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Effects of investments in water resources on regional income and employment

Jacob Edwin Wiebe

To the Graduate Council:

I am submitting herewith a dissertation written by Jacob Edwin Wiebe entitled "Effects of investments in water resources on regional income and employment." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Agricultural Economics.

, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

April 7, 1970

To the Graduate Council:

I am submitting herewith a dissertation written by Jacob Edwin Wiebe entitled "Effects of Investments in Water Resources on Regional Income and Employment." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Agricultural Economics.

Joe A. Martin
Major Professor

We have read this dissertation
and recommend its acceptance:

Luther H. Keller

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Accepted for the Council:

Helen A. Smith
Vice Chancellor for
Graduate Studies and Research

EFFECTS OF INVESTMENTS IN WATER RESOURCES ON REGIONAL INCOME AND EMPLOYMENT

A Dissertation

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

---

by

Jacob Edwin Wiebe

June 1970

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ABSTRACT

The object of this study was to examine the effects of investments in water resources on regional income and employment. To attain this end, two hypotheses were tested. The first hypothesis was that investments in water resources had a favorable impact on income and employment in the immediate areas in which the investments were made. The second hypothesis was that investments in water resources had an impact on income and employment but that the spatial nature of that impact might be diffused and irregular in pattern due to the influence of markets and other institutions.

In testing the hypotheses, data on income, employment and education were gathered for 125 counties in the Tennessee River Watershed Region. Variables included in these data were Per Capita Income, Total Income, Total Employment, Capital Invested in Manufacturing, TVA Investments, and percentages of population in four income and educational categories. These variables were analyzed by regression analyses, the calculation of beta-coefficients, by discriminant analysis for two groups and t-tests in seven programs (six of which were recorded in the study). The analytical models were applied to different combinations of the basic data in two categories of counties in each program. The counties were categorized as either directly impacted by water resource projects or not directly impacted by water resource projects. In all programs the directly impacted counties generally shared a common geographic

element in that they were located either near water resource projects or in close proximity to rivers on which water projects were located.

Several implications were drawn from the analysis of the programs. The analyses implied that residents in counties in close proximity to water resource investment projects enjoyed a greater per capita income in the long run than did residents in counties not near similar projects. The analyses also implied that investments in water resources were in the long run associated with increases in employment in counties removed from the site of investments and decreases in employment in counties near the investments. The analyses further implied that investments in water resources were not associated with an increase in the standard of living for people in the low income and educational groups living near the areas where investments were made as compared to people in the same categories living in areas removed from the sites of investments.

In considering the implications of the analyses of the study as related to the hypothesis tested, the first hypothesis would appear subject to question. The second hypothesis would tend to be favored. The analyses did not reveal a definite pattern of counties in which income and employment standards might be related geographically to water resource projects funded by public investments. The only justified conclusion of this study might, therefore, be expressed in the form of a hypothesis that the major effects of investments in water resources on regional income and employment were indeed regional and not confined to isolated areas.

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CHAPTER I

INTRODUCTION

The Setting

The economic development of a region has commonly been thought of as a discernible rise in total and per capita income of a population, widely diffused throughout occupational groups and continuing long enough to be cumulative.[1, 2]

During the past few decades problems of regional economic development have received unprecedented attention in the United States. Some regions have expanded rapidly. At the same time, other regions have experienced stages of relative decline in economic activity.[3]

The problem of wide disparities in levels of income and economic development between regions within the nation has remained a topic of concern.[4] For the economically depressed areas national policy objectives have been to arrest their decline or accelerate their economic

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[1] Benjamin Higgins, Economic Development (New York: W. W. Norton and Company, Inc., 1959), p. 432.

[2] For similarities between regional and national development objectives see Arthur Maass, et al. Design of Water-Resource Systems (Cambridge: Harvard University Press, 1962), p. 86.

[3] Niles M. Hansen, "Towards a New Approach in Regional Economic Policy," Land Economics (Madison: The University of Wisconsin Press, August, 1967), p. 377; Harvey S. Perloff, et al., Regions, Resources and Economic Growth (Baltimore: The John Hopkins Press, 1960), P. V.

[4] U. S. Congress, Senate, Water Resources Planning Act Publication 89-90, 89th Congress, 1st Sess., 1965, p. 1.

growth and to reduce the above-average rates of unemployment or under-employment in these regions.[5]

One of the tools commonly used to further regional economic development has been public investments in water resources. The Tennessee Valley Authority Act of 1933 could be cited as an example. One of the general purposes of the Authority was to promote the economic and social well-being of the people of the Tennessee River area and the related adjoining territory.[6]

The Appalachian Regional Development Act of 1965 could be given as a more recent example of water resource investment policy geared for purposes of improving the welfare of people in particular regions. Section 206 (a) of this Act read as follows:

> The Secretary of the Army is hereby authorized and directed to prepare a comprehensive plan for the development and efficient utilization of the water and related resources of the Appalachian Region, giving special attention to the need for an increase in the production of economic goods and services within the region as a means of expanding economic opportunities and thus enhancing the welfare of its people, which plan shall constitute an integral and harmonious component of the regional economic development program authorized by this Act.[7]

The problem of determining the effectiveness of water resource investments in alleviating depressed economic conditions in regions

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[5]John H. Cumberland and Frits Van beek, "Regional Economic Development Objectives and Subsidization of Local Industry" Land Economics (Madison: The University of Wisconsin Press, August, 1967), p. 253.

[6]Annual Report of The Tennessee Valley Authority and Appendixes (Washington: U. S. Government Printing Office, 1935), p. 1.

[7]U. S., Statutes at Large, Vol. 79, 1965, P. L. 98-4.

where the investments were made has received little attention. Investments of this type have generally been viewed as instruments which served their purpose well. This view appears to have met increasing opposition. This opposition would tend to be substantiated by a recent study which indicated that industrial growth in the Southeast United States had proceeded independently of Federal expenditures on water resource projects.[8] In another study it was concluded that in general, water did not constitute a bottleneck to rapid economic growth in the water deficit areas of the United States, nor did its presence in large quantities in other regions guarantee the rapid growth of these regions.[9] There are others who share the opinion that the task of evaluating the socio-economic effects of public investments in water resources has not been completed.[10]

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[8]C. A. Blowers, "Water and Industrial Growth in the Southeast" (unpublished paper, Tennessee Valley Authority, Knoxville, 1967), p. 15.

[9]Charles W. Howe, "Water Resources and Regional Economic Growth in the United States, 1950-1960," The Southern Economic Journal, Vol. 34, No. 4, April, 1968, p. 488.

[10]John R. Moore (ed.), The Economic Impact of TVA (Knoxville: The University of Tennessee Press, 1967), p. 108; from personal notes on summary by Jack L. Knetch at the "Symposium on Secondary Impacts," Washington, D. C., September 25-27, 1968; Roger C. Woodworth and Leroy Rogers, "The Future Agricultural Use of Water--Southern Humid Region," Water Resources and Economic Development in the South (Raleigh: Agricultural Policy Institute, North Carolina State University in cooperation with the Council of State Governments and the Southern Land Economics Research Committee, August, 1965), p. 23; J. H. Cumberland and Frits Van Beek, Land Economics, p. 23.

The problem, therefore, which this study examined could be summarized in the following manner. There are regions in the United States which could be classified as economically depressed regions. There exists also a public interest in solving the under-employment and low income problems in these depressed regions. Water resource investment projects have been one of the principal means used in dealing with problems of this nature, and are currently being planned on a large scale as a method for promoting regional economic development.

In the past, water resource developments have frequently been defended in terms of their favorable impact on regional development. Studies have been conducted, however, which question the effectiveness of large public investments in water resources as a means of promoting income and employment in economically depressed areas. In general, it is believed that information is needed on questions such as who benefits, how much and who pays when natural resource investments are made.[11] In view of studies and opinions such as these, there would appear to be a need for objective evaluation of the effectiveness of resource investment projects in alleviating depressed economic conditions at the regional level. Evidence of this relationship should be valuable as a guide to future policy.[12]

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[11]From Summary by Jack L. Knetch; Otto Eckstein, Water Resource Development, The Economics of Project Evaluation (Cambridge: Harvard University Press, 1958), p. 17.

[12]Charles W. Howe, The Southern Economic Journal, p. 477.

The Object

The object of this study was to evaluate some of the effects of investments in water resources. Generally, this study was designed to provide information on the effectiveness of large scale investments in water resources in promoting local and regional economic growth and in alleviating problems of low income, unemployment and underemployment.

Specifically, this study was designed to test the hypothesis that investments in water resources had a favorable impact on income and employment in the immediate local areas in which investments of this nature were made. To test this hypothesis, the economic effects of investments in water resources in delineated areas were examined. A further test involved an examination of the relationship between investments in water resources and private manufacturing investments in the same areas.

Four selected variables were used to test the hypothesis:

(a) per capita income in delineated areas

(b) employment in delineated areas

(c) the percentage of population in different income categories (This variable was selected in an attempt to examine whether investments in water resources were instrumental in decreasing the number of people in an area living on a subsistence or low level of income).

(d) the percentage of adult population attaining different levels of education

(This variable was selected to examine the relationship between public and private investments and income and employment for people of different educational levels).

CHAPTER II

THE REGION STUDIED

The region chosen to examine the income and employment effects of investments in water resources was the Tennessee River Watershed. This region consisted of 125 counties in parts of seven states. The 125 counties were part of a 201 county area either in the Tennessee River Watershed or served by distributors of Tennessee Valley Authority[1] electric power.[2] Information on population, employment and income in the 201 county area might be of assistance in describing general economic conditions in the Tennessee Valley Watershed region.[3]

The 201 county area was a region in which long-term trends in outmigration of population were common. It was also a region in which long-term total employment gains were less than employment gains for the rest of the United States. In the past, a large part of the growth in industrial employment was in the low-wage, labor-oriented industries. A principal source of workers for these industries were the large number

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[1]Hereinafter referred to as TVA.

[2]Highlights of Growth and Change (Knoxville: Tennessee Valley Authority, May, 1968), p. 2.

[3]Note: For similarities in economic conditions between the 201 county area and the 125 county watershed region, reference may be made to: A Comparative Study of the Tennessee Valley with Special Reference to Agriculture (Muscle Shoals, Alabama: Tennessee Valley Authority, July, 1968). This study concentrates primarily on the 1950-60 period.

of people leaving agricultural employment. This source of manpower has been virtually depleted.

In terms of relative employment gains, however, the region performed better than the nation in growth of all major categories of non-farm employment for the 1929-1966 period. As seen in Figure 1 the 1966/1929 ratio of persons in government employment for the region and the United States were 3.7 and 3.5, respectively. The growth ratios for employment in construction were 3.6 for the region and 2.2 for the nation. The ratios for employment in manufacturing were 3.1 for the region and 1.9 for the nation. (In absolute figures, the region had 33.2 percent of its workers engaged in manufacturing in 1966 as compared to 28.1 percent for the same national employment category.) Similar ratios for total non-farm employment, trade and service employment and total employment were 2.7 and 2.0, 2.4 and 2.0 and 1.4 and 1.6, respectively. Only in mining and farm employment were the ratios lower for the region than for the nation. In these cases the ratios were 0.5 for the region and 0.6 for the national employment in manufacturing and 0.3 and 0.4 for farm employment for the same respective areas.

An examination of the income level in the power service area revealed that the general income level for the region was below that of the national average. In manufacturing, the heavy concentration of workers in low-wage industries together with generally lower wage rates, held average earnings for all manufacturing workers in the region, for 1966, to $4,938. This was 74 percent of the national average of $6,631

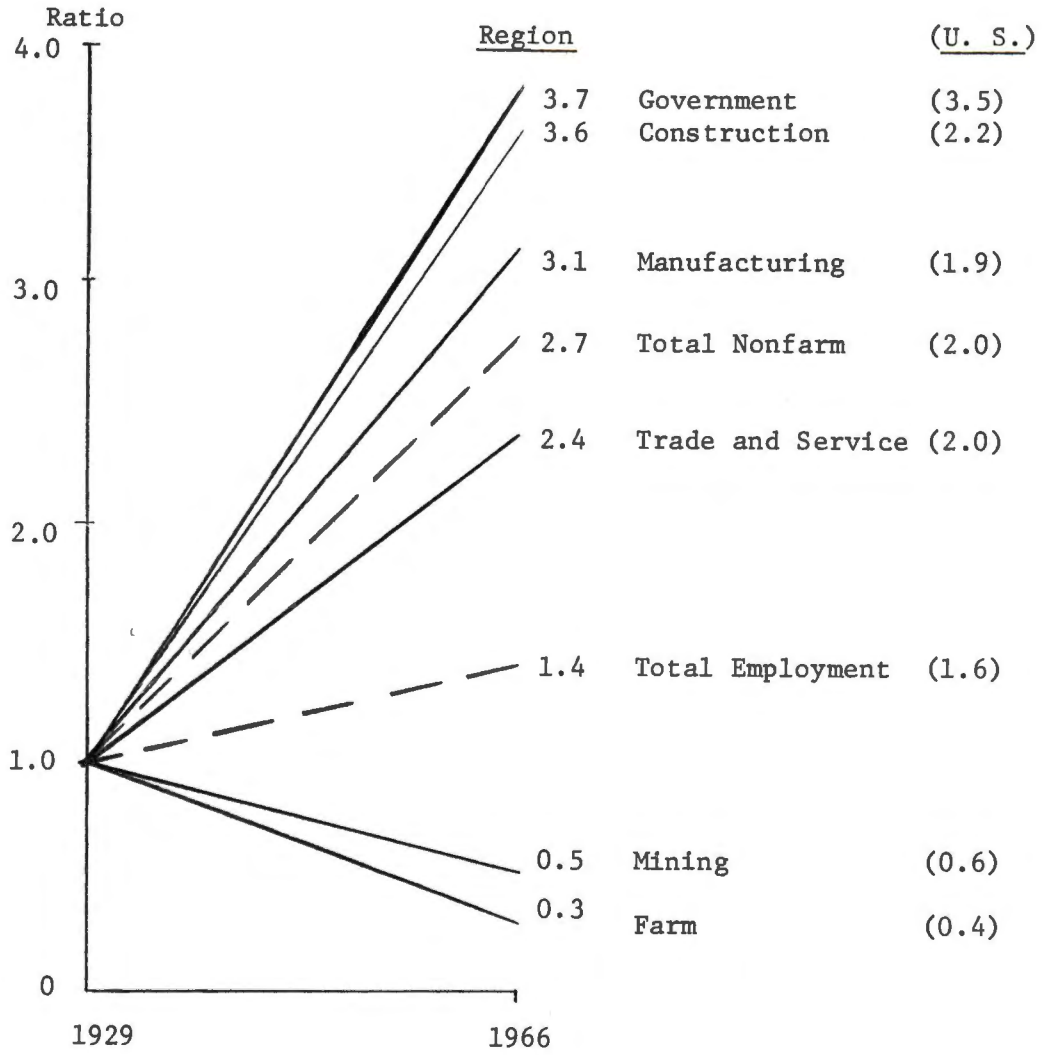

Figure 1. Employment Ratios, 1966/1929.

Source: Highlights of Growth and Change (Knoxville: Tennessee Valley Authority, May, 1968), P. 10.

for the same year. The regional per capita income in 1966 was $2,075. This was 70 percent of the national average of $2,963 for the same period.

In terms of relative income changes, the region again fared better than the nation. Total wages and salary payments increased twelve times for the region during the 1929 to 1966 period. The comparable national total increased about eight times during the same period. A break-down of the 1966/1929 wage and salary ratios may be seen in Figure 2. The growth ratios for earnings of workers in government, construction and manufacturing in the region and the nation were 22.7 and 15.4, 18.5 and 9.4, and 15.0 and 8.0, respectively. Similar ratios for total wages and salaries, workers in trade and service industries, farming and mining were 12.0 and 7.8, 8.4 and 6.6, 4.7 and 2.1 and, 4.4 and 3.0, respectively.

A decline in the dependence on low-income agriculture as a source of employment and a rapid expansion of higher paying non-farm jobs were major factors contributing to the growth of income in the power service regions. In general, the region made significant gains in providing income and employment opportunities for its citizens. The relative income gap between the region and the nation as a whole appeared to be closing. It was believed, however, that continued progress for the region would depend on its success in improving the low-income area as well as sustaining growth and development in its principal urban industrial centers.[4]

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[4] Highlights of Growth and Change, Tennessee Valley Authority, pp. 2-24.

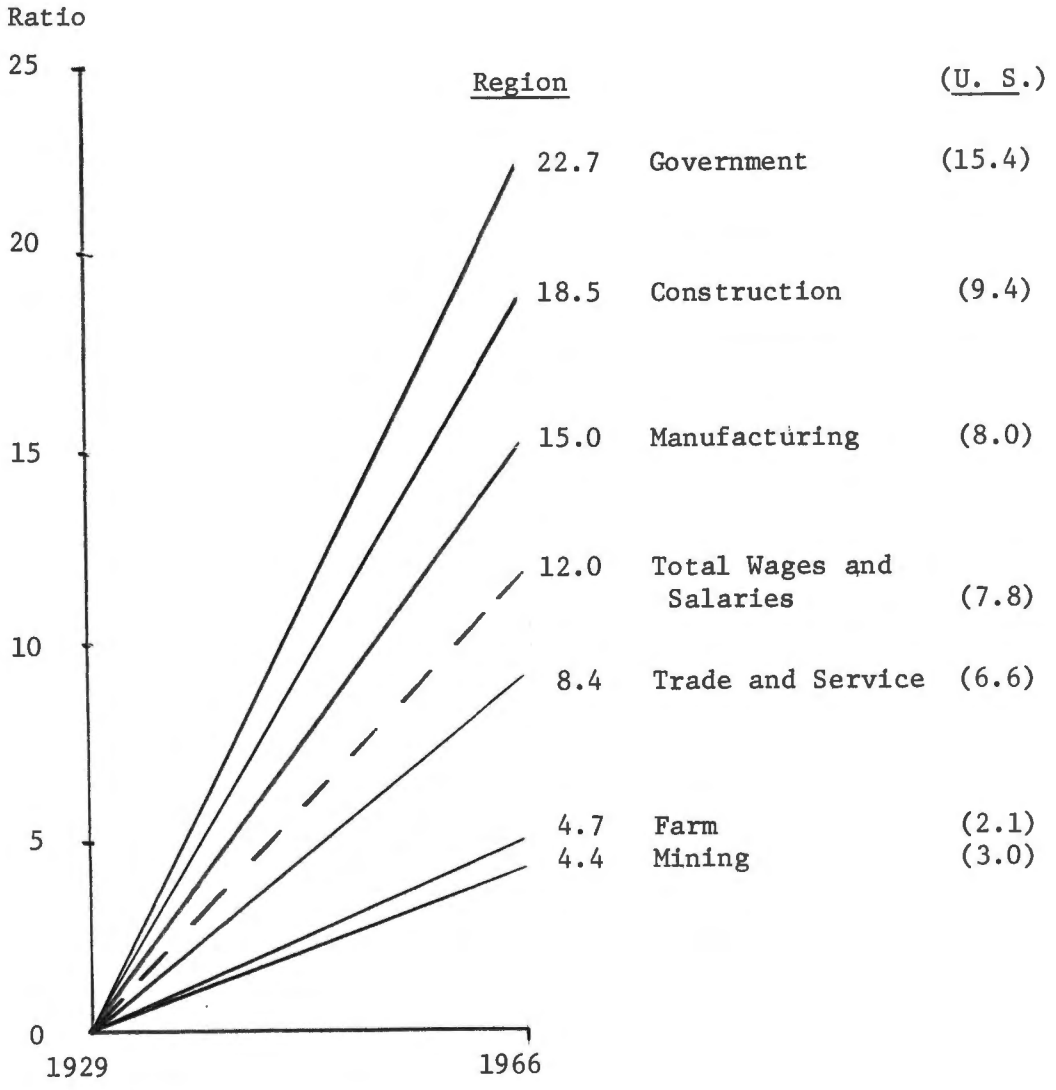

Figure 2. Wage and Salary Ratios, 1966/1929.

Source: Highlights of Growth and Change (Knoxville: Tennessee Valley Authority, May, 1968), P. 15.

CHAPTER III

DELINEATION OF AREAS

The 125 counties of the Tennessee River Watershed region were delineated into sub-areas in three different programs. In each program the counties were arbitrarily divided into two groups. One group consisted of counties expected by their location to be directly affected by TVA projects. Counties in this group were called TVA counties. Income and employment benefits in these counties were hypothesized to be greater than similar benefits in the remaining or second group of counties. The second group of counties were referred to as non-TVA counties.

The delineation of programs also considered the time of construction of a project. If construction on a project had begun prior to the time series under consideration, the counties delineated as those receiving benefits from the project were considered to do so from the beginning of the series. These counties fall in the TVA category. In cases where construction of a project was undertaken during the time series under consideration, the counties hypothesized to be directly affected by the project were considered as such five years prior to the beginning of construction. A five year period was arbitrarily chosen to pick up possible trends in the changes of variables as construction was anticipated. For example, construction on Nickajack Dam was begun in 1964. If counties, such as Marion County, Tennessee, were not already

considered to be affected by other TVA projects, Marion County would be shifted from the non-TVA to the TVA category in 1959, or five years prior to 1964.

In the delineation Program 1, counties considered to be directly affected by TVA projects included:

(a) counties in which TVA projects were located

(b) counties within 15 miles of TVA projects readily accessible by a major truck highway.

Counties in the watershed region considered not to be directly affected by TVA projects included all counties not in (a) or (b) as shown by the shaded area in the 125 county outline on Figure 3. In this delineation 45 of the 125 counties were considered directly affected by TVA projects as shown on Table 1.

In Program 2, counties which had a TVA project located within or on the border of the county were considered to be directly affected by the projects. A total of 32 counties fell in this category as shown in Table 2. The remaining 93 counties were not considered to be directly affected by the projects as shown on Figure 4.

In Program 3, counties were considered affected by TVA projects if either a project was located within or on the border of the county, or if the county bordered the Tennessee River. In this delineation 57 counties were considered directly affected by TVA projects as shown on Table 3. The remaining 68 counties were not considered to be affected by TVA projects as shown on Figure 5.

