of all kinds during 1963 to the State Government and its agencies? Include unemployment conpensation, sales taxes, excise taxes, etc.

(41) _____

(e) What were your approximate total payments of all kinds during 1963 to the County and local Government including school districts? (42) _____

12. What were your approximate outlays in 1963 for the following items? (Please do not show any expenditure more than once.)

	local	outside	total
	(50)	(51)	(52)
(a) Costs of merchandise purchased for resale (list by broad categories such as food, clothing, etc. ___			
___			
___			
___	(53)	(54)	(55)
(b) Costs of materials and general supplies used in the operation of the business but not for resale ___	(56)	(57)	(58)
(c) Costs of maintenance and repair of plant and equipment (except motor vehicles) ___	(59)	(60)	(61)
(d) Rental costs ___	(62)	(63)	(64)
(e) Electricity ___	(66)	(67)	(68)
(f) Heat & Fuel - coal, fuel oil, gas (underline) (65) ___	(69)	(70)	(71)
(g) Telephone and telegraph ___	(72)	(73)	(74)
(h) Water & Sewage ___	(75)	(76)	(77)
(i) Insurance (premium payments only-- including employer's share of hospitalization for employees) ___			

-more-

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12. (continued)

	local (78)	outside (79)	total (80)
(j) Finance costs (interest payments only)			
(k) Transportation: rail	(81)	(82)	(83)
truck	(84)	(85)	(86)
other	(87)	(88)	(89)
(l) Personal services (accountants, lawyers, repair men, etc.)	(90)	(91)	(92)
(m) Maintenance and operating costs of cars and trucks (except labor) including allowances for business use of personal cars	(93)	(94)	(95)
(n) General office expenses (except labor	(96)	(97)	(98)
(o) Advertising	(99)	(100)	(101)
(p) Contributions to nonprofit organizations	(102)	(103)	(104)
(q) Retirement or pension fund payments (employer's share only)	(105)	(106)	(107)
(r) Miscellaneous	(108)	(109)	(110)

13. What, approximately, were your total gross sales at this

store in 1963 (116) _____

14. About what proportion of these total sales would you estimate were

to customers residing outside of Clinton County (123) _____

_____

15. About what proportion of your total sales are to tourists, hunters, or other non-Clinton residents here on vacation?

(124) _____

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16. Approximately what proportion of your total sales <u>within</u> Clinton County were to the following?

    (a)   Industrial or manufacturing plants (<u>125</u>) _____

          Mainly what kinds of plants were these (<u>126</u>) _____

          _____

    (b)   Other retail and service establishments (<u>127</u>) _____

          Mainly what kinds of stores were these (<u>128</u>) _____

          _____

    (c)   Farmers (<u>129</u>) _____

    (d)   Builders and Contractors (<u>130</u>) _____

    (e)   Government accounts, including schools (<u>131</u>) _____

    (f)   Nonprofit organizations (<u>132</u>) _____

    (g)   Households or private individuals (final consumers) (<u>133</u>) _____

          _____

    (h)   Others (specify) (<u>134</u>) _____

17. Approximately what proportion of your total gross receipts are from sales of the following products?

    (a)   Food and groceries (<u>135</u>) _____

    (b)   Gasoline and automobile servicing and repairs (<u>136</u>) _____

          _____

    (c)   New and used car sales (<u>137</u>) _____

    (d)   Clothing and wearing apparel (<u>138</u>) _____

    (e)   Household furnishings and furniture, including appliances

          (<u>139</u>) _____

    (f)   Lumber, building materials, hardware (<u>140</u>) _____

    (g)   Drugs and cosmetics (<u>141</u>) _____

17. (continued)

    (h) Jewelry (142) _____

    (i) Repair Services (143) _____

    (j) Other (specify) (144) _____

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FIGURE D: SERVICE ESTABLISHMENTS SURVEY

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   **Service Establishments**
The Pennsylvania State University   **Survey (1)**
120 Boucke Building
University Park, Pennsylvania   Code no.   (2)_____

1. How many months of the year are you open? (151)_____

2. What proportion of this business is locally owned? (8)_____

3. Average number of employees in 1963:

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

4. Of the total number of employees, about how many are women?

    (15)_____

5. What were your approximate 1963 expenditures for new buildings or
    additions including land and remodeling of existing structures?

    (19)_____ Approximately how many of this was

    purchased outside of Clinton County (20)_____

6. Approximate 1963 expenditures for new capital equipment, including
    company cars and trucks:

	Kind of Equipment	Total Cost
	(21)	(22)
(a) From within Clinton County		
	(24)	(25)
(b) From outside Clinton County:		

7. What are your primary sources of capital funds?

    (a) Internal funding (from within the company) (29) _____

    (b) From banks within Clinton County (30) _____

    (c) From public or private agencies within Clinton County other

        than banks (31) _____

    (d) From other sources within Clinton County (32) _____

    (e) From sources outside of Clinton County but within

        Pennsylvania (33) _____

    (f) From sources outside of Pennsylvania (34) _____

8. Assuming demand for your goods and/or services constant, would you expand your present operations here in Clinton County if capital funds were available at a lower rate of interest?

        Yes (35) _____ No (36) _____

9.   (a) What were your approximate payments to the Federal Government in 1963 for both employer's and employee's share of social security?

            (38) _____

    (b) What were your approximate payments to the Federal Government

        in 1963 for employee's income taxes withheld? (39) _____

    (c) What were your approximately payments of all other kinds to the Federal Government in 1963 (exclusive of the payments in (a) and (b) above? This would include corporate taxes, business taxes, excise taxes, etc.

            (40) _____

    (d) What were your approximate new payments of all kinds during 1963 to the State Government and its agencies? Include unemployment compensation, sales taxes, excise taxes, etc.

            (41) _____

    (e) What were your approximate total payments of all kinds during 1963 to the County and local Government including school districts?

            (42) _____

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10. What were your approximate outlays in 1963 for the following
items? (Please do not show any expenditure more than once)

		Local	Outside	Total
		(50)	(51)	(52)
(a)	Costs of merchandise purchase for re-sale (list by broad categories, such as food, gasoline, etc.			
		(53)	(54)	(55)
(b)	Costs of materials and general supplies used in the operation of the business, but not for resale			
		(56)	(57)	(58)
(c)	Costs of maintenance and repair of plant and equipment (except motor vehicles)			
		(59)	(60)	(61)
(d)	Rental costs			
		(62)	(63)	(64)
(e)	Electric			
		(66)	(67)	(68)
(f)	Heat & Fuel			
		(69)	(70)	(71)
(g)	Telephone and telegraph			
		(72)	(73)	(74)
(h)	Water and sewage			
		(78)	(79)	(80)
(i)	Insurance (premium payments only--including hospitalization for employees)			
		(78)	(79)	(80)
(j)	Finance (interest payments only)			
		(84)	(85)	(86)
(k)	Transportation (specify by what kinds)			
		(90)	(91)	(92)
(l)	Personal services: accountants, repair men, lawyers, doctors, etc.			
		(93)	(94)	(95)
(m)	Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business and use of personal cars			
		(96)	(97)	(98)
(n)	General office expenses (except labor)			

	Local	Outside	Total
10. (continued) | (99) | (100) | (101) |

(o) Advertising _____

	(102)	(103)	(104)

(p) Contributions to nonprofit
   organizations _____

	(105)	(106)	(107)

(q) Retirement or pension fund payments
   (employer's share only) _____

	(108)	(109)	(110)

(r) Miscellaneous _____

11. Approximately what were your total gross receipts (sales)

in 1963? (116) _____

12. About what proportion of these would you estimate came from

customers outside of Clinton County? (123) _____

13. About what proportion of your total sales would you estimate were

to tourists, hunters, or other non-Clinton County residents here

on vacation? (124) _____

14. About what proportion of your total sales to Clinton County

Customers were in the following:

(a) Industrial and manufacturing plants (125) _____

   Mainly, what kind of plants were these? (126) _____

   _____

(b) Other retail establishments (127) _____

   Mainly, what kind of stores were these? (128) _____

(c) Governmental accounts (including schools) (131) _____

(d) Households (final consumers) (133) _____

(e) Others (specify) (134) _____

   _____

15. Approximately what proportion of your total gross receipts are

from sales of the following products or services:

    (a) Restaurant and dining (152) _____

    (b) Bar (153) _____

    (c) Lodging (154) _____

    (d) Repair services and parts (143) _____

    (e) Cleaning and Laundry (155) _____

    (f) Personal grooming services (barbers, beauty shop operators)

        (156) _____

    (g) Retail Sales (157) _____

    (h) Recreation and entertainment services (158) _____

    (i) Other (specify) (159) _____

FIGURE E: FINANCIAL INSTITUTIONS SURVEY (1)

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis   Financial Institutions Survey (1)
   Group
The Pennsylvania State University   Code No. (2) _____
120 Boucke Building
University Park, Penna.