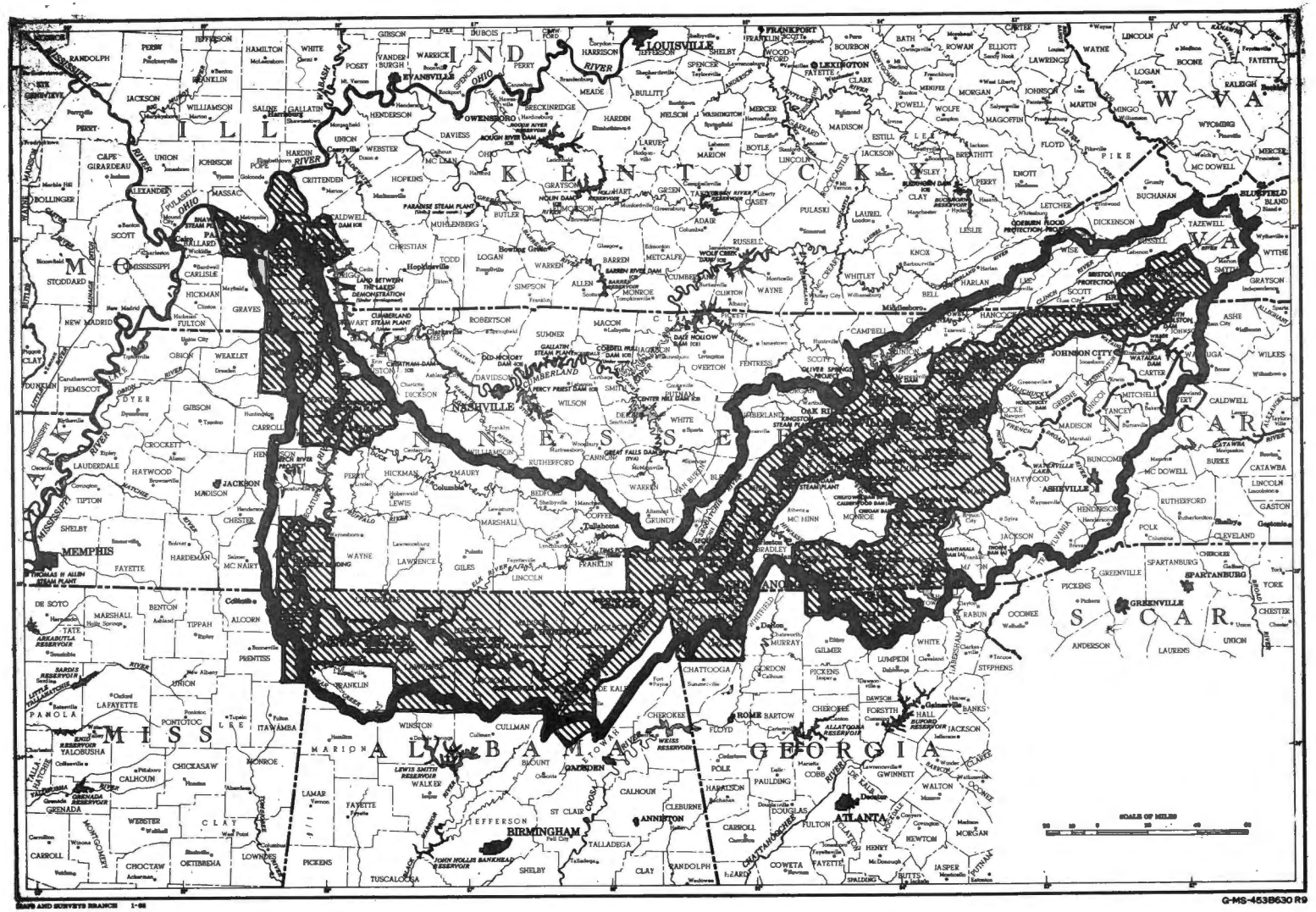

Figure 3. TVA Impacted Counties in the Tennessee River Watershed Region, Program 1.

TABLE 1

DIRECTLY IMPACTED COUNTIES, PROGRAM 1

County		Change County from Non-TVA to TVA Group in Year
1.	Anderson	1940
3.	Benton	1940
5.	Blount	1940
9.	Carter	1941
20.	Grainger	1940
23.	Hamblen	1940
24.	Hamilton	1940
26.	Hardin	1940
27.	Hawkins	1945
29.	Henry	1940
32.	Humphreys	1944
33.	Jefferson	1940
35.	Knox	1940
39.	Loudon	1940
42.	Marion	1940
45.	Meigs	1940
50.	Polk	1940
51.	Rhea	1940
52.	Roane	1946
55.	Sevier	1940
57.	Sullivan	1942
72.	Washington	1945
77.	Cherokee	1940
78.	Clay	1940
79.	Graham	1940
86.	Swain	1940
93.	Tishomingo	1940
94.	Calloway	1940
96.	Livingston	1940
97.	Lyon	1940
98.	McCracken	1940
99.	Marshall	1940
101.	Catoosa	1940
102.	Dade	1940
103.	Fannin	1940
108.	Union	1940
109.	Walker	1940
112.	Colbert	1940
117.	Jackson	1940
118.	Lauderdale	1940

TABLE 1 (Continued)

County		Change County from Non-TVA to TVA Group in Year
119.	Lawrence	1940
120.	Limestone	1940
121.	Madison	1940
123.	Marshall	1940
124.	Morgan	1940

NOTE: Counties not listed considered not directly affected by TVA projects.

TABLE 2

DIRECTLY IMPACTED COUNTIES, PROGRAM 2

County		Change County from Non-TVA to TVA Group in Year
1.	Anderson	1940
3.	Benton	1944
7.	Campbell	1940
9.	Carter	1943
20.	Grainger	1940
24.	Hamilton	1940
26.	Hardin	1940
27.	Hawkins	1947
32.	Humphreys	1944
33.	Jefferson	1940
39.	Loudon	1940
42.	Marion	1940
45.	Meigs	1940
50.	Polk	1940
51.	Rhea	1940
52.	Roane	1946
55.	Sevier	1940
57.	Sullivan	1946
61.	Washington	1945
77.	Cherokee	1940
78.	Clay	1940
79.	Graham	1940
86.	Swain	1940
96.	Livingston	1940
99.	Marshall	1940
103.	Fannin	1940
108.	Union	1940
112.	Colbert	1940
117.	Jackson	1940
118.	Lauderdale	1940
119.	Lawrence	1940
123.	Marshall	1940

NOTE: Counties not listed considered not directly affected by TVA projects.

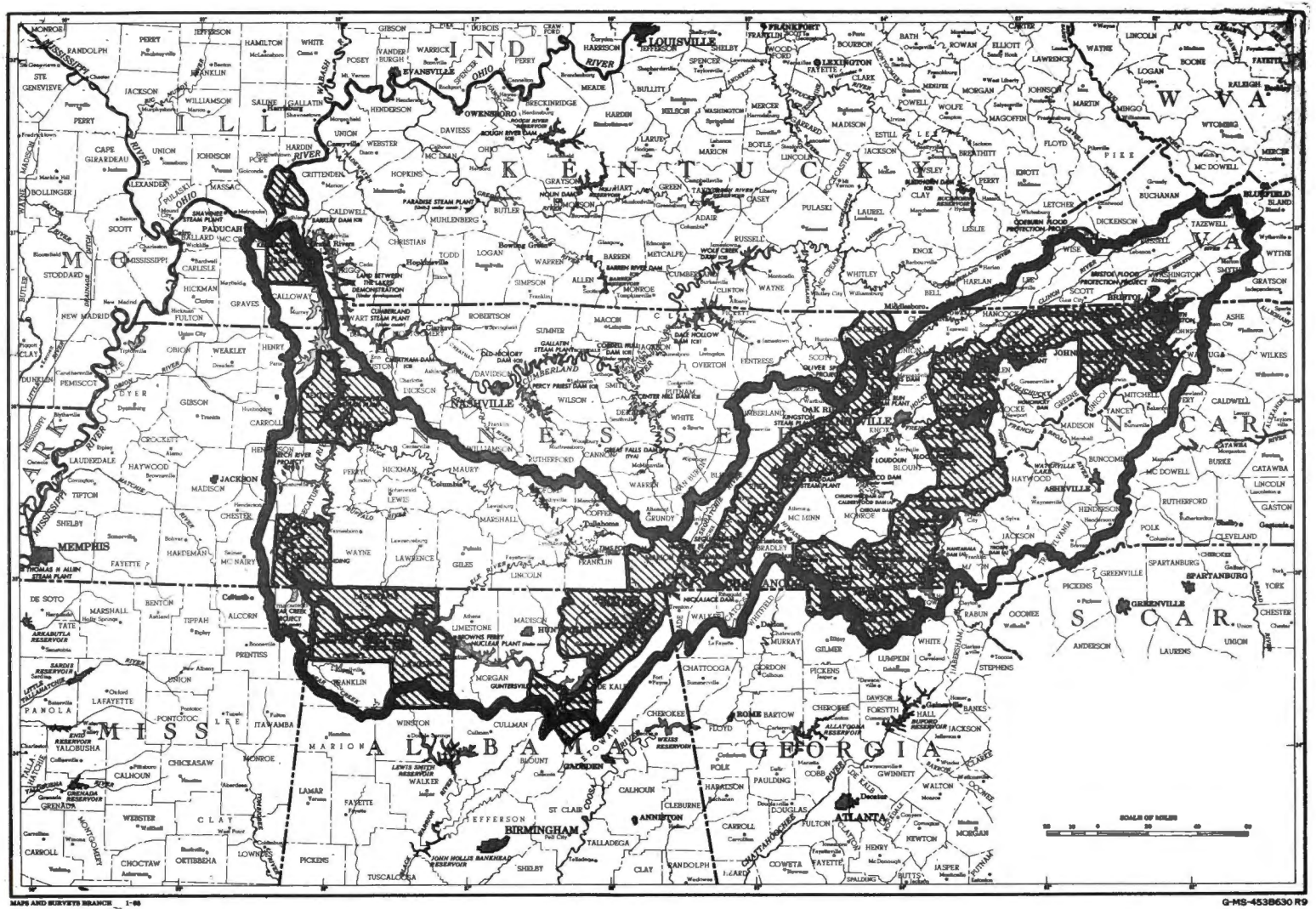

Figure 4. TVA Impacted Counties in the Tennessee River Watershed Region, Program 2.

TABLE 3

DIRECTLY IMPACTED COUNTIES, PROGRAM 3

County		Change County from Non-TVA to TVA Group in Year
1.	Anderson	1940
3.	Benton	1940
5.	Blount	1940
6.	Bradley	1940
7.	Campbell	1940
9.	Carter	1941
11.	Claiborne	1940
15.	Decatur	1940
20.	Grainger	1940
23.	Hamblen	1940
24.	Hamilton	1940
26.	Hardin	1940
27.	Hawkins	1945
29.	Henry	1940
31.	Houston	1940
32.	Humphreys	1944
33.	Jefferson	1940
34.	Johnson	1941
35.	Knox	1940
39.	Loudon	1940
40.	McMinn	1940
42.	Marion	1940
45.	Meigs	1940
49.	Perry	1940
50.	Polk	1940
51.	Rhea	1940
52.	Roane	1946
55.	Sevier	1940
56.	Stewart	1940
57.	Sullivan	1942
59.	Union	1940
72.	Washington	1945
77.	Cherokee	1940
78.	Clay	1940
79.	Graham	1940
86.	Swain	1940
93.	Tishomingo	1940
94.	Calloway	1940
96.	Livingston	1940
97.	Lyon	1940

TABLE 3 (Continued)

County		Change County from Non-TVA to TVA Group in Year
98.	McCracken	1940
99.	Marshall	1940
100.	Trigg	1940
101.	Catoosa	1940
102.	Dade	1940
103.	Fannin	1940
107.	Towns	1940
108.	Union	1940
109.	Walker	1940
112.	Colbert	1940
117.	Jackson	1940
118.	Lauderdale	1940
119.	Lawrence	1940
120.	Limestone	1940
121.	Madison	1940
123.	Marshall	1940
124.	Morgan	1940

NOTE: Counties not listed considered not directly affected by TVA projects.

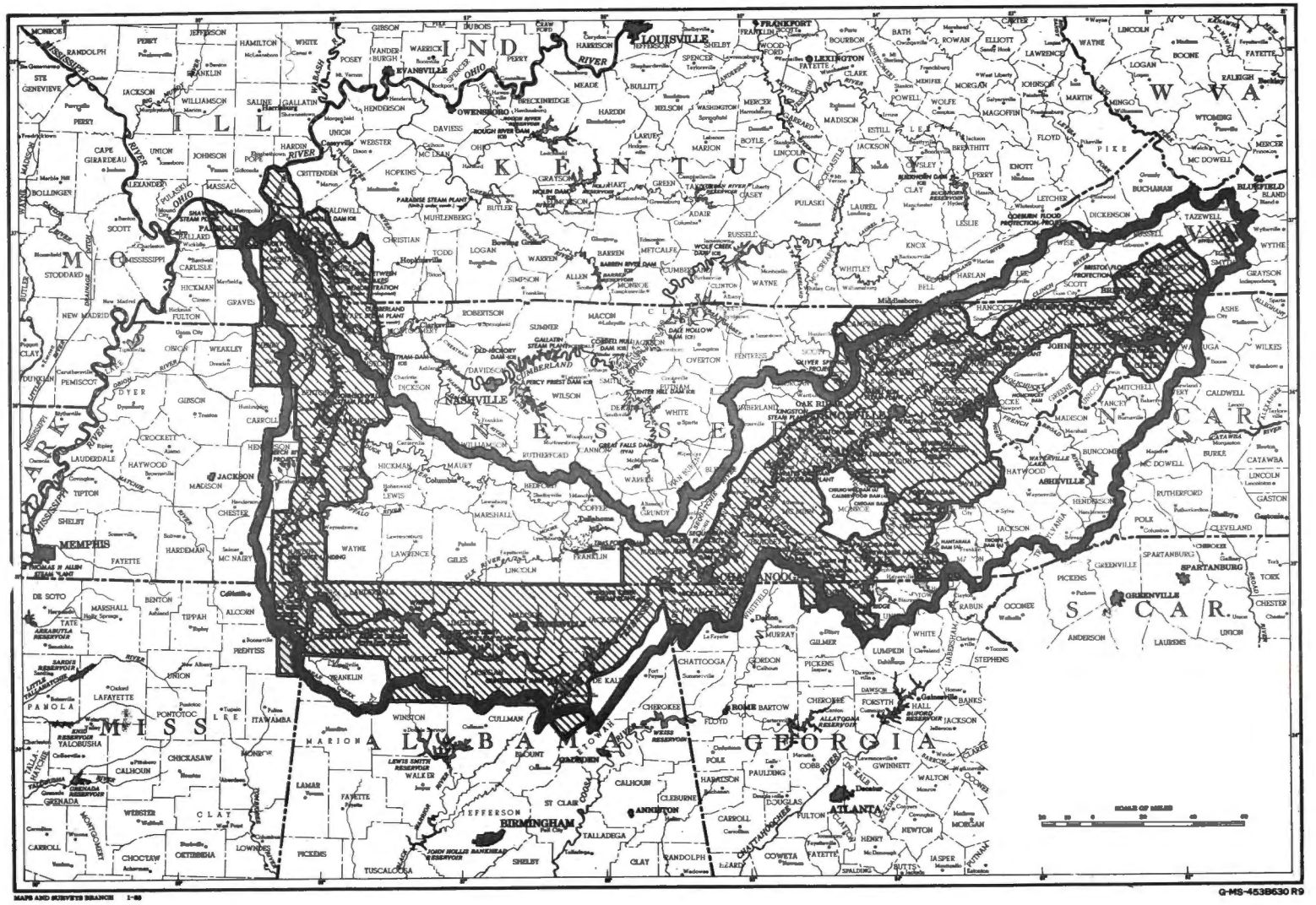

Figure 5. TVA Impacted Counties in the Tennessee River Watershed Region, Program 3.

CHAPTER IV

STATISTICAL MODELS USED IN THE ANALYSIS OF DATA

Four different statistical models were used in making the analysis. These models were: multiple regression analysis, standard partial regression coefficients (beta-coefficients), t-test, and discriminant analysis for two groups.

First, multiple regression analysis[1] was used in the analysis of data for both the TVA impacted counties and non-TVA impacted counties. In this model as many as six independent variables were regressed on the dependent variable. This was done in stages for two reasons. First, data were not available for all variables for all of the years in the 1940 to 1963 period under study as seen in Table 4. Second, the total income estimates were given in gross figures for the 1940 to 1947 period and in net figures for 1948 to 1963. The analysis in each program was therefore conducted for the periods of 1940 to 1947, 1948 to 1963, 1948 to 1960 and 1953 to 1960. A typical multiple regression model used was:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$$

where: Y = dependent variable

a = intercept

$X_1 - X_6$ = independent variables

$b_1 - b_6$ = regression coefficients.

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[1] BMD03R. "Multiple Regression with Case Combinations." Knoxville: The University of Tennessee Computing Center, September 1, 1965.

TABLE 4

VARIABLES USED IN ANALYSIS, YEARS FOR WHICH DATA WERE AVAILABLE AND APPENDIX IN WHICH DATA WERE RECORDED

Variable (Per County)	Description - Abbreviations	Data Available For Years	Data Recorded In Appendix
x_1	Time (calendar year) - T		
x_2	Per Capita Income - PCI	1940-63	B
x_3	All Spendable Money Income - TI	1940-63	C
x_4	Total Employment - TE	1940-63	D
x_5	Capital Invested in Manufacturing -CIM	1940-63	E, F
x_6	TVA Investments in Dams, Steam Plants and Reservoirs - TVAI	1940-63	G, H
x_7	Percentage of Total Consumer Units in Income Category of $0 - $2499	1953-60	I
x_8	Percentage of Total Consumer Units in Income Category of $2500 - $3999	1953-60	J
x_9	Percentage of Total Consumer Units in Income Category of $4000 - $6999	1953-60	K
x_{10}	Percentage of Total Consumer Units in Income Category of $7000 and over	1953-60	L

TABLE 4 (Continued)

Variable (Per County)	Description - Abbreviations	Data Available For Years	Data Recorded In Appendix
x_{11}	Percentage of Total Population 25 Years and Over Who Completed No School	1940-60	M, N, O
x_{12}	Percentage of Total Population 25 Years and Over Who Completed 1-8 Years of Elementary School	1940-60	M, N, O
x_{13}	Percentage of Total Population 25 Years and Over Who Completed 1-4 Years of High School	1940-60	M, N, O
x_{14}	Percentage of Total Population 25 Years and Over Who Completed 1-4 Years of More of College	1940-60	M, N, O

Note: Variables $x_7 - x_{14}$ inclusive are referred to in the study by description only.

Once the regression coefficients for both TVA and non-TVA counties had been computed, the regression coefficients for the different equations were examined to determine the relative effects of the independent variables on the dependent variable. Since the computed regression coefficients were often in different units, the coefficients, in order to be compared, had to be converted into units of standard deviations. To do this, the standard partial regression coefficients[2] (beta-coefficients) were calculated. The absolute values of the beta-coefficients were then compared. The variable having the greatest absolute beta-coefficient was considered the variable having the greatest effect on predicting the dependent variable. The variable with the second greatest absolute beta-coefficient was considered the variable having the second greatest effect on estimating the dependent variable.

To calculate the beta coefficients, the following equation was used:

$$b_1^{x} = b_1 \frac{\sigma_1}{\sigma_y}$$

where: b_1^{x} = calculated beta coefficient

b_1 = regression coefficient

σ_1 = standard error of regression coefficient b_1

σ_y = standard error of y estimate.

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[2]Taro Yamane, Statistics, An Introductory Analysis (2nd edition New York: Harper and Row, 1967), pp. 761-763; Robert G. D. Steel and James H. Torrie, Principles and Procedures of Statistics (New York: McGraw-Hill Book Company, Inc., 1960), pp. 284-285.

A third statistical model, the t-test, was applied to compare the corresponding regression coefficients for TVA and non-TVA counties. This test was conducted to examine whether the corresponding coefficients for the two categories of counties could be considered estimates of a common population. The model used in the t-test[3] was the following:

$$t = \frac{b_1 - b_2}{\sqrt{\frac{\sigma_{b_1}^2}{n_1} + \frac{\sigma_{b_2}^2}{n_2}}}$$

where: b_1 = regression coefficient for TVA counties

b_2 = corresponding regression coefficient for non-TVA counties

σ_{b_1} = standard error of regression coefficient for TVA counties

σ_{b_2} = corresponding standard error of regression coefficient for non-TVA counties

n_1 = number of observations for TVA counties

n_2 = number of observations for non-TVA counties.

An example of the use of the t-test was as follows: assume we have calculated the regression coefficients for per capita income regressed on a dependent variable for both TVA (b_1) and non-TVA (b_2) counties in any particular program. To examine whether there was a difference in the growth patterns of these coefficients over time, the

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[3] Ibid., pp. 173-175.

coefficients could be plotted on a conventional two-dimensional graph as shown in Figure 6. The t-test would then be applied, given the standard errors of the regression coefficients and the number of observations in both TVA and non-TVA data, to determine whether the slope or regression coefficients of the two categories of counties were significantly different. Should the calculated t-value prove to be greater than the t-table values at given probability levels, the difference between the two coefficients would be said to be significantly different at a given probability level.

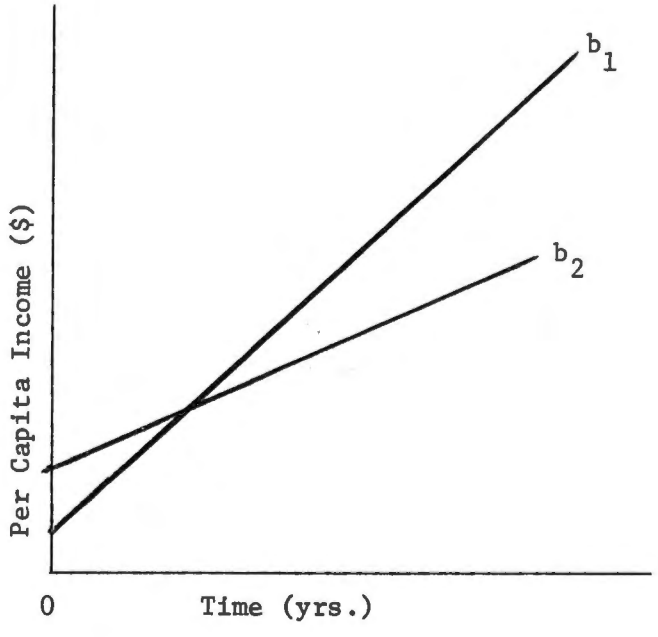

Figure 6. Hypothetical Changes in Per Capita Income Over Time.