1. Type of institution? (160) _____

2. What was your average employment in 1963?

	Number of employees		Total
	part-time	full-time	payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

3. About how many of these employees were women? (15) _____

4. What were your approximate 1963 expenditures for new buildings or

    additions, including land, and remodeling of existing structure?

    (19) _____ About how many of this was

    purchased outside of Clinton County? (20) _____

5. Approximate 1963 expenditures for new capital equipment? (161) ____

    _____ About how much of this was

    purchased outside of Clinton County? (25) _____

6. What are your primary sources of capital funds?

    a) Internal funding (from within the company) (29) _____

    b) From banks within Clinton County (30) _____

    c) From public or private agencies within Clinton County other

        than banks (31) _____

    d) From other sources within Clinton County (32) _____

6. (continued)

e) From sources outside of Clinton County but within

Pennsylvania (33) _____

f) From sources outside of Pennsylvania (34) _____

7. Assuming demand for your goods and/or services constant, would you expand your present operations here in Clinton County if capital funds were available at a lower rate of interest?

Yes (35) _____ No (36) _____

8. a) What were your approximate payments to the Federal Government

in 1963 for both employer's and employee's share of social

security? (38) _____

b) What were your approximate payments to the Federal Government in 1963 for employee's income taxes withheld? (39) _____

c) What were your approximate payments of all other kinds to the

Federal Government in 1963 (exclusive of the payments in a)

and b) above? This would include corporate taxes, business

taxes, excise taxes, etc. (40) _____

d) What were your approximate new payments of all kinds during

1963 to the State Government and its agencies? Include

unemployment compensation, sales taxes, excise taxes, etc.

(41) _____

e) What were your approximate total payments of all kinds during

1963 to the County and local Government including school

districts? (42) _____

9. What were your approximate outlays in 1963 for the following items?

		local	outside	total
		(53)	(54)	(55)
a)	Costs of materials and general supplies			
		(56)	(57)	(58)
b)	Costs of maintenance and repair of plant and equipment (except motor vehicles			
		(59)	(60)	(61)
c)	Rental costs			
		(62)	(63)	(64)
d)	Electricity			
		(66)	(67)	(68)
e)	Heat & Fuel--coal, fuel oil, gas (underline) (65)			
		(69)	(70)	(71)
f)	Telephone and telegraph			
		(72)	(73)	(74)
g)	Water and sewage			
h)	Insurance (premium payments only-including hospitalization for employees)	(75)	(76)	(77)
		(78)	(79)	(80)
i)	Finance (interest payments only)			
		(90)	(91)	(92)
j)	Personal services (accountants, auditors, lawyers, repairmen,etc.			
		(93)	(94)	(95)
k)	Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business use of personal cars			
		(99)	(100)	(101)
l)	Advertising			
		(102)	(103)	(104)
m)	Contributions to non-profit organizations			
		(105)	(106)	(107)
n)	Retirement or pension fund payments (employer's share only)			
		(108)	(109)	(110)
o)	Miscellaneous			

10. What were your total demand deposits at the end of

1961 (162) _____

1962 (163) _____

1963 (164) _____

11. How much interest on government bonds of all types did you earn

in 1963? (165) _____

12. Approximately how much interest on mortgages held for your own

account and on mortgages which you service for other lenders did

you earn in 1963? (166) _____ What proportion

of this would you estimate came from residents of Clinton County?

(167) _____ What proportion of this latter amount

would you estimate came from: a) industrial and manufacturing

establishments (168) _____;

b) business and commercial establishments (169) _____;

c) Governmental bodies (170) _____;

d) private individuals (171) _____.

13. During 1963 approximately how much interest did you receive on all

all other kinds of loans held for your account and on loans which

you service for other lenders? (172) _____

What proportion of this would you estimate came from residents of

Clinton County (173) _____ Of this latter amount

what proportion would you estimate came from:

a) Industrial and manufacturing establishments (174) _____

b) Business and commerical establishments (175) _____

c) Governmental bodies (176) _____

d) Private individuals (177) _____

14. What was your volume of shares (or time deposits) outstanding at the end of

1961 (178)_____   1962 (179)_____   1963 (180)_____

15. Approximately what were your total interest payments during 1963 to holders of time deposits (181)_____ About what proportion of this would you estimate was paid to residents of Clinton County (182)_____ Of this amount, about what proportion would you estimate was paid to the following:

    a) Industrial and manufacturing establishments (183)_____

    b) Business and commercial establishments (184)_____

    c) Governmental bodies (185)_____

    d) Non-profit organizations (186)_____

    e) Private individuals (187)_____

    f) Others (specify) (188)_____

16. Do you manage any trusts for beneficiaries living in Clinton County? (189)_____ If so, about how much was earned by all of them during 1963? (190)_____

17. What proportion of your total demand deposits would you estimate are owned by the following:

    a) Industrial and manufacturing accounts (191)_____

    b) Retail, commercial, small business accounts (192)_____

    c) Governmental accounts including schools (193)_____

    d) Non-profit organizations (194)_____

    e) Utilities (195)_____

    f) Private individuals and households (196)_____

FIGURE F: REAL ESTATE & INSURANCE SURVEY (1)

CONFIDENTIAL - For authorized personnel only

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Real Estate & Insurance
The Pennsylvania State University   Survey (1)
120 Boucke Building
University Park, Pennsylvania   Code No. (2) _____

1. Location of head or main office (7) _____

2. Average Employment during 1963:

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County Residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

3. How many of these employees were women? (15) _____

4. What were your approximate 1963 expenditures for new buildings,
   renovations, or additions, including land in connection with the
   operation of this office only?
                      (19) _____

   About how much of this was purchased outside of Clinton County?

   (20) _____

5. What were your approximate 1963 expenditures for new capital equip-
   ment, including cars used in connection with the business (specify
   kind of equipment):
   (21, 24) _____

   _____

   About what proportion of this was purchased outside of the county?

   (25) _____

6. What were your approximate outlays in 1963 for the following

   items? Please do not show any expenditure more than once.

-over-

6. (continued)

		Local	Outside	Total
		(53)	(54)	(55)
(a)	Costs of materials and general supplies used in the operation of the business	(59)	(60)	(61)
(b)	Rental costs	(62)	(63)	(64)
(c)	Electric	(65)	(66)	(68)
(d)	Heat & Fuel	(69)	(70)	(71)
(e)	Telephone and telegraph	(72)	(73)	(74)
(f)	Water & Sewage	(75)	(76)	(77)
(g)	Insurance (premium payments only—including employer's share of hospitalization for employees)	(78)	(79)	(80)
(h)	Finance (interest costs only)	(90)	(91)	(92)
(i)	Personal services (accountants, lawyers, etc.)	(93)	(94)	(95)
(j)	Maintenance and operating costs including allowances for business use of personal cars	(96)	(97)	(98)
(k)	Office operating expenses (except labor)	(102)	(103)	(104)
(l)	Contributions to nonprofit organizations	(105)	(106)	(107)
(m)	Retirement or pension fund payments (employer's share only)	(108)	(109)	(110)
(n)	Miscellaneous (including advertising			

7. What were your approximate outlays in 1963 for the following

    government payments (in connection with your business only):

    (a) Social security payments on employees (both employer's and

         employee's share (38) _____

    (b) Employee's income taxes withheld (39) _____

    (c) Business taxes to the Federal Government or other Federal

         payments (40) _____

    (d) Total payments of all kinds to the State State Government, in-

         cluding unemployment compensation, sales taxes, transfer

         taxes, license fees, etc. (41) _____

    (e) Total payments to the County Government and local governments

         including school districts (42) _____

8. What were the approximate total premium payments on all kinds of

    insurance paid by your clients to you or your firm during

    1963? (238) _____ Of this amount,

    about what proportion came from clients outside of Clinton

    County? (239) _____

9. Approximately how much did you receive in 1963 in commissions,

    rentals, and other fees (exclusive of insurance) from clients

    residing outside of Clinton County? (240) _____

FIGURE G: PERSONAL SERVICES SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Personal services survey (1)
The Pennsylvania State University
120 Boucke Building   Code No. (2) _____
University Park, Pennsylvania

1. What proportion of this business is locally owned? (8) _____

2. Average number of employees in 1963:

| | Number of Employees | | Total |
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

3. How many of these employees were women? (15) _____

4. What were your approximate 1963 expenditures for new buildings,

    renovations, or additions, including land, in connection with

    your business only? (19) _____

    About how much of this was purchased outside of Clinton County?

    (20) _____

5. Approximate 1963 expenditures for new capital equipment, including

    cars and other vehicles, used in connection with your business

    (specify kind of equipment)?

Kind of Equipment	Local	Outside
(21, 24)	(22)	(25)

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6. What were approximate outlays in 1963 for the following items?

   Please do not show any expenditure more than once.

		Local	Outside	Total
		(53)	(54)	(55)
(a)	Costs of materials, drugs, supplies, ets.,used in connection with your business			
		(56)	(57)	(58)
(b)	Costs of maintenance and repair of plant and equipment (except motor vehicles)			
		(59)	(60)	(61)
(c)	Rental costs			
		(62)	(63)	(64)
(d)	Electric			
		(66)	(67)	(68)
(e)	Heat & Fuel--coal, fuel oil, gas (underline) (65)			
		(69)	(70)	(71)
(f)	Telephone and telegraph			
		(72)	(73)	(74)
(g)	Water and Sewage			
		(75)	(76)	(77)
(h)	Insurance (premium payments only on insurance directly connected with the business or its employees			
		(78)	(79)	(80)
(i)	Finance (interest payments only)			
		(90)	(91)	(92)
(j)	Personal services (accountants, lawyers, doctors, repair men, etc.)			
		(93)	(94)	(95)
(k)	Maintenance and operating costs of cars and other vehicles used only in connection with the business including allowances for business use of personal auto			
		(96)	(97)	(98)
(l)	Office expenses			
		(102)	(103)	(104)
(m)	Contributions to nonprofit organizations			
		(108)	(109)	(110)
(n)	Miscellaneous			

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7. What were your approximate outlays in 1963 for the following governmental payments (in connection with the business only)?

   (a) Social Security payments to the Federal Government on employees only (both employer's and employee's shares)

   (38) _____

   (b) Employee's income taxes withheld (39) _____

   (c) Federal business taxes, if any, and all other Federal payments (40) _____

   (e) Total payments to the County and local government including school districts (42) _____

8. What were your approximate gross receipts in 1963? (116) _____

   _____

9. About what proportion of your gross receipts would you estimate came from customers residing <u>outside</u> of Clinton County. (123) ____

   _____

10. About what proportion of your gross receipts would you estimate came from tourists, hunters, or other non-Clinton County residents here on vacation? (124) _____

11. About what proportion of your gross receipts originating <u>within</u> the county (county residents) were from the following?

    (a) Manufacturing and industrial firms (125) _____

    (b) Retail, wholesale, and other business establishments (127) ____

    _____

11. (continued)

    (c) Local governmental bodies or agencies including schools

        (131) _____

    (d) Private individuals or households (133) _____

    (e) Nonprofit organizations (132) _____

    (f) Other (specify) (134) _____

12. About what proportion of your total gross receipts are paid

    direct by insurance companies? (247) _____

13. (Attorney's only) Do you manage any estates or trust funds for

    beneficiaries residing in Clinton County? (189) _____

    If so, about how much did all of them combined earn during

    1963? (190) _____

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FIGURE H: TRANSPORTATION SURVEY QUESTIONNAIRE

CONFIDENTIAL – For authorized personnel only.

CLINTON COUNTY REGIONAL ANALYSIS GROUP

Pennsylvania Regional Analysis Group   Transportation survey (1)
The Pennsylvania State University
120 Boucke Building   Code No. (2) _____
University Park, Pennsylvania

1.   Major form of transportation (248) _____

2.   Location of main or head office (7) _____

3.   What proportion of this business is locally owned (8) _____

4.   What was your average employment during 1963?

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

5.   About how many of these employees were women? (15) _____

6.   What were your approximate 1963 expenditures for new buildings or
     additions, including land, and remodeling of existing structures?

     (19) _____ About how much of this was purch-

     ased outside of Clinton County? (20) _____

7.   What were your approximate 1963 expenditures for new capital
     equipment, including company cars, trucks, etc.

	Kind of Equipment	Total Cost
	(21)	(22)
(a) From within Clinton County		

| | (24) | (25) |
| (b) From outside Clinton County | | |

8. What was your approximate depreciation in plant and equipment

   during 1963 (26) _____

9. What are your primary sources of capital funds?

   (a) Internal funding (from within the company) (29) _____

   (b) From banks within Clinton County (10) _____

   (c) From public or private agencies within Clinton County other

        than banks (31) _____

   (d) From other sources within Clinton County (32) _____

   (e) From sources outside of Clinton County but within Penn-

        sylvania (33) _____

   (f) From sources outside of Pennsylvania (34) _____

10. Assuming demand for your goods and/or services constant, would you
    expand your present operations here in Clinton County if capital
    funds were available at a lower rate of interest?

        Yes (35) _____   No (36) _____

11. (a) What were your approximate payments to the Federal Government
         in 1963 for both employer's and employee's share of social
         security?
                   (38) _____

    (b) What were your approximate payments to the Federal Govern-
         ment in 1963 for employee's income taxes withheld? (39) _____

         _____

    (c) What were your approximate payments of all kinds to the
         Federal Government in 1963 (exclusive of the payments in (a)
         and (b) above)? This would include corporate taxes, business
         taxes, excise taxes, etc.
                             (40) _____

    (d) What were your approximate net payments of all kinds during
         1963 to the State Government and its agencies? Include un-
         employment compensation, sales taxes, excise taxes, etc.

         (41) _____

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11. (continued)

(e) What were your approximate total payments of all kinds during 1963 to the County and local Government including school districts? (42) _____

12. What were your approximate outlays in 1963 from this office for the following items? (Please do not show any expinditures more than once.)

	Local	Outside	Total
	(50)	(51)	(52)
(a) Costs of goods and materials purchased for resale (if any)			
	(53)	(54)	(55)
(b) Costs of materials and general supplies used in the operation of the business but not for sale			
	(56)	(57)	(58)
(c) Costs of maintenance and repair of plant and equipment (except motor vehicles)			
	(249)	(250)	(251)
(d) Payments to subcontractors or haulers			
	(59)	(60)	(61)
(e) Rental costs			
	(62)	(63)	(64)
(f) Electricity			
	(66)	(67)	(68)
(g) Heat & Fuel--coal, fuel oil, gas (underline) (65)			
	(69)	(70)	(71)
(h) Telephone and telegraph			
	(72)	(73)	(74)
(i) Water and Sewage			
	(75)	(76)	(77)
(j) Insurance (premium payments only-- including employer's share of hospitalization for employees)			
	(78)	(79)	(80)
(k) Finance (interest payments only)			
	(90)	(91)	(92)
(l) Personal services (accountants, repair men, lawyers, etc.			