The fourth model, called discriminant analysis for two groups, was used in regard to delineation of counties[4] in the study. In the delineation of counties it was decided that a county belonged to one of two groups. Data on different variables available for the 125 counties were read as indicators of which group the county belonged to. This was done by a program which computed a linear function of variables measured for each county of the two groups. The function computed served as an index for discrimination between the groups and was determined from the "best" criterion. This was brought about in that the difference between the mean indices for the two groups divided by a pooled standard deviation of the indices was maximized.[5]

In the computational procedure in discriminant analysis for two groups, the data were prepared in the form:[6]

$$x_{ijk} \qquad \begin{aligned} i &= 1, 2 \\ j &= 1, 2, \ldots, n_i \\ k &= 1, 2, \ldots, p + q \end{aligned}$$

where n_i = number of observations in the i^{th} group

$p + q = m$ = number of variates.

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[4] See Chapter III on Methods of Delineation.

[5] Gerhard Tintner, Econometrics (New York: John Wiley and Sons, Inc., 1952), pp. 96-102; William S. Peters, George W. Summers, Statistical Analysis for Business Decisions (New Jersey: Prentice-Hall, Inc., 1968), pp. 401-408.

[6] BMD04M. "Discriminant Analysis for Two Groups." Knoxville: The University of Tennessee Computing Center, September 1, 1965.

The following series of steps in the analysis were then followed:

1. The means for each group were computed

$$(x_{i.1}, x_{1.2}, \ldots, x_{i.m}), \quad i = 1, 2 .$$

2. The differences of the means were computed

$$(x_{1.} - x_{2.})' = (x_{1.1} - x_{2.1}, x_{1.2} - x_{2.2}, \ldots, x_{1.m} - x_{2.m}).$$

3. The matrices S^1 and S^2 were computed

$$S^i = (s^i{}_{pq}) \quad i = 1, 2$$

$$s^i{}_{pq} = \sum_{j=1}^{n_i} (x_{ijp} - x_{i.p})(x_{ijq} - x_{i.q}) .$$

4. The matrix A was computed

$$A = S^1 + S^2 .$$

5. Matrix A was inverted.

6. The coefficients $U_1, U_2, \ldots, U_m$ of the discriminant function were computed

where: $(a^{j1}, a^{j2}, \ldots, a^{jm})$ was the j^{th} row of A^{-1}

then: $$U = \sum_{p=1}^{m} a^{jp} (x_{1.p} - x_{2.p}) .$$

In vector notation

$$U = A^{-1} (x_{1.} - x_{2.}), \text{ where } U = \begin{bmatrix} U_1 \\ U_2 \\ . \\ . \\ . \\ U_m \end{bmatrix} .$$

7. The F-statistic was computed

$$F\ (m,\ n + n\text{-}1\text{-}m) = \frac{n_1 n_2\ (n_1 + n_2 - m - 1)}{m\ (n_1 + n_2)\ (n_1 + n_2 - 2)} \cdot D^2$$

where: $D_2 = (n_1 + n_2 - 2) \sum_{i=1}^{m} \sum_{j=1}^{m} a^{ij} (x_{1.i} - x_{2.i})(x_{1.j} - x_{2.j})$.

8. The mean, variance and standard deviation of the quantities

$$Z_{id} = U_1 x_{id1} + U_2 x_{id2} + \ldots + U_m x_{idm} \qquad \begin{matrix} d = 1, 2, \ldots, n_i \\ i = 1, 2 \end{matrix}$$

were computed.

9. The n_1 and n_2 values of Z_d were arranged in order of algebraic size. These values were printed in the following format:

County No.	First Group Values	Second Group Values	Rank in Group 1	Rank in Group 2
1	Z_{d_1}	Z_{d_2}	(Rank order of counties beginning with counties closest to fitting and ending with counties least fitting "group" as delineated.)	
2				
.				
.				
.				
125				

CHAPTER V

ANALYSIS OF PROGRAM 1

Beta-Coefficients Calculated and Compared

In Program 1, counties classified as directly impacted TVA counties included:

(a) counties in which TVA projects were located.

(b) counties within 15 miles of TVA projects and readily accessible by a major truck highway. Forty-five of the 125 counties were considered TVA counties in this program.

Non-TVA counties, or counties classified as not directly impacted by TVA projects included all counties in the watershed region not in (a) or (b). Eighty of the 125 counties were therefore classified as non-TVA counties.

In analyzing the data for the two classifications of counties, several models were used. The first of these models used was that of multiple regression analysis.

Once the results of the multiple regression analysis were obtained, the appropriate coefficients and standard errors were used to calculate the beta-coefficients as recorded in Tables 5 to 14 inclusive. With the assistance of the beta-coefficients, it was possible to compare the importance of the independent variables in estimating the dependent variable when the variables were given in different units. For example, in Table 5, the variables Time (X_1) and TVA Investments (X_6) were given

TABLE 5

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 1 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	49.85151***	5.50115	1.25202	49.68728***	3.36353	0.92282	0.49426
x_3 - TI	0.00355**	0.00070	0.00000	0.01083***	0.00071	0.00000	0.00000
x_4 - TE	0.00826*	0.00430	0.00000	-0.01009***	0.00307	-0.00000	74.91631***
x_5 - CIM	-0.01712**	0.00743	-0.00000	0.00336	0.00507	0.00000	-45.79504***
x_6 - TVAI[a]	-4.43107**	2.08868	-0.04225	-0.27898	0.19441	-0.00030	-35.65337***
1948-63							
x_1 - T	35.20780***	1.93284	0.35012	23.84263***	0.99701	0.16353	146.49488***
x_3 - TI	0.00214***	0.00037	0.00000	0.00395***	0.00039	0.00000	0.00000
x_4 - TE	0.00363**	0.00153	0.00000	0.00071	0.00126	0.00000	0.00000
x_5 - CIM	-0.00438*	0.00231	-0.00000	0.01238***	0.00239	0.00000	0.00000
x_6 - TVAI	3.12665***	1.09029	0.01754	-0.25517***	0.06591	-0.00012	82.68213***

1940-47 $a_1 = -1680.86682$; $R_1^2 = 0.6862$; $\sigma_{y_1} = 219.03757$; $n_1 = 323$

$a_2 = -1624.76199$; $R_2^2 = 0.6643$; $\sigma_{y_2} = 181.10249$; $n_2 = 677$

1948-63 $a_1 = -1111.04752$; $R_1^2 = 0.6286$; $\sigma_{y_1} = 194.36472$; $n_1 = 712$

$a_2 = -557.10982$; $R_2^2 = 0.6446$; $\sigma_{y_2} = 145.36348$; $n_2 = 1288$

where: subscript 1 refers to TVA counties; subscript 2 refers to Non-TVA counties; b = regression coefficient; σ_b = standard error of regression coefficient; β = beta coefficient; a = intercept; R^2 = coefficient of determination; σ_y = standard error of y estimate; n = sample size.

Statistically significant probability levels indicated by: *** = 1 percent; ** = 5 percent; * = 10 percent.

[a]TVA Investment (x_6) data were the same for TVA and non-TVA counties.

Note: Description abbreviations given in Table 4, page 23.

TABLE 6

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA -- NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1940-47 AND 1948-63)

	TVA			Non-TVA			
Variable Description	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-278.42959***	78.65617	-7.69581	-134.07186***	48.05395	-2.85002	-30.38937***
x_2 - PCI	1.39380*	0.72549	0.00036	-1.57182***	0.47804	-0.00033	66.86604***
x_3 - TI	0.12303***	0.00646	0.00000	0.19451***	0.00707	0.00000	-163.99008***
x_5 - CIM	1.04181***	0.07771	0.00003	0.72302***	0.05680	0.00002	65.83142***
x_6 - TVAI	-49.99418*	27.18337	-0.47756	-0.51394	2.43027	2.43027	-32.65151***
1948-63							
x_1 - T	-755.67044***	49.81004	-7.91214	-327.37115***	24.85178	-2.53405	-215.11723***
x_2 - PCI	2.17257**	0.91752	0.00042	0.34501	0.61678	0.00007	47.54196***
x_3 - TI	0.17753***	0.00627	0.00000	0.22501***	0.00624	0.00000	-167.86876***
x_5 - CIM	0.12110**	0.05650	0.00000	0.10887**	0.05314	0.00000	4.73548***
x_6 - TVAI	-34.55121	26.80914	-0.19471	2.37014	1.46263	0.00108	-36.71789***

1940-47 $a_1 = 15405.08496$; $R_1^2 = 0.9608$; $\sigma_{y_1} = 2845.73206$; $n_1 = 323$

$a_2 = 9983.80627$; $R_2^2 = 0.8535$; $\sigma_{y_2} = 2260.57504$; $n_2 = 677$

1948-63 $a_1 = 41768.87939$; $R_1^2 = 0.9088$; $\sigma_{y_1} = 4757.24109$; $n_1 = 712$

$a_2 = 19283.28076$; $R_2^2 = 0.8076$; $\sigma_{y_2} = 3210.57669$; $n_2 = 1288$

TABLE 7

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.30750***	0.05240	-0.00874	-0.31514***	0.04152	-0.00677	2.27478**
x_2 - PCI	-0.00081*	0.00048	-0.00000	-0.00189***	0.00041	-0.00000	0.00000
x_3 - TI	0.00000	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000
x_4 - TE	-0.00005	0.00004	-0.00000	-0.00001	0.00003	-0.00000	0.00000
x_5 - CIM	0.00020***	0.00006	0.00000	0.00004	0.00005	0.00000	0.00000
x_6 - TVAI	-0.05094***	0.01768	-0.00049	-0.01784***	0.00209	-0.00002	-33.26700***
1948-60							
x_1 - T	0.16609***	0.01681	0.00243	0.17693***	0.01206	0.00176	-13.76683***
x_2 - PCI	-0.00144***	0.00025	-0.00000	-0.00242***	0.00027	-0.00000	0.00000
x_3 - TI	-0.00001***	0.00000	-0.00000	0.00003***	0.00001	0.00000	0.00000
x_4 - TE	0.00005***	0.00001	0.00000	-0.00007***	0.00002	-0.00000	0.00000
x_5 - CIM	-0.00000	0.00002	-0.00000	-0.00009***	0.00003	-0.00000	0.00000
x_6 - TVAI	0.00837	0.00676	0.00005	0.00455***	0.00057	0.00000	14.43852***

1940-47 $a_1 = 15.20338$; $R_1^2 = 0.2049$; $\sigma_{y_1} = 1.84275$; $n_1 = 315$

$a_2 = 17.02170$; $R_2^2 = 0.2344$; $\sigma_{y_2} = 1.93254$; $n_2 = 669$

1948-60 $a_1 = -5.50724$; $R_1^2 = 0.1699$; $\sigma_{y_1} = 1.41819$; $n_1 = 575$

$a_2 = -5.27911$; $R_2^2 = 0.2672$; $\sigma_{y_2} = 1.21410$; $n_2 = 1046$

TABLE 8

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1940-47 AND 1948-60)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-4.46346***	0.77711	-0.12691	-3.77501***	0.63964	-0.08110	-13.69064***
x_2 - PCI	-0.01164*	0.00707	-0.00000	-0.03060***	0.00636	-0.00000	41.37480***
x_3 - TI	0.00001	0.00009	0.00000	-0.00003	0.00014	-0.00000	0.00000
x_4 - TE	-0.00100*	0.00054	-0.00000	0.00052	0.00051	0.00000	0.00000
x_5 - CIM	0.00398***	0.00093	0.00000	0.00000	0.00083	0.00000	0.00000
x_6 - TVAI	-0.81473***	0.26227	-0.00782	-0.24894***	0.03220	-0.00027	-47.97248***
1948-60							
x_1 - T	3.37671***	0.26955	0.04940	3.35921***	0.17400	0.03338	1.40428
x_2 - PCI	-0.01619***	0.00396	-0.00000	-0.02802***	0.00392	-0.00000	68.30254***
x_3 - TI	-0.00017***	0.00005	-0.00000	0.00022***	0.00007	0.00000	0.00000
x_4 - TE	0.00071***	0.00020	0.00000	-0.00089***	0.00025	-0.00000	0.00000
x_5 - CIM	-0.00001	0.00027	-0.00000	-0.00004	0.00037	-0.00000	0.00000
x_6 - TVAI	0.19508*	0.10853	0.00115	0.10244***	0.00815	0.00005	20.44086***

1940-47 $a_1 = 223.00276$; $R_1^2 = 0.2243$; $\sigma_{y_1} = 27.33050$; $n_1 = 315$

$a_2 = 214.82721$; $R_2^2 = 0.2060$; $\sigma_{y_2} = 29.77499$; $n_2 = 669$

1948-60 $a_1 = -114.42096$; $R_1^2 = 0.2570$; $\sigma_{y_1} = 18.42581$; $n_1 = 575$

$a_2 = -108.51688$; $R_2^2 = 0.3933$; $\sigma_{y_2} = 17.51238$; $n_2 = 1046$

TABLE 9

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-1.07945***	0.21550	-0.03096	-0.92867***	0.16503	-0.01995	-10.99326***
x_2 - PCI	-0.00097	0.00196	-0.00000	-0.00460***	0.00164	-0.00000	0.00000
x_3 - TI	-0.00003	0.00003	-0.00000	-0.00010***	0.00004	-0.00000	0.00000
x_4 - TE	-0.00031**	0.00015	-0.00000	0.00047***	0.00013	0.00000	0.00000
x_5 - CIM	0.00205***	0.00026	0.00000	0.00014	0.00022	0.00000	0.00000
x_6 - TVAI	-0.19026***	0.07273	-0.00183	-0.06126***	0.00831	-0.00007	-31.38885***
1948-60							
x_1 - T	1.47183***	0.69796	0.02153	1.26005***	0.06617	0.01252	46.36906***
x_2 - PCI	0.01298***	0.00144	0.00000	0.01066***	0.00149	0.00000	0.00000
x_3 - TI	-0.00009***	0.00002	-0.00000	-0.00007***	0.00003	-0.00000	0.00000
x_4 - TE	0.00039***	0.00007	0.00000	0.00036***	0.00010	0.00000	0.00000
x_5 - CIM	0.00020**	0.00010	0.00000	0.00024*	0.00014	0.00000	0.00000
x_6 - TVAI	0.13212***	0.03944	0.00078	0.03790***	0.00310	0.00002	57.34073***

1940-47 $a_1 = 53.02427$; $R_1^2 = 0.3430$; $\sigma_{y_1} = 7.57893$; $n_1 = 315$

$a_2 = 49.74948$; $R_2^2 = 0.1782$; $\sigma_{y_2} = 7.68206$; $n_2 = 669$

1948-60 $a_1 = -69.33942$; $R_1^2 = 0.6015$; $\sigma_{y_1} = 6.69626$; $n_1 = 575$

$a_2 = -60.83077$; $R_2^2 = 0.5472$; $\sigma_{y_2} = 6.65975$; $n_2 = 1046$

TABLE 10

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1940-47 AND 1948-60)

Variable Description							
1940-47							
x_1 - T	-0.28570***	0.08887	-0.00812	-0.37706***	0.05568	-0.00810	16.76401***
x_2 - PCI	-0.00022	0.00081	0.00000	-0.00130**	0.00055	-0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	0.00000	-0.00003***	0.00001	-0.00000	0.00000
x_4 - TE	0.00001	0.00006	0.00000	0.00016***	0.00004	0.00000	0.00000
x_5 - CIM	0.00066***	0.00011	0.00000	0.00004	0.00007	0.00000	0.00000
x_6 - TVAI	-0.06127**	0.02999	0.00059	-0.02116***	0.00280	-0.00002	-23.71759***
1948-60							
x_1 - T	0.22963***	0.04574	0.04612	0.37183***	0.04041	0.00369	257.56118***
x_2 - PCI	0.00790***	0.00067	0.00000	0.00545***	0.00091	0.00000	0.00000
x_3 - TI	-0.00001	0.00001	-0.00000	0.00002	0.00002	0.00000	0.00000
x_4 - TE	0.00006*	0.00003	0.00000	0.00002	0.00006	0.00000	0.00000
x_5 - CIM	0.00001	0.00005	0.00000	-0.00023***	0.00009	-0.00000	0.00000
x_6 - TVAI	0.00513	0.01842	0.00167	0.01179***	0.00189	0.00000	73.23085***

1940-47 $a_1 = 14.09327$; $R_1^2 = 0.2621$; $\sigma_{y_1} = 3.12534$; $n_1 = 315$

$a_2 = 19.42392$; $R_2^2 = 0.1920$; $\sigma_{y_2} = 2.59190$; $n_2 = 669$

1948-60 $a_1 = -12.67522$; $R_1^2 = 0.5060$; $\sigma_{y_1} = 3.12641$; $n_1 = 575$

$a_2 = -19.40306$; $R_2^2 = 0.2718$; $\sigma_{y_2} = 4.06728$; $n_2 = 1046$

TABLE 11

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.91372***	0.14960	-0.02591	-1.51404***	0.19503	-0.04339	54.44200***
x_2 - PCI	-0.04252***	0.00166	-0.00001	-0.02953***	0.00221	-0.00000	0.00000
x_3 - TI	0.00002	0.00002	0.00000	-0.00013***	0.00004	0.00000	0.00000
x_4 - TE	0.00006	0.00007	0.00000	0.00015	0.00012	0.00000	0.00000
x_5 - CIM	-0.00023**	0.00009	-0.00000	-0.00006	0.00018	-0.00000	0.00000
x_6 - TVAI	0.04281	0.03641	0.00030	-0.00517	0.00607	-0.00000	24.84311***

$a_1 = 136.28376$; $R_1^2 = 0.8083$; $\sigma_{y_1} = 5.27510$; $n_1 = 360$

$a_2 = 162.21149$; $R_2^2 = 0.6509$; $\sigma_{y_2} = 6.80497$; $n_2 = 640$

TABLE 12

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.00920	0.09368	-0.00026	0.21434**	0.10790	0.00614	-34.26531***
x_2 - PCI	0.00013	0.00104	0.00000	0.00292**	0.00122	0.00000	0.00000
x_3 - TI	-0.00002	0.00001	-0.00000	0.00003	0.00002	0.00000	0.00000
x_4 - TE	0.00000	0.00004	0.00000	-0.00007	0.00007	-0.00000	0.00000
x_5 - CIM	0.00010*	0.00006	0.00000	-0.00007	0.00010	-0.00000	0.00000
x_6 - TVAI	0.00857	0.02280	0.00006	0.00192	0.00336	0.00000	5.52257***

$a_1 = 29.79516$; $R_1^2 = 0.0286$; $\sigma_{y_1} = 3.30324$; $n_1 = 360$

$a_2 = 14.36625$; $R_2^2 = 0.0419$; $\sigma_{y_2} = 3.76505$; $n_2 = 640$

TABLE 13

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	1.56773***	0.11120	0.04446	1.90112***	0.11535	0.05448	-44.90131***
x_2 - PCI	0.02900***	0.00123	0.00000	0.01882***	0.00131	0.00000	0.00000
x_3 - TI	-0.00004***	0.00001	-0.00000	0.00012***	0.00002	0.00000	0.00000
x_4 - TE	0.00008	0.00005	0.00000	-0.00024***	0.00007	-0.00000	0.00000
x_5 - CIM	0.00010	0.00007	0.00000	0.00015	0.00011	0.00000	0.00000
x_6 - TVAI	-0.02156	0.02706	-0.00015	0.00085	0.00359	0.00000	-15.65185***

$a_1 = -97.76436$; $R_1^2 = 0.8207$; $\sigma_{y_1} = 3.92097$; $n_1 = 360$

$a_2 = 109.57269$; $R_2^2 = 0.7796$; $\sigma_{y_2} = 4.02499$; $n_2 = 640$

TABLE 14

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 1 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.64500***	0.05744	-0.01829	-0.60186***	0.07313	-0.01725	-10.30950***
x_2 - PCI	0.01340***	0.00064	0.00000	0.00780***	0.00083	0.00000	0.00000
x_3 - TI	0.00003***	0.00001	0.00000	-0.00001	0.00001	-0.00000	0.00000
x_4 - TE	-0.00014***	0.00003	-0.00000	0.00016***	0.00005	0.00000	0.00000
x_5 - CIM	0.00004	0.00004	0.00000	-0.00002	0.00007	-0.00000	0.00000
x_6 - TVAI	-0.02981	0.01398	-0.00021	0.00240	0.00228	0.00000	-43.83267***

$a_1 = 31.69365$; $R_1^2 = 0.7437$; $\sigma_{y_1} = 2.02527$; $n_1 = 360$

$a_2 = 33.01430$; $R_2^2 = 0.4423$; $\sigma_{y_2} = 2.55163$; $n_2 = 640$

in units of years and dollars, respectively, and could, therefore, not be compared directly. The dependent and independent variables were consequently converted into units of standard deviations by the calculation of the beta-coefficients. As a result, a beta-coefficient of 1.25202 (Table 5, 1940-47) meant that for a one standard deviation change in Time (X_1), there would be a 1.25202 standard deviation change in per capita income for TVA counties. A one standard deviation change in TVA Investments (X_6) would, in turn, result in a 0.04225 standard deviation change in per capita income for TVA counties. In this case, it appeared, therefore, that Time (X_1) had a relatively greater effect on estimating per capita income for TVA counties than did TVA Investments (X_6). The beta-coefficients for Total Income (X_3), Total Employment (X_4), and Capital Invested in Manufacturing (X_5) were zero. Relative to Time (X_1) and TVA Investments (X_6), the Variables Total Income (X_5), Total Employment (X_4) and Capital Invested in Manufacturing (X_5) appeared to have a substantially lesser effect in estimating per capita income for TVA counties. A similar relationship between the independent and dependent variables appeared to hold for the 1948-63 period as seen in Table 5.

For non-TVA counties (Table 5) the beta-coefficients for the variables Time (X_1) and TVA Investments (X_6) were 0.92282 and 0.00030, respectively. These two coefficients again suggested that the variables of Time (X_1) and TVA Investments (X_6) had the greatest effects on per capita income estimates for the 1940-47 period. The corresponding beta coefficients for 1948-63 were 0.16353 and 0.00012. The beta-coefficient

for Time (X_1) in this case, too, was larger than the beta-coefficient for TVA Investments (X_6). This trend appeared to hold almost without exception for all the regression models in Program 1 as recorded in Tables 5-14 inclusive.

t-Values Calculated and Regression Coefficients Compared

After the beta-coefficients had been calculated, the corresponding TVA and non-TVA regression coefficients of Tables 5 to 14 were statistically compared by the t-test. Table 5 showed the results of regressing five independent variables on per capita income for both TVA and non-TVA counties. For the 1940-47 period, the t-value for Total Employment (X_4), Capital Invested in Manufacturing (X_5), and TVA Investments (X_6) were statistically significant at the 1 percent level. This indicated that per capita income increased 0.00826 units per unit change in Total Employment (X_4) and TVA counties (b_1). For non-TVA counties (b_2), per capita income decreased 0.01009 units per unit change in Total Employment (X_4). A comparison of Capital invested in Manufacturing (X_5) in TVA (b_1) and non-TVA counties (b_2) indicated that per capita income decreased 0.01712 units per unit increase in this variable (X_5) for TVA counties (b_1). The corresponding figure for non-TVA counties (b_2) was 0.00336. A unit increase in TVA Investments (X_6), in turn, was associated with a 4.43107 unit decrease in per capita income for TVA counties (b_1). The corresponding figure for non-TVA counties (b_2) was a decrease as well of 0.27898 units.