12. (continued)

	Local (93)	Outside (94)	Total (95)
(m) Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business use of personal cars			
	(96)	(97)	(98)
(n) Office expenses			
	(99)	(100)	(101)
(o) Advertising			
	(102)	(103)	(104)
(p) Contributions to non-profit organizations			
	(105)	(106)	(107)
(q) Retirement or pension fund payments (employer's share only)			
	(108)	(109)	(110)
(r) Miscellaneous			

13. What were the major products you hauled during 1963 and the approximate percentages of each?

Kinds of Products (252)	% of Total Business (253)

14. About what proportion of the total tonnage of freight hauled by you during 1963 represents shipments moving:

(a) Into Clinton County from outside (254) _____

(b) Out of the county (255) _____

(c) Solely within the county (256) _____

15. What was your approximate 1963 gross income at this office

(116) _____

16. What proportion of this would you estimate was paid by customers residing outside Clinton County or whose business was located outside the county? (123) _____

17. Of your total receipts from Clinton County Customers only, what proportion would you estimate came from the following:

    (a) Industrial or manufacturing concerns (125) _____

    (b) Retail or other small businesses (127) _____

    (c) Governmental operations, including schools (131) _____

    (d) Utilities (149) _____

    (e) Builders and contractors (130) _____

    (f) Households (133) _____

    (g) Other (specify) (134) _____

_____

_____

_____

FIGURE I: BUILDERS AND CONTRACTORS SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Builders and Contractors
The Pennsylvania State University   Survey (1)
120 Boucke Building
University Park, Pennsylvania   Code No. (2) _____

1. What proportion of this business is locally owned (owners residing

   in Clinton County)? (8) _____

2. What was your average employment during 1963?

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

3. About how many of these employees were women? (15) _____

4. Major type of contract or construction work performed? (257) ____

   _____

5. What were your approximate capital expenditures for new buildings,
   including land, and additions or remodeling of existing buildings
   used in connection with your business during 1963? (19) _____

   _____ About how much of this was purchased

   outside of Clinton County? (20) _____

6. What were your approximate 1963 expenditures for new capital equip-
   ment, including cars,trucks, and other automotive or power
   equipment?

	Kind of Equipment	Total Cost
	(21)	(22)
(a) From within Clinton County		

   _____

   _____

6. (continued)

	Kind of Equipment (24)	Total Cost (25)
(b) From outside Clinton County		

7. What was your approximate depreciation in plant and equipment during 1963? (26) _____

8. What was the approximate value of your change in inventory during 1963?

    Gain (27) _____   Loss (28) _____

9. What are your primary sources of capital funds?

    (a) Internal funding (from within the company) (29) _____

    (b) From banks within Clinton County (30) _____

    (c) From public or private agencies with Clinton County other than banks (31) _____

    (d) From other sources within Clinton County (32) _____

    (e) From sources outside of Clinton County but within Pennsylvania (33) _____

    (f) From sources outside of Pennsylvania (34) _____

10. Assuming demand for your goods and/or services constant, would you expand your present operations here in Clinton County if capital funds were available at a lower rate of interest?

    Yes (35) _____   No (36) _____

11. (a) What were your approximate payments to the Federal Government in 1963 for both employer's and employee's share of social security?
    (38) _____

    (b) What were your approximate payments to the Federal Government in 1963 for employee's income taxes withheld?

    (39) _____

11. (continued)

(c) What were your approximate payments of all other kinds to the Federal Government in 1963 (exclusive of the payments in (a) and (b) above? This would include corporate taxes, business taxes, excise taxes, etc.

(40) _____

(d) What were your approximate new payments of all kinds during 1963 to the State Government and its agencies? Include unemployment compensation, sales taxes, excise taxes, etc.

(41) _____

(e) What were your approximate total payments of all kinds during 1963 to the County and local Government including school districts?

(42) _____

12. What were your approximate outlays in 1963 for the following items? (Please do not show any expenditures more than once)

	Local	Outside	Total
	(50)	(51)	(52)
(a) Cost of materials used by your firm in all of its construction and contracting jobs, including cost of materials purchased for retailing			
	(53)	(54)	(55)
(b) Costs of materials and general supplies used in the operation of the business but not for resale			
	(56)	(57)	(58)
(c) Costs of maintenance and repair of plant and equipment (except motor vehicles)			
	(59)	(60)	(61)
(d) Rental costs			
	(62)	(63)	(64)
(e) Electricity			
	(66)	(67)	(68)
(f) Heat & Fuel -- coal, fuel oil, gas (underline) (65)			
	(69)	(70)	(71)
(g) Telephone and Telegraph			
	(72)	(73)	(74)
(h) Water and Sewage			
	(75)	(76)	(77)
(i) Insurance (premium payments only)-- including employee's share of hospitalization for employees			

Builders and Contractors
Survey (1)
Page 4

12. (continued)

		Local	Outside	Total
		(78)	(79)	(80)
(j)	Finance (interest payments only, including Bond costs)	(81)	(82)	(83)
(k)	Transportation: rail	(84)	(85)	(86)
	truck	(87)	(88)	(89)
	other	(90)	(91)	(92)
(l)	Personal services (accountants, repair men, lawyers, doctors, etc.)	(93)	(94)	(95)
(m)	Maintenance and operating costs of cars, trucks, and other vehicles (except labor), including allowances for business use of personal cars	(96)	(97)	(98)
(n)	Office expenses (except labor)	(99)	(100)	(101)
(o)	Advertising	(102)	(103)	(104)
(p)	Contributions to non-profit organizations	(105)	(106)	(107)
(q)	Retirement or pension fund payments (employer's share only)	(108)	(109)	(110)
(r)	Miscellaneous			

13. Did you subcontract any work during 1963?_____
    Approximately how much did this cost you:

    (a) To Clinton County subcontractors (258)_____

    (b) To subcontractors outside of Clinton County (259)_____

14. What was your approximate total gross income in 1963? (116)_____

    _____

15. Of this about what proportion came from customers residing
    <u>outside</u> of Clinton County?

                          (123)_____

16. Of the work done by you <u>within</u> Clinton County, about what proportion would you estimate was done for the following?

  (a) New resident home construction (<u>.133</u>) _____

  (b) Remodeling or renovation of existing homes (<u>133</u>) _____

  (c) Construction of hunting cabins, summer vacation homes, or remodeling of existing one's for non-Clinton County residents

      (<u>124</u>) _____

  (d) Construction of new manufacturing or industrial buildings

      (<u>125</u>) _____

  (e) Remodeling or renovation of manufacturing or industrial

      buildings (<u>125</u>) _____

  (f) Construction of new stores or store buildings (<u>127</u>) _____

      _____

  (g) Remodeling or renovation of existing stores or store

      buildings (<u>127</u>) _____

  (h) Construction or remodeling for non-profit organizations

      (<u>132</u>) _____

  (i) Governmental accounts (including school) (<u>131</u>) _____

  (j) Farmers (<u>129</u>) _____

  (k) Utilities (<u>149</u>) _____

  (l) Others (specify) (<u>134</u>) _____

FIGURE J: WHOLESALE DISTRIBUTORS SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Wholesale distributors
The Pennsylvania State University   Survey (1)
120 Boucke Building
University Park, Pennsylvania   Code No. (2) _____

1. Is this: (a) the head or main store? (3) _____

    Number and location of branch stores (5) _____

    (b) Branch store (6) _____

    Location of main office (7) _____

2. (For head office only) What proportion of this business is
    locally owned (owners residing in Clinton County)?

    (8) _____

3. What was your store's 1963 average employment?

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County Residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

4. About how many of these employees were women? (15) _____

5. What were your approximate 1963 expenditures for new buildings or
    additions, including land, and remodeling of existing buildings?

    (19) _____ About how much of this was

    purchased outside of Clinton County? (20) _____

6. Approximate 1963 expenditures for new capital equipment, including
    cars, trucks, etc.

	Kind of Equipment	Total Cost
	(21)	(22)
(a) From within Clinton County		
	(24)	(25)
(b) From outside Clinton County		

7. What was your approximate 1963 depreciation in plant and

    equipment (26) _____

8. What was the approximate value of your 1963 change in inventory?

    Gain (27) _____   Loss (28) _____

9. What are your primary sources of capital funds?

    (a) Internal funding (from within the Company) (29) _____

    (b) From banks within Clinton County (30) _____

    (c) From public or private agencies within Clinton County other

         than banks (31) _____

    (d) From other sources within Clinton County (32) _____

    (e) From sources outside of Clinton County but within

         Pennsylvania (33) _____

    (f) From sources outside of Pennsylvania (34) _____

10. Assuming demand for your goods and/or services constant, would you
    expand your present operations here in Clinton County if capital
    funds were available at a lower rate of interest?

         Yes (35) _____   No (36) _____

11. (a) What were your approximate payments to the Federal Government
         in 1963 for both employer's and employee's share of social
         security?
                   (38) _____

    (b) What were your approximate payments to the Federal Govern-
         ment in 1963 for employee's income tax withholdings? (39) ___

         _____

    (c) What were your approximate payments of all other kinds to
         the Federal Government in 1963 (exclusive of the payments in
         (a) and (b) above? This would include corporate income
         taxes, business income taxes, excise taxes, etc., (40) _____

         _____

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11. (continued)

(d) What were your approximate new payments of all kinds during 1963 to the State Government and its agencies? Include un-employment compensation, sales taxes, excise taxes, etc.

(41) _____

(e) What were your approximate total payments of all kinds during 1963 to the County and local government including scnool districts?

(42) _____

12. What were your approximate outlays in 1963 for the following items? (Please do not show any expenditure more than once)

		local	outside	total
(a)	Costs of merchandise purchased for resale (list by broad categories such as lumber, gasoline, etc.)	(50)	(51)	(52)
		(53)	(54)	(55)
(b)	Costs of materials and general supplies used in the operation of the business but not for re-sale	(56)	(57)	(58)
(c)	Costs of maintenance and repair of plant and equipment (except motor vehicles)	(59)	(60)	(61)
(d)	Rental costs	(62)	(63)	(64)
(e)	Electricity	(66)	(67)	(68)
(f)	Heat & Fuel--coal, fuel oil, gas (underline) (65)	(69)	(70)	(71)
(g)	Telephone and Telegraph	(72)	(73)	(74)
(h)	Water & Sewage			

12. (continued)

	local	outside	total
	(75)	(76)	(77)

(i) Insurance (premium payments only--
including hospitalization for
employees)_____

	(78)	(79)	(80)

(j) Finance (interest payments only)_____

	(81)	(82)	(83)

(k) Transportation: rail_____

	(84)	(85)	(86)

　　　　　　　　　　truck_____

	(87)	(88)	(89)

　　　　　　　　　　other_____

	(90)	(91)	(92)

(l) Personal services (accountants,
lawyers, etc.)_____

	(93)	(94)	(95)

(m) Maintenance and operating costs
of cars, trucks, and other vehicles
(except labor) including allowances
for business use of personal cars_____

	(96)	(97)	(98)

(n) Office expenses (except labor)_____

	(99)	(100)	(101)

(o) Advertising_____

	(102)	(103)	(104)

(p) Contributions to nonprofit
organizations_____

	(105)	(106)	(107)

(q) Retirement or pension fund pay-
ments (employer's share only)_____

	(108)	(109)	(110)

(r) Miscellaneous_____

13. Approximately what were your total 1963 gross sales at this store?

(116) _____

14. Approximately what proportion were local sales and what proportion
retail?

	Wholesale	Retail
	(145)	(146)

Sales to Clinton County residents or
businesses_____

	(147)	(148)

Sales to Non-Clinton County residents
or businesses _____

15. About what proportion of your total sales would you estimate were
to tourists, hunters, or other non-Clinton County residents here
on vacation? (124) _____.

16. About what proportion of your total sales to Clinton County
customers only were to the following?

    (a)   Industrial or manufacturing firms (125) _____

          What kinds of firms or plants were these in general (126) _____

          _____

    (b)   Retail or service establishments (127) _____

          What kinds were these in general (128) _____

    (c)   Farmers (129) _____

    (d)   Builders and contractors (130) _____

    (e)   Utilities (149) _____

    (f)   Government accounts including schools (131) _____

    (g)   Non-profit organizations (132) _____

    (h)   Households or private individuals (133) _____

    (i)   Others (specify) (134) _____

          _____

17. What principal products do you handle (150) _____

_____

FIGURE K: UTILITIES SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only.

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Utilities Survey (1)
The Pennsylvania State University
120 Boucke Building   Code No. (2) _____
University Park, Pennsylvania

1. Type of Utility (205) _____

2. Location of Main or Head Office (7) _____

3. Proportion of this utility that is locally owned (owners residing
    in Clinton County?
                    (8) _____

4. What was your company's average employment in 1963 (Clinton
    County operations only)?

	Number of Employees		Total
	full-time	part-time	Payroll
	(9)	(10)	(11)
Clinton County Residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

5. About how many of these employees were women? (15) _____

6. What were your approximate 1963 expenditures for new buildings or
    additions, including land, and remodeling of existing structures?

    (19) _____ About how much of this was purchas-

    ed outside of Clinton County? (20) _____

7. Approximate 1963 expenditures for new capital equipment, in-
    cluding company cars, trucks, etc.

	Kind of Equipment	Total Cost
	(21)	(22)
(a) From within Clinton County		

7. (continued)   <u>Kind of Equipment</u>   <u>Total Cost</u>

                                                 (24)   (25)

     (b) From outside Clinton County _____

_____

_____

_____

_____

8. About how much did you spend in 1963 for rights-of-way and other

easements? (206) _____ About how much of this

was spent outside Clinton County? (207) _____

9. What was your approximate depreciation in plant and equipment in

1963? (26) _____

10. What was the approximate net value of your 1963 change in
inventory?

         Gain (27) _____ Loss (28) _____

11. What are your primary sources of capital funds?

     (a) Internal funding (from within the company (29) _____

     (b) From banks within Clinton County (30) _____

     (c) From public or private agencies within Clinton County other

         than banks (31) _____

     (d) From other sources within Clinton County (32) _____

     (e) From sources outside of Clinton County but within

         Pennsylvania (33) _____

     (f) From sources outside of Pennsylvania (34) _____

12. Assuming demand for your goods and/or services constant, would you
expand your present operations here in Clinton County if capital
funds were available at a lower rate of interest?

         Yes (35) _____ No (36) _____

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13. (a) What were your approximate payments to the Federal Govern-
         ment in 1963 for employer's and employee's share of social
         security?

        (38) _____

    (b) What were your approximate payments to the Federal Govern-
         ment in 1963 for employee's income taxes withheld?

(39) _____

    (c) What were your approximate payments of all other kinds to
         the Federal Government in 1963 (exclusive of the payments in
         (a) and (b) above)? This would include corporate taxes,
         business taxes, excise taxes, etc.

        (40) _____

    (d) What were your approximate new payments of all kinds during
         1963 to the State Government and its agencies? Include
         unemployment compensation, sales taxes, excise taxes, etc.