For the 1948-63 period, only two coefficients were statistically significantly different. These coefficients were for variables Time (X_1) and TVA Investments (X_6) as seen in Table 5. For Time (X_1), the coefficients for TVA (b_1) and non-TVA counties (b_2) were both positive.

They were 35.20780 and 23.84263, respectively. For TVA Investments (X_6), however, the coefficient for TVA counties (b_1) was 3.12665 while the corresponding coefficient for non-TVA counties (b_2) was -0.27898. (See Table 5, page 32.)

When five corresponding independent variables regressed on total employment were compared, all the t-values were significant at the 1 percent level as seen in Table 6. Employment decreased for both periods under study for both TVA (b_1) and non-TVA counties (b_2). The decrease in employment was less, however, for the latter than for the former counties. For the 1940-47 period the coefficient for TVA counties (b_1) was -278.42959. The corresponding coefficient for non-TVA counties (b_2) was -134.07186. The corresponding figures for the 1948-63 period were -755.67044 and -327.37115.

The effects of TVA Investments (X_6) on total employment on TVA (b_1) and non-TVA counties (b_2) also differed (as did the effects of the remaining three variables) for the two periods under study. For the 1940-47 period, a unit change in TVA Investments (X_6) was associated with a change in employment of -49.99418 for TVA counties (b_1) and -0.51394 for non-TVA counties (b_2). For 1948-63 the corresponding figures were -34.55121 and 2.37014 as seen in Table 6, page 33.

The figures in Tables 7, 8, 9, and 10, pages 34-37, were the result of an attempt to determine which educational group received the most benefits when TVA investments were made in a region. Except for Table 8, only two coefficients were significantly different in this analysis. These coefficients were Time (X_1) and TVA Investments (X_6). In Table 8, Per Capita Income (X_2) also differed significantly for TVA (b_1) and non-TVA (b_2) counties. In this series of tables there appeared to be a trend in changes in the four dependent variables based on the percentages of population in the different educational categories relative to changes in TVA Investments (X_6). For the 1940-47 period in all four cases, the coefficients for TVA Investments (X_6) in TVA counties (b_1) were less than the coefficients for TVA Investments (X_6) in non-TVA counties (b_1). The coefficients for TVA Investments (X_6) in TVA (b_1) and non-TVA counties (b_2) for the 1940-47 period in Tables 7, 8, 9, and 10, respectively, were -0.05094 and -0.01784, -0.81473 and -0.24894, -0.19026 and -0.06126, and -0.06127 and -0.02116.

For the 1948-60 period, the corresponding figures were all positive but a definite pattern of figures similar to that for 1940-47 did not appear.

An attempt was also made to determine whether any particular income group received greater benefits in a TVA county than a similar income group in non-TVA counties. Tables 11, 12, 13, and 14, pages 38-41, showed the results of this part of the analysis for Program 1. These tables also showed that only two variables differed significantly for TVA (b_1) and

non-TVA counties (b_2). These were, as before, Time (X_1) and TVA Investments (X_6). The percentage of population in income category of $0-$2499 experienced a decline in both TVA (b_1) and non-TVA counties (b_2) as seen by the coefficients -0.91372 and -1.51404 in Table 11, page 38. The effects of TVA Investments (X_6) on the percentage of population in this income category showed that a unit change in TVA investments was associated with increase of 0.04281 in this segment of the population for TVA counties (b_1). For non-TVA counties (b_2) the corresponding figure was -0.00517.

For the percentage of consumer units in the $2500-$3999 income category, TVA Investments (X_6) appeared to have a positive effect in both TVA (b_1) and non-TVA counties (b_2), as seen in Table 12, page 39. The coefficients for TVA Investments (X_6) was 0.00857 for TVA counties (b_1) and 0.00192 for non-TVA counties (b_2).

TVA Investments (X_6), on the other hand, appeared to be associated with a decrease in the percentage of population in income categories of $4000-$6999 and $7000 and over for TVA counties (b_1). As seen in Table 13, page 40, a unit change in TVA Investments (X_6) generated a change of -0.02156 for percentage of population in TVA counties (b_1) in the $4000-$6999 income category. The respective figure for non-TVA counties (b_2) was an increase of 0.00085. For the percentage of population in the $7000 and over income category, the corresponding figures were -0.02481 and 0.00240 as seen in Table 14, page 41.

Comments on Analysis of Program 1

In the analysis of data the relationships between the different independent variables and the dependent variables in both TVA and non-TVA counties were of particular interest. It was hypothesized that counties delineated as TVA counties would experience greater income and employment benefits than counties delineated as non-TVA counties. In the analysis, therefore, a series of similar coefficients for either TVA or non-TVA could have indicated a pattern of income and employment growth possibly related to proximity of water resource projects. Such a series of coefficients in Program 1 was not evident. What did appear evident was that the variables Time (X_1) and TVA Investments (X_6) were the most important variables in estimating the dependent variables for both categories of counties revealed in the analysis of the beta-coefficients.

Another point of inquiry was related to the welfare aspects of public investments in water resources. A decrease in the percentage of population in the lower income category in counties delineated as TVA counties would, therefore, have been an important finding. But the analysis of Program 1 did not produce a coefficient which suggested that the percentage of population in the lower income category received greater benefits than the percentage of population in the other income categories in TVA counties. The analysis appeared to produce coefficients contrary to the results anticipated. These results were recorded

in Table 11, page 38. In this case, the percentage of population in the $0-$2499 income category decreased over time for both TVA (b_1) and non-TVA counties (b_2). This was indicated by the respective coefficients of -0.91372 and -1.51401. The coefficients showed a greater decrease in this category for non-TVA (b_2) counties than for TVA (b_1) counties. The percentage of population in the $0-$2499 income category increased, however, relative to TVA Investments (X_6) (as indicated by the coefficient of 0.04281) and decreased for the non-TVA counties (as indicated by the coefficient of -0.00517, Table 11).

Results contrary to the anticipated results were also found in regard to the welfare aspects as related to the different segments of the population as categorized by the educational levels. For 1940-47 it was found that the decrease in the percentage of population which had completed no school relative to Time was greater for non-TVA than for TVA counties. Relative to TVA Investments, however, the percentage of population in this category decreased more for TVA than for non-TVA counties for the same period. For 1948-60, the percentage of population in this category increased relative to Time for both TVA and non-TVA counties. The increase in this case was greater for the latter category of counties. The percentage of population which had completed no school also increased relative to TVA Investments for the same period. The increase was greater for TVA than non-TVA counties as recorded in Table 7, page 34.

For 1948-60 the percentages of population who had completed 1-8 years of elementary school and 1-4 years of high school showed an increase relative to both Time and TVA Investments for both TVA and non-TVA counties. In all cases the increase was greater for TVA counties as seen in Tables 8 and 9, pages 35 and 36. This situation was reversed for the same period when the percentage of population who had completed at least one year of college was the dependent variable. In this case the coefficients relative to Time and TVA Investments were also positive but the coefficients were greater for non-TVA than for TVA counties as recorded in Table 10, page 37.

Another aspect which appeared to merit consideration was related to the coefficient of determination (R^2). These coefficients indicated how much variation in the dependent variable was explained by the regression. Since data on a series of arbitrarily divided counties were compared, a criteria such as the coefficients of determination might be useful in making decisions as to which series of counties might be the better model. The range of the coefficients of determination for the 32 equations in each of the programs was therefore recorded. A count of the coefficients of determination greater than 0.5000 (arbitrarily chosen) was also made in each of the programs.

For Program 1, the coefficients of determination ranged from 0.0286 to 0.9508. Of the 32 coefficients of determination computed, 16 were greater than 0.5000. These results were recorded in Tables 5 to 14, pages 32 to 41.

CHAPTER VI

ANALYSIS OF PROGRAM 2

Beta-Coefficients Calculated and Compared

In this analysis, counties which had TVA projects located within or on the border of the county were assumed to be directly affected by the projects. These counties were referred to as TVA counties. In Program 2, 32 counties fell in this category. The remaining 93 counties were referred to as non-TVA counties.

In Program 2, the data were first analyzed, as in Program 1, by multiple regression. The appropriate coefficients and variables were then used to calculate the beta-coefficients as shown in the following pages in Tables 15-24 inclusive.

In Program 2, a pattern in beta-coefficients similar to the pattern in Program 1 appeared. Almost without exception the variables Time (X_1) and TVA Investments (X_6) were the only variables which generated beta-coefficients. Where other beta-coefficients appeared, as in Table 16, the coefficients for Time (X_1) were usually substantially larger than the coefficients for any of the other variables. Table 16 showed the results of regressing five independent variables on total employment for the two periods of 1940-47 and 1948-63. For the 1940-47 period the beta coefficients in order of magnitude for the variables were: Time (X_1), 6.91853; TVA Investments, 0.34375; Per Capita Income, 0.00040; Capital Invested in Manufacturing, 0.00002; and Total Income,

TABLE 15

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	53.74388***	4.45937	1.15910	51.57074***	3.74906	1.04210	8.16844***
x_3 - TI	0.00278***	0.00062	0.00000	0.01084***	0.00076	0.00000	0.00000
x_4 - TE	0.01087***	0.00383	0.00000	-0.01355***	0.00327	-0.00000	22.10000***
x_5 - CIM	-0.01102*	0.00621	-0.00000	0.01097*	0.00606	0.00000	-58.77165***
x_6 - TVAI	-3.55572	1.93318	-0.03324	-0.23856	0.21683	-0.00028	-35.49509***
1948-63							
x_1 - T	33.65276***	1.59152	0.28684	23.30779***	1.13387	0.17517	164.41293***
x_3 - TI	0.00199***	0.00033	0.00000	0.00404***	0.00042	0.00000	0.00000
x_4 - TE	0.00413***	0.00140	0.00000	0.00001	0.00136	0.00000	0.00000
x_5 - CIM	-0.00198	0.00214	-0.00000	0.01104***	0.00268	0.00000	0.00000
x_6 - TVAI	3.97694***	1.03675	0.02208	-0.25554***	0.07442	-0.00013	123.02215***

1940-47 $a_1 = -1873.17294$; $R_1^2 = 0.6810$; $\sigma_{y_1} = 206.76787$; $n_1 = 432$

$a_2 = -1676.99065$; $R_2^2 = 0.6589$; $\sigma_{y_2} = 185.53020$; $n_2 = 568$

1948-60 $a_1 = -1057.09837$, $R_1^2 = 0.6314$; $\sigma_{y_1} = 186.72035$; $n_1 = 912$

$a_2 = -516.45156$; $R_2^2 = 0.6275$; $\sigma_{y_2} = 150.87455$; $n_2 = 1088$

TABLE 16

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1940-47 AND 1948-63)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-283.48344***	63.22839	-6.91853	-98.41363*	54.91186	-2.29266	-48.49441***
x_2 - PCI	1.70707***	0.60141	0.00040	-2.18779***	0.52798	-0.00049	106.87833***
x_3 - TI	0.12446***	0.00517	0.00000	0.19658***	0.00761	0.00000	-180.30000***
x_5 - CIM	1.01763***	0.06050	0.00002	0.72995***	0.07088	0.00000	69.14520***
x_6 - TVAI	-36.71983	24.25307	0.34375	-0.79850	2.75781	0.00093	-30.69392***
1948-63							
x_1 - T	-656.55678***	40.54098	-6.02264	-331.90244***	28.17373	-2.76912	-204.03912***
x_2 - PCI	2.31310***	0.78260	0.00041	0.00513	0.68043	0.00000	69.68016***
x_3 - TI	0.17447***	0.00558	0.00000	0.22784***	0.00683	0.00000	-201.72355***
x_5 - CIM	0.14738***	0.05055	0.00000	0.06587	0.06032	0.00000	32.89479***
x_6 - TVAI	-33.13386	24.71319	-0.18528	2.22159	1.67346	0.00110	-43.12131***

1940-47 $a_1 = 15162.86572$; $R_1^2 = 0.9594$; $\sigma_{y_1} = 2590.75354$; $n_1 = 432$

$a_2 = 8969.63440$; $R_2^2 = 0.8403$; $\sigma_{y_2} = 2357.41748$; $n_2 = 568$

1948-63 $a_1 = 36266.17529$; $R_1^2 = 0.9046$; $\sigma_{y_1} = 4419.56842$; $n_1 = 912$

$a_2 = 19924.40503$; $R_2^2 = 0.8025$; $\sigma_{y_2} = 3376.85974$; $n_2 = 1088$

TABLE 17

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.28464***	0.04960	-0.00718	-0.32595***	0.04395	-0.00766	13.59002***
x_2 - PCI	-0.00045	0.00046	-0.00000	-0.00224***	0.00043	-0.00000	0.00000
x_3 - TI	-0.00001	0.00001	-0.00000	0.00002**	0.00001	0.00000	0.00000
x_4 - TE	0.00000	0.00004	0.00000	-0.00005	0.00003	-0.00000	0.00000
x_5 - CIM	0.00013**	0.00006	0.00000	0.00003	0.00006	0.00000	0.00000
x_6 - TVAI	-0.00081	0.00347	-0.00000	-0.01912***	0.00220	-0.00002	129.47249***
1948-60							
x_1 - T	0.15956***	0.01467	0.00201	0.18194***	0.01301	0.00195	-32.30276***
x_2 - PCI	-0.00144***	0.00023	-0.00000	-0.00259***	0.00029	-0.00000	0.00000
x_3 - TI	-0.00001***	0.00000	-0.00000	0.00003***	0.00001	0.00000	0.00000
x_4 - TE	0.00005***	0.00001	0.00000	-0.00007***	0.00002	-0.00000	0.00000
x_5 - CIM	-0.00002	0.00002	-0.00000	-0.00008***	0.00003	-0.00000	0.00000
x_6 - TVAI	0.00519***	0.00092	0.00000	0.00447***	0.00061	0.00000	0.00000

1940-47 $a_1 = 13.91177$; $R_1^2 = 0.1372$; $\sigma_{y_1} = 1.96656$; $n_1 = 424$

$a_2 = 17.87624$; $R_2^2 = 0.2791$; $\sigma_{y_2} = 1.87020$; $n_2 = 560$

1948-60 $a_1 = -5.14341$; $R_1^2 = 0.2070$; $\sigma_{y_1} = 1.16715$; $n_1 = 739$

$a_2 = -5.42579$; $R_2^2 = 0.2722$; $\sigma_{y_2} = 1.21328$; $n_2 = 882$

TABLE 18

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1940-47 AND 1948-60)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-4.23791***	0.76998	-0.10689	-3.72824***	0.66756	-0.08762	-10.88095***
x_2 - PCI	-0.00659	0.00720	-0.00000	-0.03566***	0.00647	-0.00001	66.69267***
x_3 - TI	-0.00008	0.00009	-0.00000	0.00005	0.00014	0.00000	0.00000
x_4 - TE	-0.00022	0.00058	-0.00000	-0.00011	0.00051	-0.00000	0.00000
x_5 - CIM	0.00266***	0.00093	-0.00000	-0.00009	0.00093	-0.00000	0.00000
x_6 - TVAI	0.01364	0.05394	0.00002	-0.258873***	0.03347	-0.00030	91.50404***
1948-60							
x_1 - T	3.32165***	0.23597	0.04176	3.39598***	0.18255	0.03641	-6.98867***
x_2 - PCI	-0.01517***	0.00373	-0.00000	-0.03092***	0.00403	-0.00001	111.37039***
x_3 - TI	-0.00013***	0.00005	-0.00000	0.00025***	0.00007	0.00000	0.00000
x_4 - TE	0.00063***	0.00019	0.00000	-0.00101***	0.00025	-0.00000	0.00000
x_5 - CIM	-0,00026	0.00026	-0.00000	0.00016	0.00038	0.00000	0.00000
x_6 - TVAI	0.07663***	0.01479	0.00006	0.10138***	0.00862	0.00005	-40.68917***

1940-47 $a_1 = 209.46165$; $R_1^2 = 0.1377$; $\sigma_{y_1} = 30.52948$; $n_1 = 424$

$a_2 = 217.11999$; $R_2^2 = 0.2414$; $\sigma_{y_2} = 28.40448$; $n_2 = 560$

1948-60 $a_1 = -112.67199$; $R_1^2 = 0.2834$; $\sigma_{y_1} = 18.77044$; $n_1 = 739$

$a_2 = -108.44200$; $R_2^2 = 0.4061$; $\sigma_{y_2} = 17.02479$; $n_2 = 882$

TABLE 19

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.99347***	0.19960	-0.02506	-0.97874***	0.17850	-0.02300	-1.19941
x_2 - PCI	-0.00019	0.00187	-0.00000	-0.00620***	0.000173	-0.00000	0.00000
x_3 - TI	-0.00004*	0.00002	-0.00000	-0.00005	0.00004	-0.00000	0.00000
x_4 - TE	-0.00012	0.00015	-0.00000	0.00033**	0.00014	0.00000	0.00000
x_5 - CIM	0.00156***	0.00024	0.00000	0.00007	0.00025	0.00000	0.00000
x_6 - TVAI	-0.01001	0.01398	-0.00002	-0.06714***	0.00895	-0.00008	73.75514***
1948-60							
x_1 - T	1.32192***	0.08537	0.01662	1.30411***	0.07226	0.01398	4.48344***
x_2 - PCI	0.01356***	0.00135	0.00000	0.01014***	0.00160	0.00000	0.00000
x_3 - TI	-0.00006***	0.00002	-0.00000	-0.00007**	0.00003	-0.00000	0.00000
x_4 - TE	0.00027***	0.00007	0.00000	0.00034***	0.00010	0.00000	0.00000
x_5 - CIM	0.00015	0.00010	0.00000	0.00035**	0.00015	0.00000	0.00000
x_6 - TVAI	-0.00639	0.00535	-0.00000	0.03881***	0.00341	0.00002	-226.00000***

1940-47 $a_1 = 48.40224$; $R_1^2 = 0.2387$; $\sigma_{y_1} = 7.91399$; $n_1 = 424$

$a_2 = 53.37570$; $R_2^2 = 0.2050$; $\sigma_{y_2} = 7.59520$; $n_2 = 560$

1948-60 $a_1 = -62.02419$; $R_1^2 = 0.5752$; $\sigma_{y_1} = 6.79061$; $n_1 = 739$

$a_2 = -62.48847$; $R_2^2 = 0.5522$; $\sigma_{y_2} = 6.73901$; $n_2 = 882$

TABLE 20

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 2 (1940-47 AND 1948-60)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-0.27696***	0.07830	-0.00699	-0.40517***	0.05969	-0.00952	28.10520***
x_2 - PCI	-0.00011	0.00073	-0.00000	-0.00172***	0.00058	-0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	-0.00002	0.00001	-0.00000	0.00000
x_4 - TE	0.00008	0.00006	0.00000	0.00010**	0.00005	0.00000	0.00000
x_5 - CIM	0.00046***	0.00009	0.00000	0.00002	0.00008	0.00000	0.00000
x_6 - TVAI	-0.00198	0.00549	-0.00000	-0.02315***	0.00299	-0.00003	74.84797
1948-60							
x_1 - T	0.23936***	0.03836	0.00291	0.38663***	0.04594	0.00415	-70.36849***
x_2 - PCI	0.00715***	0.00061	0.00000	0.00585***	0.00101	0.00000	0.00000
x_3 - TI	0.00000	0.00001	0.00000	0.00003	0.00002	0.00000	0.00000
x_4 - TE	0.00004	0.00003	0.00000	0.00001	0.00006	0.00000	0.00000
x_5 - CIM	-0.00001	0.00004	-0.00000	-0.00024**	0.00010	-0.00000	0.00000
x_6 - TVAI	0.00297	0.00240	0.00000	0.01207***	0.00217	0.00001	0.00000

1940-47 $a_1 = 13.48416$; $R_1^2 = 0.1948$; $\sigma_{y_1} = 3.10453$; $n_1 = 424$

$a_2 = 21.05852$; $R_2^2 = 0.2203$; $\sigma_{y_2} = 2.53986$; $n_2 = 560$

1948-60 $a_1 = -12.70446$; $R_1^2 = 0.4818$; $\sigma_{y_1} = 3.05168$; $n_1 = 739$

$a_2 = -20.41621$; $R_2^2 = 0.2682$; $\sigma_{y_2} = 4.28406$; $n_2 = 882$

TABLE 21

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.93913***	0.14130	-0.02290	-1.58799***	0.21010	-0.04944	58.05439***
x_2 - PCI	-0.04428***	0.00167	-0.00000	-0.02965***	0.00228	-0.00001	-0.00001
x_3 - TI	0.00003*	0.00002	0.00000	-0.00015***	0.00004	-0.00000	0.00000
x_4 - TE	0.00000	0.00007	0.00000	0.00027**	0.00012	0.00000	0.00000
x_5 - CIM	-0.00022**	0.00010	-0.00000	-0.00000	0.00019	-0.00000	0.00000
x_6 - TVAI	0.02551	0.03978	0.00018	-0.00693	0.00654	-0.00000	17.24175***

$a_1 = 140.38448$; $R_1^2 = 0.7868$; $\sigma_{y_1} = 5.79365$; $n_1 = 456$

$a_2 = 165.53565$; $R_2^2 = 0.6496$; $\sigma_{y_2} = 6.74877$; $n_2 = 544$

TABLE 22

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	0.16158*	0.08610	0.00394	0.16644	0.11476	0.00518	-1.20414
x_2 - PCI	0.00135	0.00102	0.00000	0.00284**	0.00124	0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	0.00003	0.00002	0.00000	0.00000
x_4 - TE	0.00007*	0.00004	0.00000	-0.00010	0.00007	-0.00000	0.00000
x_5 - CIM	0.00007	0.00006	0.00000	-0.00006	0.00010	-0.00000	0.00000
x_6 - TVAI	0.01837	0.02424	0.00013	0.00263	0.00357	0.00000	13.80496***

$a_1 = 18.65225$; $R_1^2 = 0.0305$; $\sigma_{y_1} = 3.53162$; $n_1 = 456$

$a_2 = 17.40305$; $R_2^2 = 0.0282$; $\sigma_{y_2} = 3.68607$; $n_2 = 544$

TABLE 23

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	1.50774***	0.09555	0.03676	1.96268***	0.12723	0.06110	-64.48678***
x_2 - PCI	0.02984***	0.00113	0.00000	0.01889***	0.00138	0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	0.00013***	0.00002	0.00000	0.00000
x_4 - TE	0.00007	0.00004	0.00000	-0.00030***	0.00007	-0.00000	0.00000
x_5 - CIM	0.00010	0.00007	0.00000	0.00010	0.00012	0.00000	0.00000
x_6 - TVAI	-0.01281	0.02690	-0.00009	0.00146	0.00396	0.00000	-11.28144***

$a_1 = -95.79593$; $R_1^2 = 0.8250$; $\sigma_{y_1} = 3.91926$; $n_1 = 456$

$a_2 = -112.53415$; $R_2^2 = 0.7759$; $\sigma_{y_2} = 4.08665$; $n_2 = 544$

TABLE 24

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 2 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.73036***	0.04907	-0.01781	-0.54158***	0.08346	-0.01687	-44.42093***
x_2 - PCI	0.01310***	0.00058	0.00000	0.00792***	0.00090	0.00000	0.00000
x_3 - TI	0.00003***	0.00001	0.00000	-0.00000	0.00001	-0.00000	0.00000
x_4 - TE	-0.00015***	0.00002	-0.00000	0.00013	0.00005	0.00000	0.00000
x_5 - CIM	0.00005	0.00004	0.00000	-0.00004	0.00008	-0.00000	0.00000
x_6 - TVAI	-0.03107**	0.01382	-0.00021	0.00283	0.00260	0.00000	-52.30916***

$a_1 = 36.76571$; $R_1^2 = 0.7351$; $\sigma_{y_1} = 2.01276$; $n_1 = 456$

$a_2 = 29.61700$; $R_2^2 = 0.4147$; $\sigma_{y_2} = 2.68085$; $n_2 = 544$

0.00000. The corresponding figures for the same variables in 1948-63 were: 6.02264, 0.13528, 0.00041, 0.00000, and 0.00000.

In most of the other tables in this program, only two beta coefficients were greater than zero. They were Time (X_1) and TVA Investments (X_6) with the former, without exception, being larger than the latter.

t-Values Calculated and Regression Coefficients Compared

The analysis of regression coefficients consisted again of comparing by t-test the corresponding coefficients of TVA and non-TVA counties. In the first part of the analysis for Program 2, the coefficients obtained by regressing five independent variables on per capita income for TVA and non-TVA counties were compared. The results of this comparison were recorded in Table 15. For the 1940-47 period, the t-values for four variables were significantly different. Those variables were Time (X_1), Total Employment (X_4), Capital Invested in Manufacturing (X_5), and TVA Investments (X_6). In this case, per capita income increased over time for both TVA (b_1) and non-TVA (b_2) counties. The increase, however, was greater for the TVA counties (b_1) than for the non-TVA (b_2) counties with the respective coefficients for TVA (b_1) and on-TVA (b_2) counties were -0.01102 and 0.01097, and -3.55572 and -0.23856.

For the 1948-63 period, the t-values for only two variables differed significantly. These variables were Time (X_1) and TVA Investments (X_6). As in 1940-47, Per Capita Income (X_2) increased over Time

(X_1) for both TVA (b_1) and non-TVA (b_2) counties with the former counties again experiencing the greater increase. The coefficient for TVA (b_1) counties was 33.65276 while the coefficient for non-TVA (b_2) counties was 23.30779. For TVA Investments (X_6), the coefficients for TVA (b_1) and non-TVA (b_2) counties were 3.97694 and -0.25554 respectively. These coefficients differed from those in the 1940-47 period in that TVA Investments (X_6) were now associated with an increase in per capita income for TVA counties (b_1).

When the coefficients of five independent variables regressed on total employment for TVA and non-TVA counties were compared on Table 16, page 52, all the t-values were significant at the 1 percent level. Employment decreased with respect to time for both periods for TVA (b_1) and non-TVA (b_2) counties alike. For 1940-47, the respective coefficients were -283.48344 and -98.41363. The coefficients for the corresponding variable for 1948-63 were -656.55678 for TVA counties (b_1) and -331.90244 for non-TVA counties (b_2). For Capital Invested in Manufacturing (X_5) the coefficients were greater for TVA (b_1) than for non-TVA (b_2) counties for both periods under study. For 1940-47 the coefficients were 1.01763 and 0.72995 for TVA (b_1) and non-TVA (b_2) counties respectively. The corresponding figures for 1948-63 were 0.14738 and 0.06587.

Contrary to Capital Invested in Manufacturing (X_5), TVA Investments (X_6) were associated with a decrease in total employment in three out of four cases. In both periods the coefficients were smaller for

TVA counties (b_1) than for non-TVA counties (b_2). For 1940-47, the coefficients for TVA Investments (X_6) were -36.71983 for TVA counties (b_1) and -0.79850 for non-TVA counties (b_2). The corresponding figures for 1948-63 were -33.13386 and 2.22159 as recorded in Table 16.

The results of regressing six independent variables on the dependent variables of four different levels of education were again compared for TVA and non-TVA counties. In the comparison of the percentage of population who completed no school, two coefficients differed significantly for the 1940-47 period. These were Time (X_1) and TVA Investments (X_6). For the 1948-60 period, the variable Time (X_1) only differed significantly as seen on Table 17, page 53. For the 1940-47 period, the decrease in this segment of the population was greater for non-TVA counties (b_2) than for TVA counties (b_1). The coefficient for TVA counties (b_1) was -0.28464 while the coefficient for non-TVA counties (b_2) was -0.32595. The coefficient for the effects of TVA Investments (X_6) on this percentage of the population for TVA counties (b_1) was -0.00081. For non-TVA counties (b_2) the corresponding figure was -0.01912. During the 1948-60 period, both TVA (b_1) and non-TVA (b_2) counties experienced an increase in the percentage of population who had no school. The coefficient for TVA counties (b_1) in this case was 0.15956 while the coefficient for non-TVA counties (b_2) was 0.18194.

Table 18, page 54, showed the results of comparing the coefficients of six independent variables regressed on the percentage of total population 25 years and over who completed 1-8 years of elementary school.

Three variables differed significantly for both periods in this part of the analysis. They were Time (X_1), Per Capita Income (X_2), and TVA Investments (X_6). For the 1940-47 period both TVA (b_1) and non-TVA (b_2) counties recorded a decrease in this percentage of the population. For 1940-47, the coefficients for TVA (b_1) and non-TVA (b_2) counties respectively were -4.23791 and -3.72824. The corresponding coefficients for 1948-60 were 3.32165 and 3.39598. During 1940-47, TVA Investments (X_6) were associated with an increase in this segment of the population for TVA counties (b_1) and a decrease for non-TVA counties (b_2). For 1948-60, both TVA (b_1) and non-TVA (b_2) counties experienced an increase in this segment of the population relative to TVA Investments (X_6). The increase, however, was greater for the non-TVA (b_2) than for the TVA (b_1) counties. The respective coefficients for these variables, as recorded in Table 18, were 0.01364 and 0.25873, and 0.07663 and 0.10138.

The comparisons of the coefficients for the segments of the population in TVA and non-TVA counties who had some high school and college education were recorded in Tables 19 and 20, pages 55 and 56, respectively. For the 1940-47 period, both segments of the population decreased relative to TVA Investments (X_6). The decrease was less, however, for TVA (b_1) than for non-TVA (b_2) counties. The respective coefficients were -0.00198 and -0.06714 (Table 19) and -0.00198 and -0.02315 (Table 20).

The difference between the percentage of population in the high school category relative to TVA Investments (X_6) was also significant

for the 1948-60 period (Table 19). TVA counties (b_1), in this case, experienced a decline in this segment of the population (-0.00639) while non-TVA counties (b_2) experienced an increase (0.03881). There was not a significant difference for the corresponding variable relative to the percentage of total population who completed 1-4 years or more of college as seen on Table 20.

A comparison of the percentage of total consumer units in the four different income categories for TVA and non-TVA counties was recorded on Tables 21, 22, 23, and 24, pages 57, 58, 59, and 60. In all four tables, only Time (X_1) and TVA Investments (X_6) differed significantly for the two categories of counties. The segment of the population in the $0-$2499 income category again decreased over time. For TVA counties (b_1) the coefficient was -0.93913. For non-TVA counties (b_2) the coefficient was -1.58799. TVA Investments (X_6), however, was associated with an increase in the percentage of this segment of the population (0.02551) for TVA counties (b_1) and a decrease in the similar segment of the population (-0.00693) for non-TVA (b_2) counties.

In the analysis of the population in the $2500-$3999 income category the coefficients for TVA Investments (X_6) were significantly different as seen in Table 22. Relative to TVA Investments (X_6), the increase in this segment of the population was greater for TVA counties (b_1) than for non-TVA counties (b_2). The respective coefficients were 0.01837 and 0.00263.

Table 23 depicted the coefficients for the segment of the population in the $4000-$6999 income category. This segment of the

population increased over time for both TVA (b_1) and non-TVA (b_2) counties. The coefficients were 1.50774 and 1.96268 respectively. TVA Investments (X_6), however, were associated with a decline in this portion of the population (-0.01281) for TVA counties (b_1) and an increase (0.00146) for non-TVA counties (b_2).

Table 24 showed the results of the comparison of the $7000 and over segments of the population for TVA (b_1) and non-TVA (b_2) counties. Both classifications of counties reported a decrease over time for this segment of the population. For TVA counties (b_1) the coefficient was -0.73036. The corresponding coefficient for non-TVA (b_2) counties was -0.54158. The coefficients for this income category relative to TVA Investments (X_6) were -0.03107 for TVA (b_1) counties and 0.00283 for non-TVA (b_2) counties.

Comments on Analysis of Program 2

In this overall study, the same basic variables were analyzed in three different programs. One of the objects of this series of analyses was to examine the income and employment effects in counties delineated with respect to geographic areas where public investments in water resources had occurred. The delineation of counties in Program 2 therefore differed from the delineation of counties in Program 1 as described in Chapter III. Yet when the coefficients in Program 2 were compared with the coefficients in Program 1, similarities in coefficients appeared. For example, the analysis of beta-coefficients showed that

the variables Time (X_1) and TVA Investments (X_6) were again the most important variables in estimating the dependent variables. Also, in most cases where significant t-values occurred in Program 2, similar significant values occurred in Program 1. An examination of the results of Program 2 relative to the welfare aspects of public investments in water resources further revealed results similar to those obtained in Program 1. In general, the coefficients of Program 2 were similar to the corresponding coefficients of Program 1 in both relative magnitude and sign (i.e. positive or negative).

The range of the 32 coefficients of determination (R^2) in Program 2 was from a low of 0.0282 to a high of 0.9594. Fifteen of these coefficients were greater than 0.5000 as recorded in Tables 15 to 24, pages 51 to 60.

CHAPTER VII

ANALYSIS OF PROGRAM 3

Beta-Coefficients Calculated and Compared

In Program 3, a county was considered a TVA county if:

(a) a project was located within or on the border of the county

(b) the county bordered the Tennessee River.

Fifty-seven counties were delineated as TVA counties. The remaining 68 of the 125 counties were classified as non-TVA counties.

Before the beta-coefficients for TVA and non-TVA counties in Program 3 could be calculated, the coefficients for the different variables in this study had to be computed. These coefficients were obtained by multiple regression analysis. The beta coefficients were then calculated and recorded in Tables 25-34 inclusive in this chapter.

A study of the beta-coefficients in Program 3 revealed that two independent variables were of primary importance, relative to the other variables, in estimating the dependent variables. These variables were Time (X_1) and TVA Investments (X_6). Time (X_1), without exception, was again the variable with the greatest absolute beta-coefficients. TVA Investments (X_6) was the variable with the second greatest beta-coefficient. In a few cases, as seen in Table 26, the coefficient for Per Capita Income (X_2) ranked third while the coefficient for Capital Invested in Manufacturing (X_5) ranked fourth. Table 26 showed the beta-coefficients for five independent variables regressed on total employment for TVA and non-TVA counties, respectively.

TABLE 25

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 3 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	53.02381***	5.28218	1.28139	50.43903***	3.43739	0.95018	8.19266***
x_3 - TI	0.00333***	0.00069	0.00000	0.01055***	0.00073	0.00000	0.00000
x_4 - TE	0.00870**	0.00426	0.00000	-0.01002***	0.00310	-0.00000	76.42689***
x_5 - CIM	-0.01470**	0.00685	-0.00000	0.00756	0.00554	0.00000	-53.98850***
x_6 - TVAI	-0.43187**	2.06939	-0.04196	-0.26375	0.19785	-0.00029	-37.16052***
1948-63							
x_1 - T	33.99732***	1.85909	0.32650	23.52961***	1.04540	0.16826	141.37089***
x_3 - TI	0.00218***	0.00036	0.00000	0.00355***	0.00041	0.00000	0.00000
x_4 - TE	0.00369**	0.00148	0.00000	0.00143	0.00133	0.00000	0.00000
x_5 - CIM	-0.00459**	0.00226	-0.00000	0.01374***	0.00249	0.00000	0.00000
x_6 - TVAI	3.21254***	1.07881	0.01790	-0.22073***	0.06307	-0.00010	87.06624***

1940-47 $a_1 = -1814.48869$; $R_1^2 = 0.6851$; $\sigma_{y_1} = 218.57662$; $n_1 = 342$

$a_2 = -1658.75369$; $R_2^2 = 0.6549$; $\sigma_{y_2} = 182.46761$; $n_1 = 658$

1948-63 $a_1 = -1043.03795$; $R_1^2 = 0.6226$; $\sigma_{y_1} = 193.57920$; $n_1 = 750$

$a_2 = -545.16982$; $R_2^2 = 0.6377$; $\sigma_{y_2} = 146.19215$; $n_1 = 1250$

TABLE 26

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1940-47 AND 1948-63)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-280.51077***	75.18642	-7.57356	-134.65987***	49.39623	-2.90928	-32.42138***
x_2 - PCI	1.41286**	0.69076	0.00035	-1.57267***	0.48684	-0.00033	71.25858***
x_3 - TI	0.12550***	0.00590	0.00000	0.19346***	0.00726	0.00000	-160.18479***
x_5 - CIM	1.00134***	0.06887	0.00002	0.74093***	0.06318	0.00002	58.34629***
x_6 - TVAI	-50.39543*	26.40157	-0.47778	-0.50826	2.48245	-0.00055	-34.86395***
1948-63							
x_1 - T	-749.26769***	47.77022	-7.51020	-288.41875***	25.12026	-2.32646	-244.68006***
x_2 - PCI	2.23725	0.89887	0.00042	0.65031	0.60369	0.00013	42.89293***
x_3 - TI	0.17839***	0.00619	0.00000	0.22438***	0.00624	0.00000	-162.60076***
x_5 - CIM	0.11296**	0.05553	0.00000	0.10179	0.05357	0.00000	4.41533***
x_6 - TVAI	-36.13356	26.68510	-0.20212	8.38549***	1.32913	0.00358	-45.65452***

1940-47 $a_1 = 15514.49646$; $R_1^2 = 0.9608$; $\sigma_{y_1} = 2784.76837$; $n_1 = 342$

$a_2 = 9993;67822$; $R_2^2 = 0.8448$; $\sigma_{y_2} = 2286.37180$; $n_2 = 658$

1948-63 $a_1 = 41429.23340$; $R_1^2 = 0.9052$; $\sigma_{y_1} = 4765.87292$; $n_1 = 750$

$a_2 = 16484.70728$; $R_2^2 = 0.8122$; $\sigma_{y_2} = 3114.24469$; $n_2 = 1250$

TABLE 27

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.28965***	0.05468	-0.00805	-0.32710***	0.04054	-0.00714	11.05786***
x_2 - PCI	-0.00038	0.00049	-0.00000	-0.00196***	0.00040	-0.00000	0.00000
x_3 - TI	-0.00000	0.00001	-0.00000	0.00001	0.00001	0.00000	0.00000
x_4 - TE	-0.00002	0.00004	-0.00000	-0.00002	0.00003	-0.00000	0.00000
x_5 - CIM	0.00016**	0.00006	0.00000	0.00003	0.00006	0.00000	0.00000
x_6 - TVAI	0.03258***	0.00837	0.00014	-0.01834***	0.00203	-0.00002	113.86150***
1948-60							
x_1 - T	0.15783***	0.01632	0.00219	0.18246***	0.01222	0.00186	-32.62338***
x_2 - PCI	-0.00148***	0.00025	-0.00000	-0.00250***	0.00027	-0.00000	0.00000
x_3 - TI	-0.00001***	0.00000	-0.00000	0.00003***	0.00001	0.00000	0.00000
x_4 - TE	0.00004***	0.00001	0.00000	-0.00006***	0.00002	-0.00000	0.00000
x_5 - CIM	-0.00001	0.00002	-0.00000	-0.00008***	0.00003	-0.00000	0.00000
x_6 - TVAI	0.00823***	0.00204	0.00001	0.00463***	0.00057	0.00000	0.00000

1940-47 $a_1 = 14.08211$; $R_1^2 = 0.1847$; $\sigma_{y_1} = 1.96773$; $n_1 = 334$

$a_2 = 17.55731$; $R_2^2 = 0.2609$; $\sigma_{y_2} = 1.85667$; $n_2 = 650$

1948-60 $a_1 = -4.99047$; $R_1^2 = 0.1755$; $\sigma_{y_1} = 1.17689$; $n_1 = 607$

$a_2 = -5.55084$; $R_2^2 = 0.2712$; $\sigma_{y_2} = 1.20135$; $n_2 = 1014$

TABLE 28

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 3 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-4.23967***	0.80200	-0.11782	-3.90908***	0.63848	-0.08535	-6.54291***
x_2 - PCI	-0.00624	0.00721	-0.00000	-0.03159***	0.00628	-0.00001	55.31915***
x_3 - TI	-0.00004	0.00009	-0.00000	0.00001	0.00013	0.00000	0.00000
x_4 - TE	-0.00061	0.00057	-0.00000	0.00039	0.00050	0.00000	0.00000
x_5 - CIM	0.00327***	0.00091	0.00000	-0.00005	0.00089	-0.00000	0.00000
x_6 - TVAI	0.32833***	0.12283	0.00140	-0.25456***	0.03194	-0.00028	85.26857***
1948-60							
x_1 - T	3.29146***	0.25924	0.04564	3.40820***	0.17707	0.03468	-9.80939***
x_2 - PCI	-0.01650***	0.00392	-0.00000	-0.02957***	0.00394	-0.00001	75.46189***
x_3 - TI	-0.00012**	0.00005	-0.00000	0.00020***	0.00007	0.00000	0.00000
x_4 - TE	0.00052***	0.00019	0.00000	-0.00086***	0.00025	-0.00000	0.00000
x_5 - CIM	-0.00012	0.00027	-0.00000	0.00021	0.00039	0.00000	0.00000
x_6 - TVAI	0.05450*	0.03241	0.00009	0.10322***	0.00822	0.00005	-36.41528***

1940-47 $a_1 = 208.62382$; $R_1^2 = 0.1826$; $\sigma_{y_1} = 28.85866$; $n_1 = 334$

$a_2 = 220.89869$; $R_2^2 = 0.2205$; $\sigma_{y_2} = 29.24128$; $n_2 = 650$

1948-60 $a_1 = -109.12603$; $R_1^2 = 0.2536$; $\sigma_{y_1} = 18.69769$; $n_1 = 607$

$a_2 = -110.32144$; $R_2^2 = 0.3936$; $\sigma_{y_2} = 17.40257$; $n_2 = 1014$

TABLE 29

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 3 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-1.04976***	0.22080	-0.02917	-0.06654***	0.16529	-0.02110	-6.06960***
x_2 - PCI	-0.00022	0.00198	-0.00000	-0.00488***	0.00163	-0.00000	46.60000***
x_3 - TI	-0.00003	0.00003	-0.00000	-0.00009**	0.00003	0.00000	0.00000
x_4 - TE	-0.00022	0.00016	-0.00000	0.00044***	0.00013	0.00000	0.00000
x_5 - CIM	0.00174***	0.00025	0.00000	0.00012	0.00023	-0.00000	0.00000
x_6 - TVAI	0.05620*	0.03382	0.00024	-0.06304***	0.00827	-0.00007	63.55535***
1948-60							
x_1 - T	1.46066***	0.09608	0.02025	1.24607***	0.06700	0.01268	48.44630***
x_2 - PCI	0.01309***	0.00145	0.00000	0.01023***	0.00149	-0.00000	0.00000
x_3 - TI	-0.00006	0.00002	-0.00000	-0.00008***	0.00003	0.00000	0.00000
x_4 - TE	0.00031***	0.00007	0.00000	0.00038***	0.00010	-0.00000	0.00000
x_5 - CIM	0.00013	0.00010	0.00000	0.00037**	0.00015	0.00000	0.00000
x_6 - TVAI	-0.00163	0.01201	-0.00000	0.03744***	0.00311	0.00002	-81.46712***

1940-47 $a_1 = 50.88521$; $R_1^2 = 0.2872$; $\sigma_{y_1} = 7.94521$; $n_1 = 334$

$a_2 = 51.48133$; $R_2^2 = 0.1895$; $\sigma_{y_2} = 7.56988$; $n_2 = 650$

1948-60 $a_1 = -68.70063$; $R_1^2 = 0.5777$; $\sigma_{y_1} = 6.92986$; $n_1 = 607$

$a_2 = -59.78013$; $R_2^2 = 0.5542$; $\sigma_{y_2} = 6.58451$; $n_2 = 1014$

TABLE 30

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.28346***	0.08931	-0.00288	-0.39204***	0.05543	-0.00856	20.30333***
x_2 - PCI	-0.00001	0.00080	-0.00000	-0.00139**	0.00055	-0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	-0.00003**	0.00001	-0.00000	0.00000
x_4 - TE	0.00004	0.00006	0.00000	0.00015***	0.00004	0.00000	0.00000
x_5 - CIM	0.00054***	0.00010	0.00000	0.00003	0.00008	0.00000	0.00000
x_6 - TVAI	0.02198	0.01368	0.00009	-0.02179***	0.00277	-0.00002	57.97505***
1948-60							
x_1 - T	0.25930***	0.04361	0.00360	0.36939***	0.04169	0.00376	-50.04091***
x_2 - PCI	0.00772***	0.00066	0.00000	0.00524***	0.00093	0.00000	0.00000
x_3 - TI	-0.00000	0.00001	-0.00000	0.00002	0.00002	0.00000	0.00000
x_4 - TE	0.00006*	0.00003	0.00000	0.00002	0.00006	0.00000	0.00000
x_5 - CIM	-0.00002	0.00004	-0.00000	-0.00018*	0.00009	-0.00000	0.00000
x_6 - TVAI	0.00757	0.00545	0.00001	0.01165***	0.00193	0.00000	-20.40000***