(41) _____

    (e) What were your approximate total payments of all kinds
         during 1963 to the County and local Government including
         school districts

      (42) _____

14. What were your approximate outlays in 1963 for the following
     items? (Please do not show any expenditure more than once.)

		local	outside	total
		(50)	(51)	(52)
(a)	Costs of goods and merchandise purchased for resale			
		(53)	(54)	(55)
(b)	Costs of materials and general supplies used in the operation of the business but not for resale			
		(56)	(57)	(58)
(c)	Costs of maintenance and repair of plant and equipment (except motor vehicles)			
		(59)	(60)	(61)
(d)	Rental Costs			
		(62)	(63)	(64)
(e)	Electricity			

-more-

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Utilities Survey (1)
Page 4

14. (continued)

	local	outside	total
	(66)	(67)	(68)

(f) Heat & Fuel - coal, fuel oil, gas (underline) (65) _____

	local	outside	total
	(69)	(70)	(71)

(g) Telephone and Telegraph _____

	(72)	(73)	(74)

(h) Water & Sewage _____

	(75)	(76)	(77)

(i) Insurance (premium payments only--including hospitalization for employees _____

	(78)	(79)	(80)

(j) Finance (interest payments only) _____

	(81)	(82)	(83)

(k) Transportation: rail _____

	(84)	(85)	(86)

truck _____

	(87)	(88)	(89)

other _____

	(90)	(91)	(92)

(l) Personal services (accountants, repair men, lawyers, doctors, etc.) _____

	(93)	(94)	(95)

(m) Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business use of personal cars _____

	(96)	(97)	(98)

(n) Office expenses (except labor) _____

	(208)	(209)	(210)

(o) Costs of work subcontracted _____

	(99)	(100)	(101)

(p) Advertising _____

	(102)	(103)	(104)

(q) Contributions to non-profit organizations _____

	(105)	(106)	(107)

(r) Retirement or pension fund payments (employer's share only) _____

	(108)	(109)	(110)

(s) Miscellaneous _____

15. What were your approximate total 1963 gross receipts from your

Clinton County operations only? (116) _____

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Utilities Survey (1)
Page 5

16. Could you estimate about what proportion of these came from the following?

(a) Manufacturing and industrial plants (125) _____

(b) Retail stores and other small businesses (127) _____

(c) Farms (129) _____

(d) Non-profit organizations (such as churches, etc.)

(132) _____

(e) Household consumers (133) _____

(f) Hunting Camps, Summer Vacation Homes (124) _____

(g) Governmental operations, including schools (131) _____

(h) Other utilities (149) _____

(i) Others (specify) (134) _____

_____

_____

_____

_____

FIGURE L: NON-PROFIT ORGANIZATIONS SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Non-Profit organizations
The Pennsylvania State University   Survey (1)
120 Boucke Building
University Park, Pennsylvania   Code No. (2) _____

1.   Kind of organization (church, service club, fraternal order,etc.)

   (240) _____

2.   About how many persons did your organization employ during 1963?

	Number of Employees		Total
	part-time	full-time	Payroll
	(9)	(10)	(11)
Clinton County residents			
	(12)	(13)	(14)
Non-Clinton County residents			

3.   About how many of these were women? (15) _____

4.   What were your approximate 1963 expenditures for new buildings,
     including land, and additions or remodeling of existing buildings?

   (19) _____ About how much of this was

purchased outside of Clinton County? (20) _____

5.   What were your approximate 1963 expenditures for new capital
     equipment, including cars used in connection with the business of
     the organization?
             (21, 24) _____

About what proportion of this was purchased outside of Clinton

County? (25) _____

6.   What were your approximate outlays in 1963 for the following items?
     Please do not show any expenditure more than once.

	Local	Outside	Total
	(50)	(51)	(52)
(a) Cost of goods purchased for resale			

-more-

6. (continued)

		Local	Outside	Total

(b) Costs of materials and general sup- (53) (54) (55)
plies used in the operation of the
business but not for resale_____

(56) (57) (58)

(c) Costs of maintenance and repair of
plant and equipment except motor
vehicles_____

(59) (60) (61)

(d) Rental costs_____

(62) (63) (64)

(e) Electricity_____

(66) (67) (68)

(f) Heat & Fuel -- coal, fuel oil, gas
(underline) (65)_____

(69) (70) (71)

(g) Telephone and telegraph_____

(72) (73) (74)

(h) Water and sewage_____

(75) (76) (77)

(i) Insurance (premium payments only)
including employer's share of hos-
pitalization for employees_____

(78) (79) (80)

(j) Finance (interest payments only)_____

(90) (91) (92)

(k) Personal services (accountants,
lawyers, doctors, repair men,etc.)_____

(93) (94) (95)

(l) Maintenance and operating costs of
cars, trucks and other vehicles
(except labor) including allow-
ances for business use of per-
sonal cars)_____

(96) (97) (98)

(m) Office expenses (except labor)_____

(99) (100) (101)

(n) Advertising _____

(105) (106) (107)

(o) Retirement or pension fund pay-
ments (employer's share only)_____

(241) (242) (243)

(p) Contributions, payments, etc. to
parent organization or other
activities supported wholly or
in part by your organization_____

-more-

6. (continued)

	Local (108)	Outside (109)	Total (110)
(q) Miscellaneous			

7. What were your approximate total payments to the Federal Government in 1963 for social security payments, including both employer's and employee's shares?

    (38) _____

8. What were your approximate total payments to the Federal Government in 1963 for income taxes withheld?

    (39) _____

9. What were your approximate total payments of all kinds during 1963 to the State Government, including unemployment compensation, sales and use taxes, etc.

    (41) _____

10. What were your approximate total payments of all kinds to the local and county government, including school districts, during

    1963? (42) _____

11. What were your approximate total gross receipts during 1963?

    (116) _____ (Please include financial support, if any, from parent organization.)

12. About what proportion of your total receipts would you estimate came from sources outside of Clinton County? (123) _____

13. Of the proportion that came from sources within Clinton County, about how much came from:

    (a) Gifts, donations, or dues (244) _____

    (b) Sale of goods or services (245) _____

    (c) Other (specify) (246) _____

14. Of the proportion of your total gross receipts that came from sources within Clinton County about what proportion would you estimate came from the following?

    (a) Private individuals or households (133) _____

    (b) Industrial or manufacturing firms (125) _____

    (c) Retail stores or other small businesses (127) _____

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Non-profit Organizations
Survey (1)
Page 4

14. (continued)

(d) Governmental offices or agencies, including schools (<u>131</u>)

_____

(e) Other (specify) (<u>134</u>)

FIGURE M: GOVERNMENTAL SURVEY QUESTIONNAIRE

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Governmental Survey (1)
The Pennsylvania State University
120 Boucke Building
University Park, Pennsylvania

1. Level of Government: State (211) _____ Federal (212) _____

                          Local (213) _____

2. Office or Agency (214) _____ Location (215) _____

3. Average Employment for 1963

	Number		Total
	full-time	part-time	payroll
	(9)	(10)	(11)
Clinton County Residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

4. About how many of these enployees were women? (15) _____

5. Approximate 1963 expenditures for new buildings or additions,

    including land, and remodeling of existing structures (19) _____

    About how much of this was purchased outside of Clinton County?

    (20) _____

6. Approximate 1963 expenditures for new capital equipment, including
    cars, trucks

	Kind of equipment	Total cost
	(21)	(22)
a) From within Clinton County		
	(24)	(25)
b) From outside Clinton County		

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7. What were your approximate outlays in 1963 for the following items

		local	outside	total
		(53)	(54)	(55)
a)	Costs of goods and merchandise of a non-capital nature (list by broad categories)_____			
	_____			
	_____			
		(56)	(57	(58)
b)	Costs of maintenance and repair of plant and equipment (except motor vehicles)_____			
		(208)	(209)	(210)
c)	Work contracted to private firms or persons_____			
		(59)	(60)	(61)
d)	Rental costs_____			
		(62)	(63)	(64)
e)	Electricity_____			
		(66)	(67)	(68)
f)	Heat & Fuel--coal, fuel oil, gas (underline) (65)_____			
		(69)	(70)	(71)
g)	Telephone and Telegraph_____			
		(72)	(73)	(74)
h)	Water and Sewage_____			
		(75)	(76)	(77)
i)	Insurance premiums_____			
		(78)	(79)	(80)
j)	Finance (interest payments only)_____			
		(81)	(82)	(83)
k)	Transportation: rail_____			
		(84)	(85)	(86)
	truck_____			
		(90)	(91)	(92)
l)	Personal services (lawyers, accountants, etc.)_____			
		(93)	(94)	(95)
m)	Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business use of personal cars_____			
		(96)	(97)	(98)
n)	Office expenses (except labor)_____			

7. (continued)

	local	outside	total
	(99)	(100)	(101)
o) Advertising costs			
	(102)	(103)	(104)
p) Contributions to nonprofit organications			
	(105)	(106)	(107)
q) Retirement or pension fund payments (employer's share only)			
	(108)	(109)	(110)
r) Miscellaneous operating costs			

8. List below transfer payments to:

a) Other governmental units or agencies within Clinton County only

Clinton County only	Total
(216)	(217)

b) Private firms or households within Clinton County only

Clinton County only	Total
(218)	(219)

9. Sources and kinds of income

	Source	Description	Total
	(220)	(221)	(222)
a) Transfer payments			
	(223)	(224)	(225)
b) Taxes			

9.   (continued)

	Sources	Description	Total
	(226)	(227)	(228)
c) Licenses, registrations			

	(229)	(230)	(231)
d) Fines			

	(232)	(233)	(234)
e) Sale of goods, services, capital assets, leasing, easements			

	(235)	(236)	(237)
f) Other (specify)			

FIGURE N: EDUCATION SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group   Education Survey (1)
The Pennsylvania State University
120 Boucke Building   Code No. (2) _____
University Park, Pennsylvania

1.   Approximately how many employees did you have in 1963?

	Number		
	full-time	part-time	payroll
	(9)	(10)	(11)
Clinton County Residents			
	(12)	(13)	(14)
Non-Clinton County Residents			

2.   About how many of these employees were women? (15) _____

3.   What were your approximate 1963 expenditures for new buildings and
     additions and remodeling or renovation of existing structures?

     (19) _____ About how much of this was pur-

     chased outside Clinton County? (20) _____

4.   What were your approximate 1963 expenditures for new capital
     equipment, including cars, trucks, furniture, laboratory
     equipment, etc.

	Kind of equipment	Total Cost
	(21)	(22)
a) From within Clinton County		
	(24)	(25)
b) From outside Clinton County		

5.   What was your approximate depreciation in plant and equipment in

     1963?   (26) _____

6. What were your approximate payments in 1963 to the Federal Government for employer's and employee's share of social security?

(38) _____

7. What were your approximate payments to the Federal Government in 1963 for employee's income tax withholdings?

(39) _____

8. What were your total payments to the State Government for unemployment compensation?

(41) _____ What, if any, did your

other payments to the State Government amount to? (41) _____

9. What were your approximate total payments, if any to the local or county government, including school districts?

(42) _____

10. Approximately how many students were in the following categories in 1963?

     a) Commuting daily (197) _____

     b) Residents in college provided facilities (198) _____

     c) Residents in facilities provided by local townspeople

       (199) _____

11. What were your approximate outlays in 1963 for the following items?

	local	outside	total
	(53)	(54)	(55)
a) Costs of goods and materials purchased of a non-capital nature and consumed in the operation			
	(56)	(57)	(58)
b) Costs of maintenance and repair of plant and equipment (except motor vehicles)			
	(200)	(201)	(202)
c) Food and dining services			
	(59)	(60)	(61)
d) Rental costs			
	(62)	(63)	(64)
e) Electricity			
	(66)	(67)	(68)
f) Heat & Fuel—coal, fuel oil, gas (underline) (65)			

11. (continued)

	local (69)	outside (70)	total (71)
g) Telephone and Telegraph			
	(72)	(73)	(74)
h) Water and Sewage			
	(75)	(76)	(77)
i) Insurance (premium payments only-including hospitalization for employees)			
	(78)	(79)	(80)
j) Finance (interest payments only)			
	(81)	(82)	(83)
k) Transportation: rail			
	(84)	(85)	(86)
truck			
	(87)	(88)	(89)
other			
	(90)	(91)	(92)
l) Personal services (accountants, lawyers, doctors, etc., if not on regular payroll			
	(93)	(94)	(95)
m) Maintenance and operating costs of cars, trucks and other vehicles (except labor) including allowances for business use of personal cars			
	(96)	(97)	(98)
n) Office & administrative expenses (if not included above)			
	(105)	(106)	(107)
o) Retirement or pension fund			
	(108)	(109)	(110)
p) Other (specify as to broad categories)			

12. What were your approximate total receipts from registration fees and room and board fees paid by students during 1963? (200) _____

13. What were your approximate total receipts from State Government during 1963?
    (201) _____

14. What were your approximate total receipts from the Federal Government during 1963?

    _____

15. What were your approximate total receipts from other sources
during 1963 (such as athletic admissions, etc.) (203) _____

16. Of your total gross receipts, what proportion would you estimate
came from within Clinton County? (204) _____

Figure O: RURAL AREAS HOUSEHOLD SURVEY QUESTIONNAIRE

CONFIDENTIAL - For authorized personnel only

CLINTON COUNTY REGIONAL ECONOMIC STUDY

Pennsylvania Regional Analysis Group
The Pennsylvania State University
120 Boucke Building
University Park, Pennsylvania

Rural Areas Household
  Survey

Block No. (1)_____

Interviewer (3)_____

1.   Check one:

   (a)   Farm dwelling occupied year around (<u>200</u>)_____

   (b)   Non-farm dwelling occupied year around (<u>201</u>)_____

   (c)   Farm dwelling used as hunting camp or summer vacation

         home (<u>202</u>)_____

   (d)   Vacant or abandoned farm dwelling (<u>203</u>)_____

   (e)   Hunting camp or summer vacation cabin (<u>204</u>)_____

2. _____

Persons (4)	Relation to inter-viewee (5)	Age (6)	Sex (7)	Occupation (8)	Type of Business (9)	Location (10)	Months employ-ed 1963 (11)

3.   In your opinion what is Clinton County most in need of at the

     present time? (<u>12</u>)_____

     _____

4. Approximately how many acres are in this property? (205) _____

_____ Do you farm this or any other acreage?

(206) _____ (If answer is no - go to page 5,

question #20)

5. Did you sell any crops, livestock or other farm commodities in

1963? (207) _____ (If answer is no, go to question

#20.)

6. Main type of farming carried on (208) _____

7. Approximately how many of the following do you have on your farm?

(a) Milk cows (209) _____ (b) Beef animals (210) _____

(c) Sheep (211) _____ (d) Hogs (212) _____

(e) Poultry (213) _____ (f) Other livestock (214) _____

(i) Acres in hay (217) _____ (j) Acres in other crops (218) ___

_____

8. During 1963 what was your approximate income from sales of the
    following:

	Product	Estimated Quantity Sold	Amount Received		
			local	outside	total
		(219)	(220)	(221)	(222)
(a)	Milk				
		(223)	(224)	(225)	(226)
(b)	Eggs				
		(227)	(228)	(229)	(230)
(c)	Broilers				
		(231)	(232)	(233)	(234)
(d)	Veal calves				
		(235)	(236)	(237)	(238)
(e)	Beef				
		(239)	(240)	(241)	(242)
(f)	Dairy calves & cows				
		(243)	(244)	(245)	(246)
(g)	Hogs				

-over-

8. (continued)

Product	Estimated Quantity Sold	Amount Received		
		local	outside	total
(h) Lambs & wool	(247)	(248)	(249)	(250)
(i) Other livestock	(251)	(252)	(253)	(254)
(j) Hay	(255)	(256)	(257)	(258)
(k) Straw	(259)	(260)	(261)	(262)
(l) Small grains	(263)	(264)	(265)	(266)
(m) Other crops	(267)	(268)	(269)	(270)
(n) Forest products	(271)	(272)	(273)	(274)
(o) Other (specify)	(275)	(276)	(277)	(278)