1940-47 $a_1 = 13.72904$; $R_1^2 = 0.2223$; $\sigma_{y_1} = 3.21381$; $n_1 = 334$

$a_2 = 20.10051$; $R_2^2 = 0.2065$; $\sigma_{y_2} = 2.53840$; $n_2 = 650$

1948-60 $a_1 = -14.17156$; $R_1^2 = 0.5028$; $\sigma_{y_1} = 3.14528$; $n_1 = 607$

$a_2 = -19.09930$; $R_2^2 = 0.2611$; $\sigma_{y_2} = 4.09694$; $n_2 = 1014$

TABLE 31

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFOCIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.96217***	0.14372	-0.02354	-1.28890***	0.20546	-0.03867	29.51069***
x_2 - PCI	-0.04182***	0.00163	-0.00001	-0.03000***	0.00225	-0.00001	0.00000
x_3 - TI	0.00002	0.00002	0.00000	-0.00012***	0.00004	-0.00000	0.00000
x_4 - TE	0.00004	0.00006	0.00000	0.00011	0.00012	0.00000	0.00000
x_5 - CIM	-0.00021**	0.00009	-0.00000	-0.00005	0.00019	-0.00000	0.00000
x_6 - TVAI	0.04411	0.03634	0.00027	0.00379	0.00622	0.00000	21.33966***

$a_1 = 138.23096$; $R_1^2 = 0.8028$; $\sigma_{y_1} = 5.87480$; $n_1 = 376$

$a_2 = 149.07666$; $R_2^2 = 0.6472$; $\sigma_{y_2} = 6.84765$; $n_2 = 624$

TABLE 32

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.01007	0.09034	-0.00027	0.15580	0.11278	0.00468	-10.15431***
x_2 - PCI	-0.00031	0.00102	-0.00000	0.00327***	0.00124	0.00000	0.00000
x_3 - TI	-0.00002	0.00001	-0.00000	0.00002	0.00002	0.00000	0.00000
x_4 - TE	0.00000	0.00004	0.00000	-0.00005	0.00007	-0.00000	0.00000
x_5 - CIM	0.00009	0.00006	0.00000	-0.00008	0.00010	-0.00000	0.00000
x_6 - TVAI	0.00628	0.02284	0.00004	-0.00061	0.00342	0.00000	5.84403***

$a_1 = 30.35113$; $R_1^2 = 0.0287$; $\sigma_{y_1} = 3.31872$; $n_1 = 376$

$a_2 = 17.56285$; $R_2^2 = 0.0472$; $\sigma_{y_2} = 3.75880$; $n_2 = 624$

TABLE 33

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	1.56923***	0.10538	0.04272	1.79328***	0.12178	0.05380	-30.69178***
x_2 - PCI	0.02858***	0.00120	0.00001	0.01907***	0.00133	0.00001	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	0.00011***	0.00002	0.00000	0.00000
x_4 - TE	0.00007	0.00005	0.00000	-0.00022***	0.00007	-0.00000	0.00000
x_5 - CIM	0.00011	0.00007	0.00000	0.00013	0.00011	0.00000	0.00000
x_6 - TVAI	-0.02066	0.02665	-0.00014	-0.00329	0.00369	-0.00000	-12.60157***

$a_1 = -97.43871$; $R_1^2 = 0.8216$; $\sigma_{y_1} = 3.87124$; $n_1 = 376$

$a_2 = -103.30993$; $R_2^2 = 0.7767$; $\sigma_{y_2} = 4.05886$; $n_2 = 624$

TABLE 34

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 3 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.59718***	0.05522	-0.01626	-0.66068***	0.07727	-0.01982	15.11049***
x_2 - PCI	0.01355***	0.00063	0.00000	0.00767***	0.00085	0.00000	0.00000
x_3 - TI	0.00003***	0.00001	0.00000	-0.00001	0.00001	-0.00000	0.00000
x_4 - TE	-0.00011***	0.00002	-0.00000	0.00016***	0.00005	0.00000	0.00000
x_5 - CIM	0.00002	0.00004	0.00000	-0.00000	0.00007	-0.00000	0.00000
x_6 - TVAI	-0.02972**	0.01396	-0.00020	0.00010	0.00234	0.00000	-41.75652***

$a_1 = 28.86528$; $R_1^2 = 0.7398$; $\sigma_{y_1} = 2.02864$; $n_1 = 376$

$a_2 = 36.69336$; $R_2^2 = 0.4257$; $\sigma_{y_2} = 2.57530$; $n_2 = 624$

t-Values Calculated and Regression Coefficients Compared

In this part of the analysis, the t-test was used to determine whether coefficients for TVA and non-TVA counties obtained from the regression analysis in Program 3 differed significantly. These regression coefficients were recorded in Tables 25 to 34. The results of the analysis of the first two equations in this part of Program 3 were shown in Table 25. For the 1940-47 period of the analysis, the coefficients for four of five variables regressed on per capita income for TVA and non-TVA counties were significantly different at the 1 percent level. For the first variable, Time (X_1), the coefficients were 53.02381 for TVA (b_1) counties and 50.43903 for non-TVA (b_2) counties. The coefficients for Employment (X_4) were 0.00870 for TVA (b_1) counties and -0.01002 for non-TVA (b_2) counties. For Capital Invested in Manufacturing (X_5) and TVA Investments (X_6) for TVA (b_1) and non-TVA (b_2) counties, the respective coefficients were -0.01470 and 0.00756, and -4.43187 and -0.26375.

For the 1948-63 period, the coefficients for only two variables differed significantly. These variables were Time (X_1) and TVA Investments (X_6). As in the first period in this table, the coefficients for Time (X_1) was larger (33.99732) for TVA (b_1) counties than for non-TVA (b_2) counties (23.52961). For TVA Investments (X_6) in the 1948-63 period, the coefficient for TVA (b_1) counties was 3.21254 while the coefficient for non-TVA (b_2) counties was -0.22073. For the 1940-47 period, the coefficient for TVA Investments (X_6) in TVA (b_1) counties, as mentioned earlier, was -4.43187.

Table 26 showed the results of comparing five corresponding independent variables regressed on employment for TVA and non-TVA counties. All the variables in this table had coefficients significantly different at the 1 percent level. The relative magnitudes for TVA and non-TVA counties and the signs for all the variables in this part of the analysis were similar to those recorded in Programs 1 and 2. For the 1940-47 and 1948-63 periods, the coefficients for Time (X_1) in TVA (b_1) and non-TVA (b_2) counties were -280.51077 and -134.65987, and -749.26769 and -288.41875, respectively. For the variables Per Capita Income (X_2) and Total Income (X_3) the respective coefficients for TVA (b_1) and non-TVA (b_2) counties in the two periods were 1.41286 and -1.57267, 2.23725 and 0.65031, 0.12550 and 0.19346 and 0.17839 and 0.22438. The corresponding coefficients for Capital Invested in Manufacturing (X_5) and TVA Investments (X_6) were 1.00134 and 0.74093, 0.11296 and 0.10179, -50.39543 and -0.50826 and -36.13356 and 8.38549, respectively.

The results of comparing six corresponding independent variables regressed on percentage of population 25 years and over who completed no school for the two areas delineated were recorded in Table 17, page 71. As in Program 2, the coefficients of only three variables were significantly different. These variables were Time (X_1) and TVA Investments (X_6) for the 1940-47 period and Time (X_1) again for the 1948-60 period. The coefficients for Time (X_1) for the 1940-47 period were -0.28965 and -0.32710 for TVA (b_1) and non-TVA (b_2) counties, respectively. The coefficients for TVA Investments (X_6) for the same period and area were 0.03258 and -0.01834 respectively. For the 1948-60 period, the portion

of the population in the "no school" category had increased for both regions under study. The coefficient for TVA counties (b_1) was 0.15783 while the coefficient for the non-TVA counties (b_2) was 0.18246.

The results of the comparison of the regression coefficients between TVA (b_1) and non-TVA (b_2) counties when the percentage of population who completed some elementary school was the dependent variable, were given in Table 28, page 72. In this case, three variables had coefficients significantly different for both periods under study. The variables were Time (X_1), Per Capita Income (X_2) and TVA Investments (X_6). The coefficients for Time (X_1) were both negative for the 1940-47 period. They were -4.23967 for TVA (b_1) counties and -3.90908 for non-TVA (b_2) counties. For the 1948-60 period, the respective coefficients were 3.29146 and 3.40820. The coefficients for Per Capita Income (X_2) were negative for both periods and for both types of counties. They were -0.00624 and -0.03159 and -0.01650 and -0.02957, respectively. The respective coefficients for TVA Investments (X_6) for the two periods and the two delineated areas were 0.32833 and -0.25456 and 0.05450 and 0.10322.

Table 29, page 73, shows that part of the analysis where that segment of the population who had some high school education was the dependent variable. For the first part of the study, this portion of the population decreased relative to Time (X_1) for both TVA (b_1) and non-TVA (b_2) counties. The coefficients for Time (X_1) were -1.04976 for TVA (b_1) counties and -0.96654 for non-TVA (b_2) counties. For the 1948-60 period, the corresponding coefficients were not significantly

different. TVA Investments (X_6) coefficients in TVA (b_1) and non-TVA (b_2) counties did, however, differ significantly for both periods under study. For the earlier period, the respective coefficients were 0.05620 and -0.06304. For the 1948-60 period, the corresponding coefficients were -0.00163 and 0.03744 as seen in Table 29.

When six corresponding independent variables were regressed on the percentage of adult population who had at least one year of college education, the results in Table 30, page 74, were produced. In this case, only two variables had coefficients significantly different for TVA (b_1) and non-TVA (b_2) counties. They were Time (X_1) and TVA Investments (X_6). The coefficients for Time (X_1) for the TVA (b_1) and non-TVA (b_2) counties were -0.28346 and -0.39204 for the 1940-47 period. For the 1948-60 period, the respective coefficients were 0.25930 and 0.36939. The respective coefficients for TVA Investments (X_6) in the two periods were 0.02198 and -0.02179 and 0.00757 and 0.01165.

In the last part of the analysis by t-test in Program 3, the percentage of the total population in the four different income categories were used as the dependent variables. Tables 31, 32, 33 and 34, pages 75, 76, 77 and 78, showed the results obtained. In all four cases, only two of six variables had coefficients which differed significantly. These variables were Time (X_1) and TVA Investments (X_6). Table 31 shows that the percentage of the population in the $0-$2499 income category decreased relative to Time (X_1) for both TVA (b_1) and non-TVA (b_2) counties. The coefficients were -0.96217 and -1.28890. The dependent

variable, however, increased relative to TVA Investments (X_6) for both types of counties with the increase being greater for TVA (b_1) counties. The coefficients were 0.04411 and 0.00379, respectively.

Comments on Analysis of Program 3

Program 3 consisted of the analysis of the same variable analyzed in Programs 1 and 2. In Program 3, however, as in each program, the counties were grouped differently. The grouping was based primarily on counties geographic location relative to water resource investment projects. Program 3, therefore, had a different number of counties in the TVA and non-TVA categories than did either Program 1 or Program 2. Consequently, the results in Program 3 would have been expected to differ from the results obtained in the analysis of Programs 1 and 2.

The results obtained in the analysis of Program 3 differed from the results obtained in the other two programs. The beta-coefficients for Program 3 also showed that Time (X_1) and TVA Investments (X_6) were the most important variables in estimating the dependent variables. The regression coefficient and the t-values for Program 3 were also similar in sign and relative magnitude to the corresponding regression coefficients in Programs 1 and 2. These similarities were evident in that the analysis on income and employment in Program 3 did not produce a series of coefficients which might have suggested greater increases in these variables for TVA as compared to non-TVA counties. The analysis of Program 3 also did not produce coefficients which suggested that the population in the low income and educational categories received benefits

greater than benefits received by the population in the three remaining income and educational categories. A general conclusion from the analysis of Program 3, was that the similarities of this program, as compared to the analyses of Program 1 and 2, were more evident than the dissimilarities.

The range of coefficients of determination (R^2) in Program 3 was 0.0287 to 0.9608. Sixteen of 32 coefficients were greater than 0.5000 as recorded in Tables 25-34, pages 69-78, inclusive.

CHAPTER VIII

AN EXAMINATION BY DISCRIMINANT ANALYSES FOR TWO GROUPS OF PROGRAMS 1, 2 AND 3

The delineation of counties into TVA and non-TVA categories was an important part of the overall study. The method used in the delineation, as described in Chapter III, was primarily subjective. Factors such as indexes of relative income and employment growth for the different counties were not available to facilitate a more objective method of delineating the counties. A technique to examine the degree of effectiveness of delineating counties which might fall into two categories was therefore desirable. The technique used was a discriminant analysis for two groups.

In the discriminant analysis for two groups, the variables (except TVA Investments) used in multiple regression were analysis for 1940, 1950, and 1960 for each of the three programs. The counties were entered in the discriminant analysis in the same combinations used in multiple regression analysis. If the variables for a county in discriminant analysis were substantially different from the mean of the variables of a particular group, the county with the variables deviating from the mean was shifted to the alternate group. For example, in Program 1, the delineation of counties in the original study left 45 of 125 counties in the TVA category and the remaining 80 counties in the non-TVA category. These delineations were reported in Chapter III. The

discriminant analysis for two groups in 1940 ranked 39 counties as TVA counties and 86 counties as non-TVA counties. While the mean of the variables was larger for TVA counties (0.00638) than for non-TVA counties (0.00352) the difference between means was not large enough to result in a significant F-statistic.

For 1950, the number of counties ranked by discriminant analysis as TVA and non-TVA counties, respectively, in Program 1 were 45 and 80. These numbers corresponded to the ranking in the original delineations but the counties in the different categories for the two methods of delineation were not the same. The mean of the variables for 1950 was again larger for TVA than for non-TVA counties. The respective figures were 0.12423 and 0.12027. The difference between means, however, did not result in a significant F-statistic.

For 1960, Program 1, the number of counties ranked as TVA and non-TVA counties by discriminant analysis were 45 and 80, respectively, as shown on Figure 7. The mean of variables for TVA counties was 0.42147. The corresponding mean for non-TVA counties was 0.38013. The F-statistic for 1960 (11.11190) was statistically significant at the 1 percent level These results for Program 1 were recorded in Table 35.

For Program 2, the delineation of counties used in the original analysis categorized 32 counties as TVA counties and the remaining 93 counties as non-TVA counties. The discriminant analysis for 1940 ranked 40 counties as TVA counties and 85 as non-TVA counties. The means of variables for the two categories of counties were 0.00836 and 0.00586, respectively. These means were not statistically significantly different.

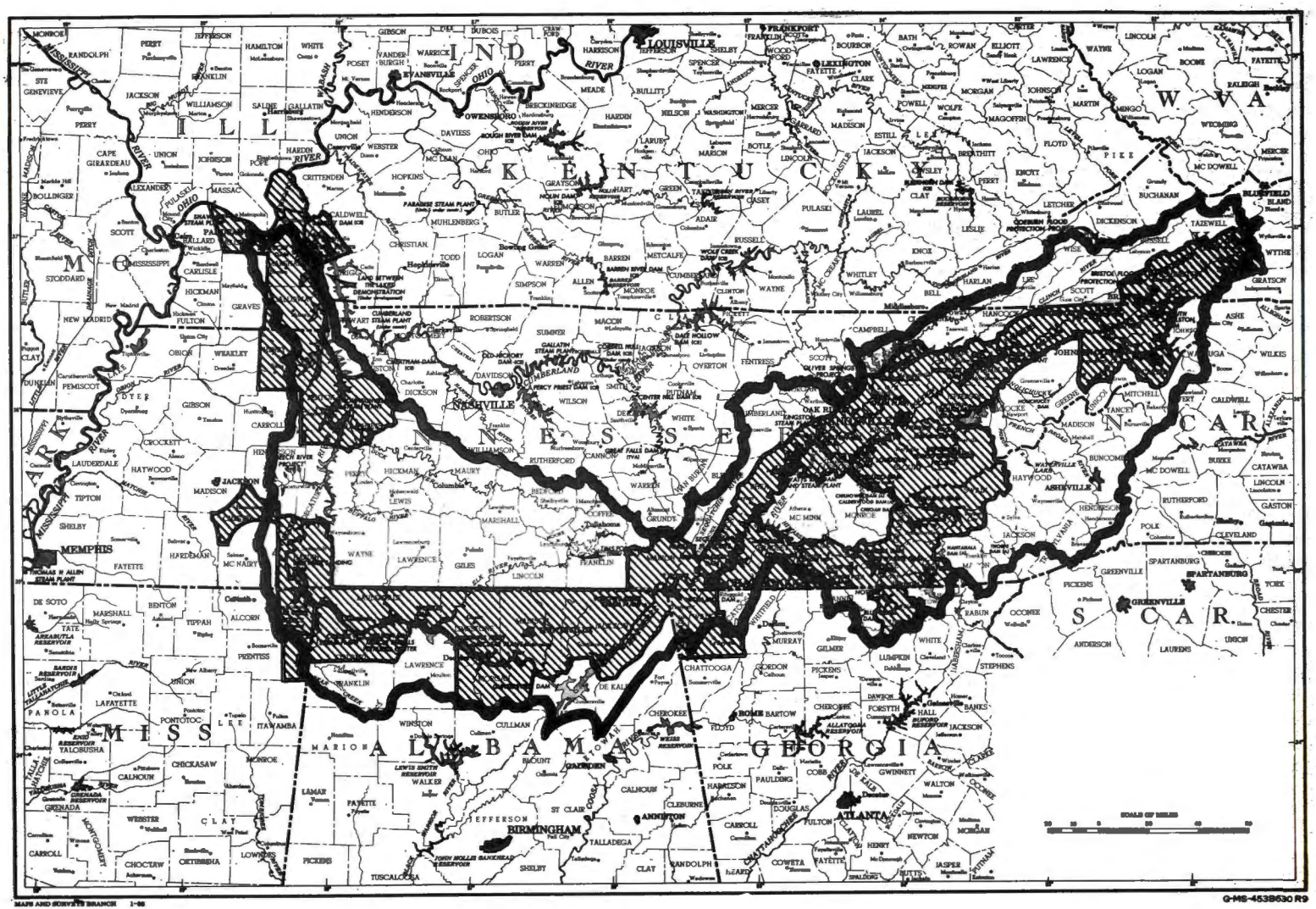

Figure 7. TVA Impacted Counties as Delineated by Discriminant Analysis on Program 1.

TABLE 35

COUNTY DELINEATION BY DISCRIMINANT ANALYSIS FOR TWO GROUPS, PROGRAM 1 (1940, 1950 AND 1960)

County	1940 F(8,116) = 1.11089 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65085 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 11.11190*** Non-TVA County Rank No.	1960 TVA County Rank No.
1. Anderson		32	14			1
2. Bedford	20		45		32	
3. Benton	32		56			8
4. Bledsoe	24		46		60	
5. Blount	80		72			5
6. Bradley	76		16			17
7. Campbell	54		78		11	
8. Carroll	58		17		40	
9. Carter	55		62			22
10. Chester	1			17		39
11. Claiborne	49		42		52	
12. Cocke	52			22	48	
13. Coffee	38		13		13	
14. Cumberland		22		35	71	
15. Decatur	42		39		26	
16. Dickson	45		48		31	
17. Fentress	8		20		17	
18. Franklin	74		44		30	
19. Giles	4		60		44	
20. Grainger		2		31		43
21. Greene	9		10		80	
22. Grundy	51			14	25	
23. Hamblen		30		20		32

TABLE 35 (Continued)

County	1940 F(8,116) = 1.11089 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65085 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 11.11190*** Non-TVA County Rank No.	1960 TVA County Rank No.
24. Hamilton	35		4			2
25. Hancock	14		11		22	
26. Hardin	10		67			9
27. Hawkins	57			25		7
28. Henderson		9	33		21	
29. Henry	61		65			24
30. Hickman	33		32		10	
31. Houston		5	30		24	
32. Humphreys	79			23		41
33. Jefferson	70			32		34
34. Johnson	56		12		77	
35. Knox		26	80			18
36. Lawrence		1	27		43	
37. Lewis	17			5	78	
38. Lincoln		14	18		2	
39. Loudon	66			2		27
40. McMinn		16	37		50	
41. McNairy	29		68		1	
42. Marion	69			27		10
43. Marshall		29	7		59	
44. Maury	68		79		38	
45. Meigs	72		5			23
46. Monroe	6		23		34	
47. Moore		11	43		28	
48. Morgan	48		40		47	
49. Perry				8	64	
50. Polk		17	54			37

TABLE 35 (Continued)

County	1940 F(8,116) = 1.11089 Non-TVA County Rank No.	1940 F(8,116) = 1.11089 TVA County Rank No.	1950 F(8,116) = 1.65085 Non-TVA County Rank No.	1950 F(8,116) = 1.65085 TVA County Rank No.	1960 F(12,112) = 11.11190*** Non-TVA County Rank No.	1960 F(12,112) = 11.11190*** TVA County Rank No.
51. Rhea		25	66			12
52. Roane		34	53			15
53. Rutherford	15		41		66	
54. Sequatchie	21		35		62	
55. Sevier	28			37		20
56. Stewart		3		6	42	
57. Sullivan	26			19		3
58. Unicoi	25		49		18	
59. Union	7		50			25
60. Van Buren	30			18	37	
61. Washington	62		1			14
62. Wayne	47		73		65	
63. Williamson	46			4	39	
64. Bland	5			15	15	
65. Dickenson	19		2		53	
66. Grayson	13		47		63	
67. Lee	81		21		67	
68. Russell	12			10	61	
69. Scott	65			9	40	
70. Smyth	37		28			4
71. Tazewell	43		61		23	
72. Washington		23	36			13
73. Wise	78		22		27	
74. Wythe		8		12	49	
75. Avery		24		42	72	

TABLE 35 (Continued)

County	1940 F(8,116) = 1.11089 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65085 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 11.11190*** Non-TVA County Rank No.	1960 TVA County Rank No.
76. Buncombe	73		34		5	
77. Cherokee	2			45		19
78. Clay	85			29		28
79. Graham		31	74			44
80. Haywood		4	3		45	
81. Henderson		36	6		74	
82. Jackson	41		26		54	
83. Macon	75			30	3	
84. Madison	16		51		16	
85. Mitchell		38	9		12	
86. Swain		39	63			11
87. Transylvania	3		69		19	
88. Watauga	27		57		56	
89. Yancy	82		19		33	
90. Alcorn	11		24		73	
91. Itawamba	53			40	35	
92. Prentiss		37	15		69	
93. Tishomingo	86			36		6
94. Calloway	23			28		42
95. Graves	40			39	76	
96. Livingston	59			26		45
97. Lyon		19	38			40
98. McCracken		21		24		30
99. Marshall	67		64			16
100. Triggs	22		25		55	

TABLE 35 (Continued)

County	1940 F(8,116) = 1.11089 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65085 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 11.11190*** Non-TVA County Rank No.	1960 TVA County Rank No.
101. Catoosa	31			34	58	
102. Dade	84		70			39
103. Fannin		13		38	14	
104. Gilmer	44			44	51	
105. Lumpkin		35	31		68	
106. Rabun	63		29		8	
107. Towns		12	55		57	
108. Union	39		75			26
109. Walker	83		59			29
110. Whitfield	64		58		6	
111. Blount		33	76		7	
112. Colbert	71			33		38
113. Cullman	50			43	20	
114. DeKalb		15		16	4	
115. Etowah	18		77		9	
116. Franklin		20		41	79	
117. Jackson		27		11		36
118. Lauderdale		28		21		33
119. Lawrence	60			3	29	
120. Limestone	34		52			31
121. Madison		18		1		35
122. Marion		7	71		70	
123. Marshall		10		13	36	
124. Morgan		6		7		21
125. Winston	36		8		46	
Group Mean	0.00352	0.00638	0.12027	0.12423	0.38013	0.42147

*** = Significant at 1 percent.

For 1950, the respective number of counties ranked as TVA and non-TVA categories by discriminant analysis were 47 and 78. The mean of variables was 0.17681 for TVA counties and 0.17291 for non-TVA counties. The difference between these means was not statistically significant.