9. Did you receive any income from doing custom work from others

during 1963? _____ About how much (279) _____

Was this done in Clinton County (280) _____

10. Did you rent any of your land to others? _____

Was he (they) a resident of Clinton County (281) _____

About how much did you receive (282) _____

11. Did you rent any land from others in 1963? _____

Was he (they) a resident of Clinton County? (283) _____

About how much rent did you pay? (284) _____

12. Did you build any new buildings, make improvements or renovations

to any of your existing farm buildings (except your house) last

year? _____ About how much did this come

to? (285) _____ How much of this was purchased

outside of Clinton County (286) _____

Rural areas household survey
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13. Did you purchase any land last year? _____

    Approximate cost (207) _____ Was this purchased

    from a resident of Clinton County? (288) _____

14. Did you purchase any farm equipment, including dairy and barn

    equipment during 1963? _____ About how much did

    this amount to (289) _____ How much of this would

    you estimate was purchased outside of Clinton County? (290) _____

    _____

15. Did you hire any labor last year? _____ Were any

    of them residents outside of Clinton County? (291) _____

    About what were your total wage costs (292) _____

16. Did you purchase any livestock last year that you intend to hold

    for more than one year _____ About how much

    did they all cost (293 _____ Approximately

    how much of this was purchased outside of Clinton County (294) _____

    _____

17. Could you give an estimate of the following expenditures on your
    farm during 1963?

item	local	outside	total
	(295)	(296)	(297)
(a) Feed purchased, including milling costs and hay			
	(298)	(299)	(300)
(b) Fertilizer and lime			
	(301)	(302)	(303)
(c) Seed and plants			
	(304)	(305)	(306)
(d) General farm supplies and hand tools			
	(307)	(308)	(309)
(e) Machinery repair and parts			
	(310)	(311)	(312)
(f) Hauling costs			

17.   (continued)

item	local	outside	total
	(313)	(314)	(315)
(g) Veterinary, breeding fees			
	(316)	(317)	(318)
(h) Gas and oil			
	(319)	(320)	(321)
(i) Custom work			
	(322)	(323)	(324)
(j) Electricity Farm share only)			
	(325)	(326)	(327)
(k) Miscellaneous			

If respondent does not know or does not have a breakdown of

his general farm expenses as above, try to ascertain what

his total costs for the above items amounted to: (328) _____

_____ About what proportion of this was

purchased outside of Clinton County? (329) _____

18.   What was your approximate 1963 depreciation in buildings, equip-
ment, and livestock purchased (as reported on income tax form)

(330) _____

19.   What was your approximate gain or loss (if any) from exchange or
sale of property? (This includes land, buildings, farm equip-
ment, livestock held for more than 6 months). This item as
reported on income tax form.

        Gain (331) _____ Loss (332) _____

20.   We need to know something about the shopping habits of the
people in Clinton County.

   (a) How many shopping trips approximately do you make <u>outside</u>

       the county per year? (13) _____

   (b) Where do you usually go? (14) _____

   (c) What items do you usually purchase? (15) _____

20. (continued)

(d) About what are your average expenditures per trip (16) _____

_____

(e) Total for year (17) _____

21. About how much did you spend last year on mail order purchases?

(18) _____ What were the usual items purchased?

(19) _____

22. About how much does your household spend per week for food and

groceries? (20) _____ Total for year (21) _____

_____ About what proportion of this is spent

outside Clinton County (22) _____

23. Could you give me an approximation of your 1963 household ex-
penditures for the following:

Item	Local	Outside	Total
	(23)	(24)	(25)
(a) Clothing and apparel			
	(26)	(27)	(28)
(b) Medical care and drugs			
	(29)	(30)	(31)
(c) Laundry, repair services, etc.			
	(32)	(33)	(34)
(d) Education			
	(35)	(36)	(37)
(e) Premiums for all forms of insurance			
	(38)	(39)	(40)
(f) Entertainment and recreation (including bar and restaurant)			
	(41)	(42)	(43)
(g) Electricity			
	(44)	(45)	(46)
(h) Telephone and telegraph			
	(47)	(48)	(49)
(i) Heating costs (coal, fuel oil, gas--underline)			
	(50)	(51)	(52)
(j) Water and sewage			

23. (continued)

Item	Local	Outside	Total
	(106)	(107)	(108)
(k) Contributions to nonprofit organizations			
	(53)	(54)	(55)
(l) County and Local taxes			
	(56)	(57)	(58)
(m) Hired domestic help			
	(59)	(60)	(61)
(n) Total automobile expenses (if not known go to 24)			

24. About how many miles per year do you drive your car? (62) _____

What proportion of your gas, oil and car repairs do you purchase

outside of Clinton County? (63) _____

25. Did any of you go on a vacation outside the county last year?

_____ About how much did you spend for this?

(64) _____

26. Did you contribute last year to anyone else's support who lives

outside of Clinton County? _____ About how much

did this amount to? (65) _____

27. Did you or anyone else in your household purchase an automobile

last year? _____ New or used? (66) _____

About how much was paid for it, including the trade-in allowance

if any? (67) _____ Was this purchased outside of

Clinton County? (68) _____

28. Did you buy any furniture or household appliances last year?

_____ About how much did these cost? (69) _

_____ What proportion was purchased outside

the county? (70) _____

29. We need information about housing arrangements for this study.
Do you folks own or rent your home? (71)_____ (For
those renting) -- How much rent do you pay? (72)_____,
permonth. Does the owner live in Clinton County? (73)_____

30. (For home owners) -- Do you have a mortgage on this home? (74)__
_____ About how much did your payments amount to in
1963 (76)_____ (or, (75)_____
permonth.) Did you pay this mortgage here in Clinton County?
(77)_____

31. Do you folks own any other real estate_____ Kind of
property (78)_____ Location: Inside County
(79)_____ Outside county (80)_____
About how much, if any, rent did you receive in 1963 from this
property (81)_____ About how much of this went to pay
for the expenses of maintaining the property? (82)_____

32. Do you have a mortgage on this other property? _____
About how much did your payments amount to in 1963 (83)_____
Did you pay this here in Clinton County? (84)_____

33. Did any of you make any payments on loans (besides mortgages)
during 1963? _____ Approximately how much was
paid (85)_____ Was this paid outside the
county? (86)_____

34. Approximately what was the cost, if any, of any major improve-
ments, renovations, or additions to your home during 1963? (87)_
_____ About how much of this was purchased outside

34. (continued)

    of the county? (88)_____

35. Did any of you receive any gifts, awards, or win any prizes

    last year? _____ About how much did you receive?

    (89)_____ How much of this came from outside

    the county (90)_____

36. Did any of you receive any money last year from the following
    sources and about how much was received?

	Local	Outside	Total
	(91)	(92)	(93)
(a) Trust funds			
	(94)	(95)	(96)
(b) Dividends and/or interest from stocks, bonds, mutual funds			
	(97)	(98)	(99)
(c) Interest from savings accounts			

37. Did you receive any income last year from rooming and boarding
    hunters or other vacationers?

    _____

    About how much was this? (100)_____

38. To make sure we haven't missed anything, do you have any business
    interests outside of Clinton County that we haven't discussed?

    (101)_____ About how much was earned from this last year?

    (102)_____

39. (For rural areas only) (a) Did you lease any of your land to

    hunting clubs last year? _____ About how much did you

    receive for this? (103)_____ (b) Did you re-

    ceive any other income from recreational sources such as fee
    fishing, fee hunting, boating, leasing of campsites, etc. (104)

    _____

40. In which category would your combined household incomes fall?

    (105)_____.

FIGURE P: TOTAL ANNUAL HOUSEHOLD INCOME CATEGORIES

(For Question Number 40, Figure O, Appendix)

A	Under	$1,000
B	1,000 -	1,999
C	2,000 -	2,999
D	3,000 -	3,999
E	4,000 -	4,999
F	5,000 -	6,999
G	7,000 -	8,999
H	9,000 -	11,000
I	11,000 -	14,000
J	14,000 -	17,000
K	17,000 -	20,000
L	Over	20,000