For 1960, discriminant analysis ranked 33 counties as TVA counties and 92 as non-TVA counties as shown on Figure 8. The means for the two categories of counties were 0.38455 and 0.35764. The F-value (6.10006) for 1960 was statistically significant. These results for Program 2 were shown in Table 36.

Table 37 showed the results of the discriminant analysis for Program 3. Fifty-seven counties had originally been classified as TVA counties in this program. The remaining 68 counties had been classified as non-TVA counties. Discriminant analysis, however, ranked 50 counties as TVA counties for 1940 and 75 counties as non-TVA counties for the same year. The respective means of variables, again not significantly different, were 0.00939 and 0.00643.

For 1950, 57 counties were ranked as TVA counties and 68 counties as non-TVA counties. The respective means were 0.18413 and 0.18126. These means were not significantly different. Even though the numbers of counties in the TVA and non-TVA classifications were the same for both discriminant analysis and the original delineation, the counties in the two classifications were not the same.

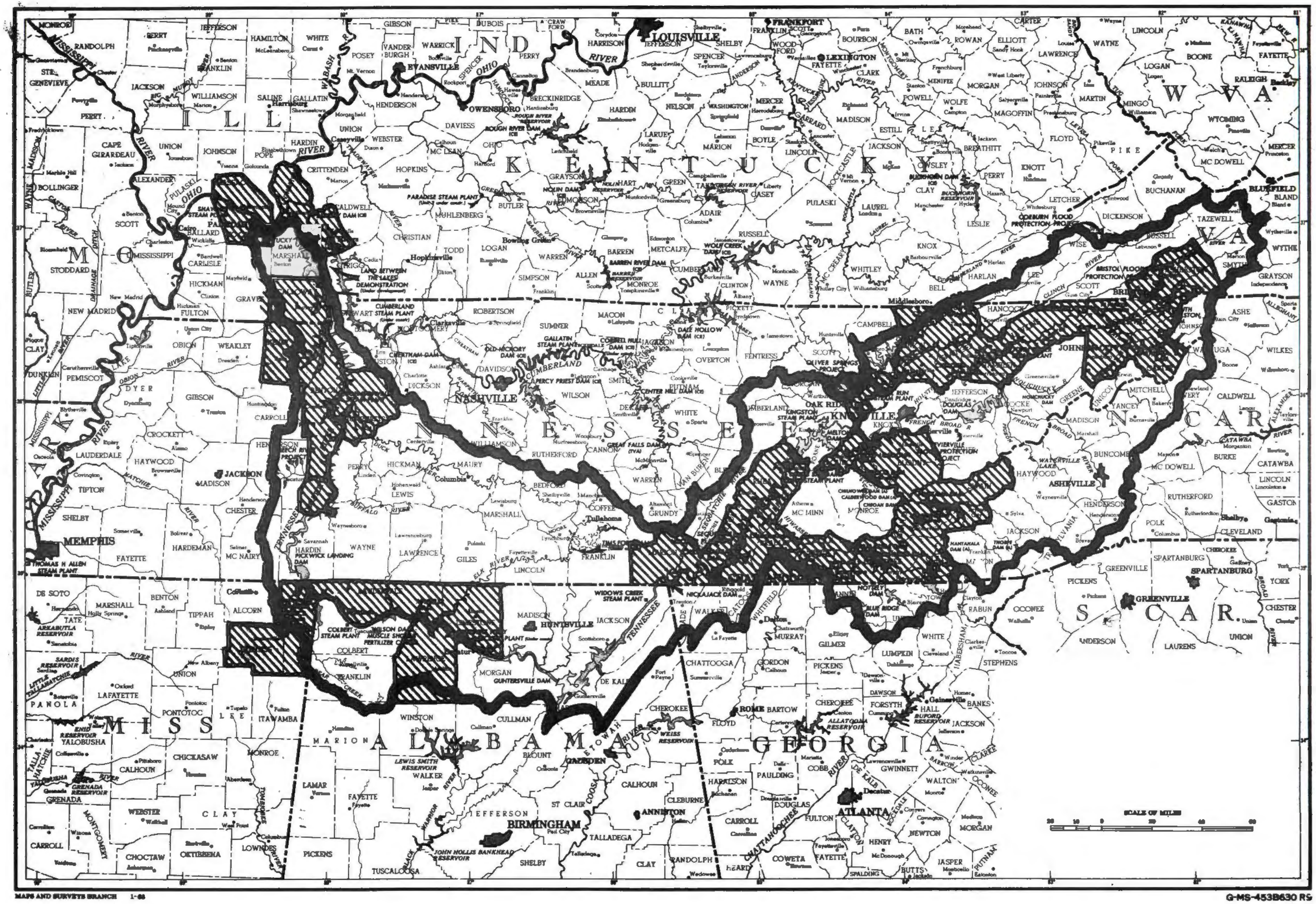

Figure 8. TVA Impacted Counties as Delineated by Discriminant Analysis on Program 2.

TABLE 36

COUNTY DELINEATION BY DISCRIMINANT ANALYSIS FOR TWO GROUPS, PROGRAM 2 (1940, 1950 AND 1960)

County	1940 F(8,116) = 0.98347 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65809 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 6.10006** Non-TVA County Rank No.	1960 TVA County Rank No.
1. Anderson	35			27		18
2. Bedford	19		16		32	
3. Benton		27	25			33
4. Bledsoe	23		13		58	
5. Blount	31		67			4
6. Bradley	75		45			27
7. Campbell		31	78		24	
8. Carroll	57		17		74	
9. Carter	53			34		10
10. Chester	54		39		40	
11. Claiborne	1		46			5
12. Cocke	37			18	45	
13. Coffee	51		20		27	
14. Cumberland	41		42		20	
15. Decatur		23		24		13
16. Dickson	44			37	9	
17. Fentress	48		10		30	
18. Franklin		10	33		18	
19. Giles	7		11		48	
20. Grainger		38		25		12
21. Greene		6	30		13	
22. Grundy	73		27		47	
23. Hamblen		34		45		14
24. Hamilton	9			29		11
25. Hancock	32		32		34	

TABLE 36 (Continued)

County	1940 F(8,116) = 0.98347 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65809 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 6.10006** Non-TVA County Rank No.	1960 TVA County Rank No.
26. Hardin	79			20	56	
27. Hawkins	8			42		2
28. Henderson		3	23		43	
29. Henry		18	4			17
30. Hickman	13			15	82	
31. Houston		1	44		61	
32. Humphreys	47		62			15
33. Jefferson	34		65		64	
34. Johnson	78		18		50	
35. Knox	65			31	81	
36. Lawrence		30		19	39	
37. Lewis		4	43		49	
38. Lincoln	67		37		17	
39. Loudon	68		5			6
40. McMinn	16		48		57	
41. McNairy	28			6	76	
42. Marion	69			33		20
43. Marshall		17		9	33	
44. Maury		15	35		65	
45. Meigs		2		21	83	
46. Monroe	50		60		84	
47. Moore	76		12		15	
48. Morgan	55		41		75	
49. Perry	56			16	14	
50. Polk	71		66			9

TABLE 36 (Continued)

County	1940 F(8,116) = 0.98347 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65809 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,116) = 6.10006** Non-TVA County Rank No.	1960 TVA County Rank No.
51. Rhea	2		29			24
52. Roane	14		53		91	
53. Rutherford	5		68		79	
54. Sequatchie		12	2		78	
55. Sevier	27		63		88	
56. Stewart	61		34		63	
57. Sullivan	24			39		29
58. Unicoi	6		40		4	
59. Union	40			5		1
60. Van Buren	46		50		1	
61. Washington	20			2	37	
62. Wayne		35	7		21	
63. Williamson	77			11	31	
64. Bland	4		47		59	
65. Dickenson	45			7	66	
66. Grayson	18		19		28	
67. Lee	36			32	22	
68. Russell	25		69		87	
69. Scott	29		73		35	
70. Smyth	12		61		53	
71. Tazewell	64		21		52	
72. Washington	11			38		22
73. Wise		24	28		19	
74. Wythe		9	51		25	
75. Avery		25	9		16	
76. Buncombe	72		22		72	
77. Cherokee	66			47		7

TABLE 36 (Continued)

County	1940 F(8,116) = 0.98347 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65809 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,116) = 6.10006** Non-TVA County Rank No.	1960 TVA County Rank No.
78. Clay	58		36			31
79. Graham		40	54			8
80. Haywood	15			10	73	
81. Henderson	80			4	60	
82. Jackson		5	6		41	
83. Macon		37	76		38	
84. Madison	42		26		2	
85. Mitchell		16		13	89	
86. Swain	84		74			16
87. Transylvania	3			41	54	
88. Watauga	10		31		62	
89. Yancy	74			44	11	
90. Alcorn	62		77		71	
91. Itawamba		21	24		80	
92. Prentiss	43		57			19
93. Tishomingo		32		23		3
94. Calloway	85			26		32
95. Graves		39	49		23	
96. Livingston		20		36		25
97. Lyon	30			28		28
98. McCracken	22		38			30
99. Marshall		14		30	85	
100. Triggs	52		3		92	
101. Catoosa		22	70		86	
102. Dade		26	64		67	
103. Fannin	38			40	55	

TABLE 36 (Continued)

County	1940 F(8,116) = 0.98347 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.65809 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,116) = 6.10006** Non-TVA County Rank No.	1960 TVA County Rank No.
104. Gilmer	81			43	51	
105. Lumpkin	21		71		8	
106. Rabun		33	15		7	
107. Towns	63			17	90	
108. Union	83		59		26	
109. Walker	82		75		69	
110. Whitfield		13	8		6	
111. Blount	26		58		70	
112. Colbert		28		35	29	
113. Cullman	39		72		10	
114. DeKalb	60		56		5	
115. Etowah	49		1		3	
116. Franklin		36	55		44	
117. Jackson	70			22	42	
118. Lauderdale		29		3		26
119. Lawrence	33			12		21
120. Limestone	59		52			23
121. Madison		19		1	12	
122. Marion	17			46	46	
123. Marshall		11		14	36	
124. Morgan		7		8	77	
125. Winston		8	14		68	
Group Mean	0.00586	0.00836	0.17291	0.17681	0.35764	0.38455

** = Significant at 5 percent.

TABLE 37

COUNTY DELINEATION BY DISCRIMINANT ANALYSIS FOR TWO GROUPS, PROGRAM 3 (1940, 1950 AND 1960)

County	1940 F(8,116) = 1.28657 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.29397 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 8.72693*** Non-TVA County Rank No.	1960 TVA County Rank No.
1. Anderson	73		57			44
2. Bedford	16		10		68	
3. Benton	17		47			10
4. Bledsoe	45		26		56	
5. Blount	57			29		7
6. Bradley	55		46			27
7. Campbell	74			31	11	
8. Carroll	19		13		60	
9. Carter		14	27			24
10. Chester	31		21		74	
11. Claiborne	51		3		76	
12. Cocke	53		37		46	
13. Coffee	36		38		17	
14. Cumberland	49			26	30	
15. Decatur		46		4	24	
16. Dickson	46		22		31	
17. Fentress	52			15	70	
18. Franklin	43		31		10	
19. Giles	4		32		25	
20. Grainger		6	59			11
21. Greene	66			32	48	
22. Grundy	58			25	22	
23. Hamblen	39		20			4
24. Hamilton		29	65		36	
25. Hancock	34		63		44	

TABLE 37 (Continued)

County	1940 F(8,116) = 1.28657 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.29397 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 8.72693*** Non-TVA County Rank No.	1960 TVA County Rank No.
26. Hardin	21			50		45
27. Hawkins	26			40		34
28. Henderson	38		8		77	
29. Henry	9		68			26
30. Hickman		9		46	21	
31. Houston		18		27	57	
32. Humphreys	33		9			43
33. Jefferson		28	48			29
34. Johnson		3	61		64	
35. Knox	10			18		20
36. Lawrence		47		14	1	
37. Lewis	48		40			2
38. Lincoln	47		14		38	
39. Loudon	24			5		36
40. McMinn	8			7	55	
41. McNairy		43	66		2	
42. Marion	75			49		12
43. Marshall	13		24		43	
44. Maury	54			55	28	
45. Meigs		40	56			14
46. Monroe	67		12		27	
47. Moore	1			20	59	
48. Morgan	11			54	62	
49. Perry	5		50		50	
50. Polk	2		55			25
51. Rhea	22			44		39
52. Roane	59			33		17

TABLE 37 (Continued)

County	1940 F(8,116) = 1.28657 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.29397 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 8.72693*** Non-TVA County Rank No.	1960 TVA County Rank No.
53. Rutherford	42		42		18	
54. Sequatchie		50		56	66	
55. Sevier	15			37		22
56. Stewart		35		21	52	
57. Sullivan	56		35			5
58. Unicoi		44	34		65	
59. Union	41			42		19
60. Van Buren	12			8	37	
61. Washington	68			41	42	
62. Wayne		48	36			6
63. Williamson	72		19		15	
64. Bland		45		51	3	
65. Dickenson		11		24	34	
66. Grayson		1		52	67	
67. Lee		22	11		71	
68. Russell		34	1		23	
69. Scott		49		22	5	
70. Smyth	61			6	39	
71. Tazewell	27			12	63	
72. Washington		26	25			15
73. Wise		5		10	61	
74. Wythe		12	15		47	
75. Avery		23	43		53	
76. Buncombe	25		39		73	
77. Cherokee	14			28		21
78. Clay		30		2		30

TABLE 37 (Continued)

County	1940 F(8,116) = 1.28657 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.29397 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 8.72693*** Non-TVA County Rank No.	1960 TVA County Rank No.
79. Graham	18		28			8
80. Haywood		4	52		49	
81. Henderson	7		67		45	
82. Jackson	44		62		16	
83. Macon	71		18		41	
84. Madison	60			57	75	
85. Mitchell		39		13	54	
86. Swain		33		23		46
87. Transylvania	70		41		72	
88. Watauga	6		16		35	
89. Yancy	65			53	12	
90. Alcorn	40		53		33	
91. Itawamba		17	33		19	
92. Prentiss	63		49		40	
93. Tishomingo		41	44			13
94. Calloway		32	4			47
95. Graves		23	60		32	
96. Livingston		24		38		18
97. Lyon	29			35		42
98. McCracken		2	51			3
99. Marshall		19	23			32
100. Triggs		25	58			16
101. Catoosa		37		39		41
102. Dade		8		43	58	
103. Fannin		20		45	14	
104. Gilmer		31	64		51	

TABLE 37 (Continued)

County	1940 F(8,116) = 1.28657 Non-TVA County Rank No.	1940 TVA County Rank No.	1950 F(8,116) = 1.29397 Non-TVA County Rank No.	1950 TVA County Rank No.	1960 F(12,112) = 8.72693*** Non-TVA County Rank No.	1960 TVA County Rank No.
105. Lumpkin		21	6		8	
106. Rabun	50		54			1
107. Towns		38		34	26	
108. Union	62			47		40
109. Walker		27		30		28
110. Whitfield	30			17	7	
111. Blount	64		17		6	
112. Colbert	35			36	29	
113. Cullman		16	5		4	
114. DeKalb		36		9	20	
115. Etowah		42	30		9	
116. Franklin	3		7		69	
117. Jackson		7		48		38
118. Lauderdale	37			1		31
119. Lawrence		13		3		35
120. Limestone	28		29			37
121. Madison	32			16		23
122. Marion	20		2		78	
123. Marshall		15		19		33
124. Morgan		10		11		9
125. Winston	69		45		13	
Group Mean	0.00643	0.00939	0.18126	0.18413	0.27635	0.30823

*** = Significant at 1 percent.

For 1960, 47 counties were ranked as TVA counties by discriminant analysis and 78 as non-TVA counties as shown on Figure 9. The respective means of variables were 0.30823 and 0.27635. The F-value for 1960 (8.72693) was statistically significant at the 1 percent level.

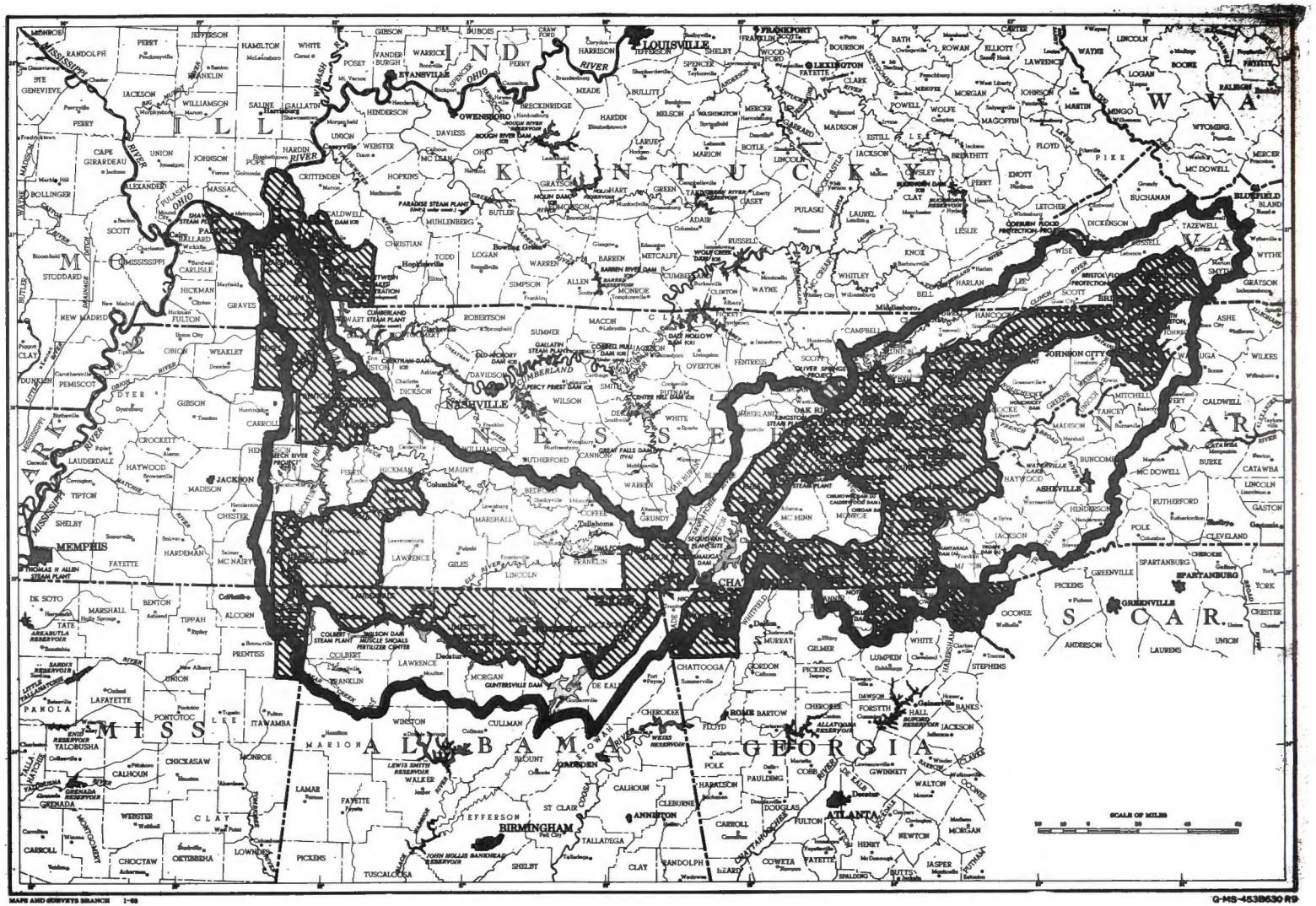

Figure 9. TVA Impacted Counties as Delineated by Discriminant Analysis on Program 3.

CHAPTER IX

COMMENTS ON THE DISCRIMINANT ANALYSIS FOR TWO GROUPS AND A SUGGESTION FOR FURTHER ANALYSIS

The mechanics of discriminant analysis for two groups are such that the results in different programs will be influenced by the combinations of data submitted as two separate groups. For example, three different combinations of data were analyzed for three different years. The results were not expected to be the same in all the analyses because the means of the variables as submitted for analyses in two groups were different for each combination submitted. The data on individual counties did not change as did the means for the different groups of counties. A county might therefore have been classified as a TVA county in one analysis and a non-TVA county in a different analysis depending on which mean the data of the particular county compared with most favorably.

As seen in Chapter VIII, discriminant analysis for two groups did not rank TVA and non-TVA counties consistently in either the three programs of 1940, 1950 and 1960 nor with the earlier arbitrary delineations. In some cases, counties far removed from water resource projects were included in the TVA category by discriminant analysis. Other counties near projects were included in the non-TVA category. Results such as these might have been explained by a factor or factors possibly not accounted for which were influential enough in the year

of the analysis to bring about a reclassification of the county in that particular year. These factors might have been elements, such as an exceptionally good harvest, a boom in construction in the county due to industrial expansion, and floods. Examples of the possible influence of factors such as these and the consequent redistribution of counties were seen in the 1940 analyses of Program 1 where Wythe County (74), Virginia and Moore County (97), Tennessee were included in the TVA category. Both counties were some distance from major projects involving public investments in water resources. Hardin County (26), Tennessee, near Pickwick Landing Dam, had been omitted from the TVA category in Program 2 in 1940 and 1950. Dade (102) and Fannin (103) counties in Georgia (both counties again near water resource projects) had been ranked as non-TVA counties in 1940 for Program 3.

A consistency did appear in the discriminant analysis for two groups. The consistency was related to the level of statistical significance in the 1960 analysis. In all three programs the combinations of TVA and non-TVA counties as ranked by discriminant analysis for 1960 were significantly different. This grouping of counties appeared to provide delineations for previously not anticipated alternative analysis. This grouping of counties also appeared to provide an opportunity to test an alternative hypothesis that investments in water resource had an impact upon income and employment, but the spatial nature of that impact might be diffused and irregular in pattern due to the influence of markets and other institutional forces. It was therefore decided

to further pursue this study by applying multiple regression and the associated analyses as conducted in Programs 1, 2 and 3 to the combinations of TVA and non-TVA counties as yielded by discriminant analysis for 1960. This further analysis constituted Programs 4, 5 and 6. It was also decided that counties which appeared in the TVA category in either Programs 4, 5 or 6 might have a common element related to investments in water resources. These counties were shown on Figure 10. Multiple regression and the associated analyses were also applied to the data of this combination of counties in what constituted Program 7. But the results of this program did not appear to offer information substantially different from the analyses of Programs 4, 5 and 6. The results of Program 7 were therefore not included in this study.

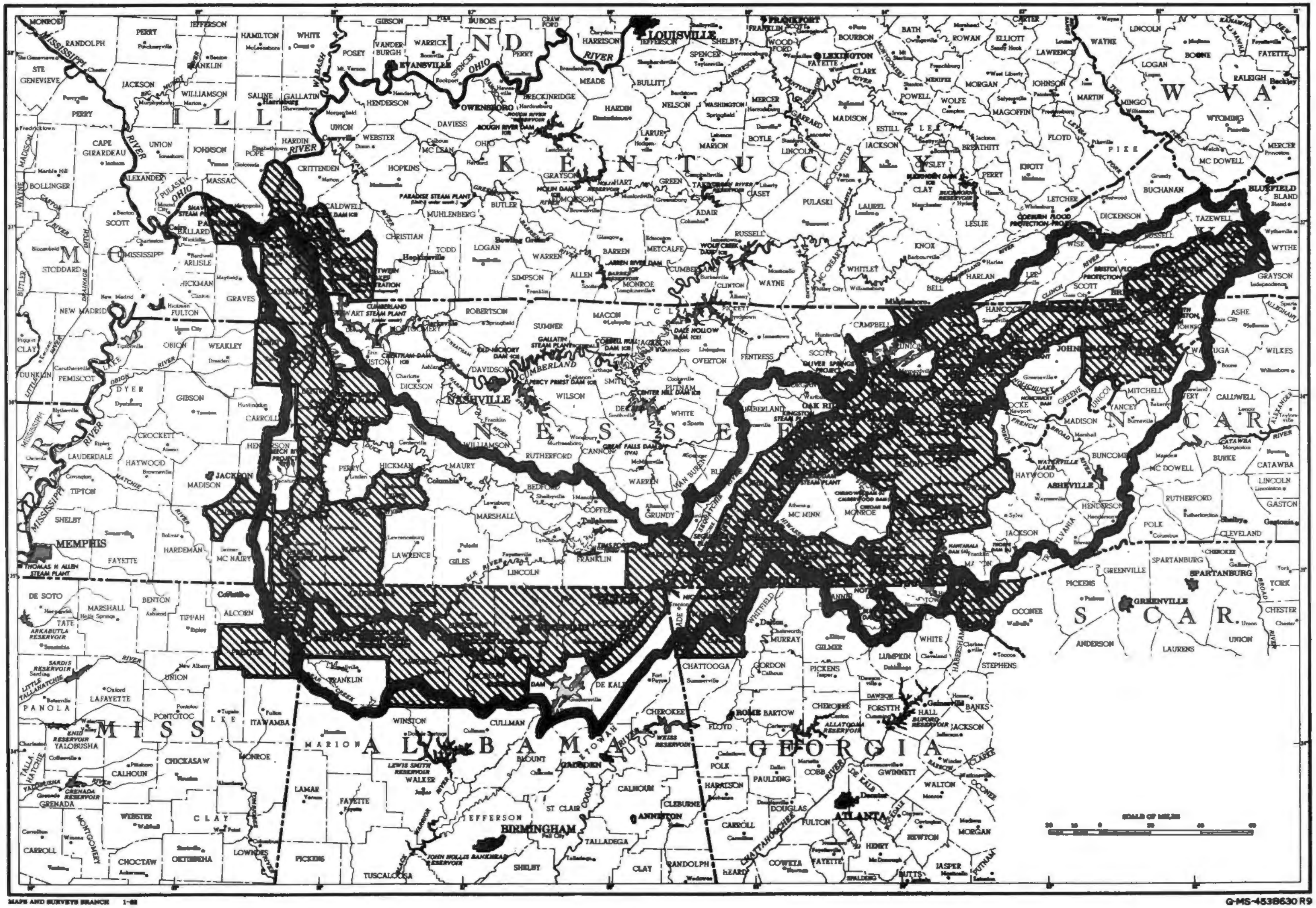

Figure 10. Counties Classified by Discriminant Analysis as TVA Impacted in Programs 1, 2 or 3.

CHAPTER X

ANALYSIS OF PROGRAM 4

Beta-Coefficients Calculated and Compared

In Program 4, the 125 counties under study were divided into TVA and non-TVA counties by applying discriminant analysis for two groups to the counties as delineated in Program 1. In ranking the counties by discriminant analysis, the variables (except TVA Investments) for 1960 were used. The results of the discriminant analysis for Program 4 were recorded in Table 35, page 88. Forty-six counties in this program were classified as TVA counties; the remaining 79 counties were classified as non-TVA counties.

Following the categorizing of counties by discriminant analysis, the data were analyzed by multiple regression. The appropriate coefficients produced by multiple regression analyses were again used as in Programs 1, 2 and 3 to calculate the beta-coefficients as recorded on the following pages in Tables 38 to 47 inclusive.

In Program 4, beta-coefficients were generated, almost without exception, by only two variables. These variables were Time (X_1) and TVA Investments (X_6). Exceptions were evident when five independent variables were regressed on total employment for TVA and non-TVA counties as recorded in Table 39. For TVA counties, Per Capita Income (X_2) also generated beta-coefficients for both the 1940-47 and 1948-63 periods. The beta-coefficients for Per Capita Income (X_2), however, ranked third

TABLE 38

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 4 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	50.67593***	5.20149	1.17173	52.21239***	3.49433	0.99739	-5.04253***
x_3 - TI	0.00433***	0.00038	0.00000	0.01024***	0.00077	0.00000	0.00000
x_4 - TE	0.00000	0.00005	0.00000	-0.01004***	0.00313	-0.00000	100.40000***
x_5 - CIM	-0.00319	0.00506	-0.00000	0.01088*	0.00636	0.00000	-40.20000***
x_6 - TVAI	-5.70499***	2.10636	-0.05342	-0.04867	0.20020	-0.00000	-51.37905***
1948-63							
x_1 - T	33.51233***	1.80651	0.31862	24.61018***	1.06682	0.17358	121.88048***
x_3 - TI	0.00198***	0.00034	0.00000	0.00406***	0.00042	0.00000	0.00000
x_4 - TE	0.00425***	0.00144	0.00000	-0.00001	0.00134	-0.00000	0.00000
x_5 - CIM	-0.00337	0.00219	-0.00000	0.01101***	0.00265	0.00000	0.00000
x_6 - TVAI	3.18026***	1.06002	0.01774	-0.26274***	0.06779	-0.00012	88.01124***

1940-47 $a_1 = -1655.89557$; $R_1^2 = 0.6627$; $\sigma_{y_1} = 224.95864$; $n_1 = 368$

$a_2 = -1750.36523$; $R_2^2 = 0.6452$; $\sigma_{y_2} = 182.92462$; $n_2 = 632$

1948-63 $a_1 = -1015.40617$; $R_1^2 = 0.6332$; $\sigma_{y_1} = 190.00607$; $n_1 = 736$

$a_2 = -595.63441$; $R_2^2 = 0.6177$; $\sigma_{y_2} = 151.25707$; $n_2 = 1264$

TABLE 39

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1940-47 AND 1948-63)

Variable Description	TVA b_1	TVA σ_{b_1}	TVA β_1	Non-TVA b_2	Non-TVA σ_{b_2}	Non-TVA β_2	t-Value
1940-47							
x_1 - T	-9486.38269	6628.00311	-245.73415	-126.47049**	51.30919	-2.80039	-27.08977***
x_2 - PCI	5.86128	59.77989	0.00137	-1.61082***	0.50219	-0.00035	2.39773**
x_3 - TI	0.09936	0.50183	0.00000	0.19804***	0.00764	0.00000	-3.77217***
x_5 - CIM	0.38499	5.75900	0.00000	0.68934***	0.07596	0.00002	-1.01376
x_6 - TVAI	-893.17605	2419.48047	-8.44581	-2.84933	2.53356	-0.00312	-7.05913***
1948-63							
x_1 - T	-728.95868***	48.92674	-7.36193	-334.85301***	24.96349	-2.63516	-203.63745***
x_2 - PCI	2.76009***	0.93814	0.00053	-0.00481	0.59128	-0.00000	72.05890***
x_3 - TI	0.17392***	0.00620	0.00000	0.22937***	0.00642	0.00000	-198.03571***
x_5 - CIM	0.14441***	0.05568	0.00000	0.07742	0.05597	0.00000	25.96511***
x_6 - TVAI	-37.32283	27.15838	-0.20923	2.47983*	1.42853	0.00112	39.72797***

1940-47 $a_1 = 429470.94922$; $R_1^2 = 0.0081$; $\sigma_{y_1} = 255869.09766$; $n_1 = 368$

$a_2 = 9847.74780$; $R_2^2 = 0.8300$; $\sigma_{y_2} = 2317.21460$; $n_2 = 632$

1948-63 $a_1 = 39890.24951$; $R_2^2 = 0.9036$; $\sigma_{y_1} = 4844.59747$; $n_1 = 736$

$a_2 = 19927.11816$; $R_2^2 = 0.8028$; $\sigma_{y_2} = 3172.13776$; $n_2 = 1264$

TABLE 40

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.18407***	0.05197	-0.00218	-0.12001***	0.03199	-0.00267	-21.42475***
x_2 - PCI	0.00042	0.00047	0.00000	-0.00056*	0.00031	-0.00000	0.00000
x_3 - TI	-0.00001	0.00000	-0.00000	0.00002***	0.00000	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00009***	0.00002	-0.00000	0.00000
x_5 - CIM	-0.00000	0.00005	-0.00000	-0.00007	0.00005	-0.00000	0.00000
x_6 - TVAI	0.02467	0.01892	0.00023	0.00053	0.00157	0.00000	24.63265***
1948-60							
x_1 - T	-0.00030	0.01317	-0.00000	0.01706*	0.00995	0.00017	-28.00000***
x_2 - PCI	-0.00155***	0.00021	-0.00000	-0.00229***	0.00021	-0.00000	0.00000
x_3 - TI	-0.00000	0.00000	-0.00000	0.00003***	0.00000	0.00000	0.00000
x_4 - TE	0.00002*	0.00001	0.00000	-0.00004***	0.00001	-0.00000	0.00000
x_5 - CIM	-0.00000	0.00001	-0.00000	-0.00012***	0.00002	-0.00000	0.00000
x_6 - TVAI	-0.00228	0.00566	-0.00001	-0.00045	0.00045	-0.00000	-8.31818***

1940-47 $a_1 = 11.79883$; $R_1^2 = 0.0598$; $\sigma_{y_1} = 2.00043$; $n_1 = 368$

$a_2 = 10.11218$; $R_2^2 = 0.1036$; $\sigma_{y_2} = 1.43784$; $n_2 = 632$

1948-60 $a_1 = 4.10946$; $R_1^2 = 0.1835$; $\sigma_{y_1} = 0.96416$; $n_1 = 598$

$a_2 = 4.03946$; $R_2^2 = 0.2081$; $\sigma_{y_2} = 0.98363$; $n_2 = 1027$

TABLE 41

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	0.22464	0.38822	0.00584	0.39105***	0.10787	0.00870	-8.04302***
x_2 - PCI	-0.00922***	0.00349	-0.00000	-0.01142***	0.00106	-0.00000	12.94117***
x_3 - TI	0.00001	0.00003	0.00000	0.00004*	0.00002	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00037***	0.00008	-0.00000	0.00000
x_5 - CIM	-0.00029	0.00034	-0.00000	-0.00048***	0.00017	-0.00000	0.00000
x_6 - TVAI	0.16764	0.14134	0.00159	-0.00181	0.00531	-0.00000	22.99185***
1948-60							
x_1 - T	0.25948***	0.09782	0.00348	0.04841	0.05118	0.00049	48.97216***
x_2 - PCI	-0.02333***	0.00155	-0.00000	-0.02027***	0.00109	-0.00000	0.00000
x_3 - TI	0.00001	0.00002	0.00000	0.00006***	0.00002	0.00000	0.00000
x_4 - TE	-0.00013*	0.00007	-0.00000	-0.00045***	0.00007	-0.00000	0.00000
x_5 - CIM	-0.00002	0.00010	-0.00000	-0.00000	0.00011	-0.00000	0.00000
x_6 - TVAI	-0.00883	0.04208	-0.00005	-0.00384*	0.00233	-0.00000	-2.90116***

1940-47 $a_1 = 60.87479$; $R_1^2 = 0.0677$; $\sigma_{y_1} = 14.94490$; $n_1 = 368$

$a_2 = 62.06468$; $R_2^2 = 0.4713$; $\sigma_{y_2} = 4.84810$; $n_2 = 632$

1948-60 $a_1 = 70.09293$; $R_1^2 = 0.5216$; $\sigma_{y_1} = 7.16183$; $n_1 = 598$

$a_2 = 81.39051$; $R_2^2 = 0.5686$; $\sigma_{y_2} = 5.06005$; $n_2 = 1027$

TABLE 42

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 4 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.10948	0.12712	-0.00284	-0.06439	0.08846	-0.00143	-6.01250***
x_2 - PCI	0.00913***	0.00114	0.00000	0.00757***	0.00087	0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	-0.00008***	0.00002	-0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	0.00045***	0.00007	0.00000	0.00000
x_5 - CIM	0.00064***	0.00011	0.00000	0.00058***	0.00014	0.00000	0.00000
x_6 - TVAI	0.04362	0.04628	0.00041	-0.00078	0.00435	-0.00000	18.34710***
1948-60							
x_1 - T	0.27179***	0.05305	0.00371	0.17292***	0.04287	0.00175	38.77255***
x_2 - PCI	0.01561***	0.00084	0.00000	0.01630***	0.00092	0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	-0.00010***	0.00002	-0.00000	0.00000
x_4 - TE	0.00011***	0.00004	0.00000	0.00044***	0.00006	0.00000	0.00000
x_5 - CIM	0.00015***	0.00005	0.00000	0.00030***	0.00010	0.00000	0.00000
x_6 - TVAI	0.06447***	0.02282	0.00038	0.00065	0.00195	0.00000	68.62366***

1940-47 $a_1 = 17.02622$; $R_1^2 = 0.4201$; $\sigma_{y_1} = 4.89357$; $n_1 = 368$

$a_2 = 14.11432$; $R_2^2 = 0.4396$; $\sigma_{y_2} = 3.97589$; $n_2 = 632$

1948-60 $a_1 = -4.34452$; $R_1^2 = 0.6853$; $\sigma_{y_1} = 3.88396$; $n_1 = 598$

$a_2 = -0.55567$; $R_2^2 = 0.5757$; $\sigma_{y_2} = 4.23901$; $n_2 = 1027$

TABLE 43

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.12442***	0.06044	-0.00323	-0.24743***	0.03604	-0.00550	35.55202***
x_2 - PCI	0.00447***	0.00054	0.00000	0.00430***	0.00035	0.00000	0.00000
x_3 - TI	-0.00002***	0.00000	-0.00000	0.00002***	0.00001	0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	-0.00002	0.00003	-0.00000	0.00000
x_5 - CIM	0.00026***	0.00005	0.00000	0.00005	0.00006	0.00000	0.00000
x_6 - TVAI	0.00745	0.02200	0.00007	0.00101	0.00177	0.00000	5.64912***
1948-60							
x_1 - T	-0.10760***	0.03255	-0.00147	0.02935	0.03834	0.00030	-43.71508***
x_2 - PCI	0.00947***	0.00051	0.00000	0.00662***	0.00082	0.00000	0.00000
x_3 - TI	0.00001	0.00001	0.00000	0.00002	0.00002	0.00000	0.00000
x_4 - TE	0.00000	0.00002	0.00000	0.00003	0.00005	0.00000	0.00000
x_5 - CIM	-0.00006*	0.00003	-0.00000	-0.00022***	0.00009	-0.00000	0.00000
x_6 - TVAI	-0.02953**	0.01400	-0.00017	0.00281	0.00175	0.00000	-46.87719***

1940-47 $a_1 = 8.74677$; $R_1^2 = 0.3609$; $\sigma_{y_1} = 2.32667$; $n_1 = 368$

$a_2 = 14.63110$; $R_2^2 = 0.4580$; $\sigma_{y_2} = 1.61979$; $n_2 = 632$

1948-60 $a_1 = 5.68083$; $R_1^2 = 0.5889$; $\sigma_{y_1} = 2.38345$; $n_1 = 598$

$a_2 = -0.43408$; $R_2^2 = 0.1777$; $\sigma_{y_2} = 3.79057$; $n_2 = 1027$

TABLE 44

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-1.02687***	0.14009	-0.02771	-1.26096***	0.17950	-0.03273	22.92752***
x_2 - PCI	-0.04052***	0.00163	-0.00001	-0.03401***	0.00217	-0.00001	0.00000
x_3 - TI	0.00004**	0.00002	0.00000	-0.00015***	0.00004	-0.00000	0.00000
x_4 - TE	-0.00000	0.00006	-0.00000	0.00019*	0.00011	0.00000	0.00000
x_5 - CIM	-0.00030***	0.00009	0.00000	0.00030	0.00020	0.00000	0.00000
x_6 - TVAI	0.02403	0.03583	0.00016	0.00191	0.00551	0.00000	11.76596***

$a_1 = 141.14590$; $R_1^2 = 0.8095$; $\sigma_{y_1} = 5.1900$; $n_1 = 368$

$a_2 = 150.58154$; $R_2^2 = 0.6474$; $\sigma_{y_2} = 6.91477$; $n_2 = 632$

TABLE 45

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	0.00724	0.08967	0.00019	0.18605*	0.09735	0.00483	-29.45800***
x_2 - PCI	0.00004	0.00105	0.00000	0.00318***	0.00117	0.00000	0.00000
x_3 - TI	-0.00002**	0.00001	-0.00000	0.00003	0.00002	0.00000	0.00000
x_4 - TE	0.00003	0.00004	0.00000	-0.00005	0.00006	-0.00000	0.00000
x_5 - CIM	0.00012**	0.00006	0.00000	-0.00017	0.00011	-0.00000	0.00000
x_6 - TVAI	0.01087	0.02294	0.00007	0.00079	0.00299	0.00000	8.40000

$a_1 = 28.93466$; $R_1^2 = 0.0334$; $\sigma_{y_1} = 3.32205$; $n_1 = 368$

$a_2 = 15.79165$; $R_2^2 = 0.0457$; $\sigma_{y_2} = 3.75020$; $n_2 = 632$

TABLE 46

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000 - $6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	1.61709***	0.10301	0.04365	1.66880***	0.10760	0.04332	-7.52693***
x_2 - PCI	0.02689***	0.00120	0.00000	0.02233***	0.00130	0.00000	0.00000
x_3 - TI	-0.00004***	0.00001	-0.00000	0.00012***	0.00002	0.00000	0.00000
x_4 - TE	0.00008*	0.00004	0.00000	-0.00023***	0.00007	-0.00000	0.00000
x_5 - CIM	0.00015**	0.00007	0.00000	-0.00009	0.00012	-0.00000	0.00000
x_6 - TVAI	-0.00611	0.02635	-0.00004	-0.00530	0.00330	-0.00000	-0.59124

$a_1 = -98.91639$; $R_1^2 = 0.8240$; $\sigma_{y_1} = 3.81608$; $n_1 = 368$

$a_2 = -98.52964$; $R_2^2 = 0.7738$; $\sigma_{y_2} = 4.14510$; $n_2 = 632$

TABLE 47

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 4 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.59766***	0.05585	-0.01612	-0.59434***	0.06703	-0.01543	-0.84050
x_2 - PCI	0.01356***	0.00065	0.00000	0.00851***	0.00081	0.00000	0.00000
x_3 - TI	0.00002***	0.00001	-0.00000	0.00000	0.00001	0.00000	0.00000
x_4 - TE	-0.00011***	0.00002	-0.00000	0.00009**	0.00004	0.00000	0.00000
x_5 - CIM	0.00003	0.00004	0.00000	-0.00004	0.00007	-0.00000	0.00000
x_6 - TVAI	-0.02877**	0.01429	-0.00019	0.00259	0.00206	0.00000	42.37837***

$a_1 = 28.84503$; $R_1^2 = 0.7378$; $\sigma_{y_1} = 2.06910$; $n_1 = 368$

$a_2 = 32.17660$; $R_2^2 = 0.4176$; $\sigma_{y_2} = 2.58219$; $n_2 = 632$

in importance in estimating the dependent variable. Time (X_1) and TVA Investments (X_6) ranked first and second, respectively. For non-TVA counties, beta-coefficients greater than zero were generated by Per Capita Income (X_2) and Capital Invested in Manufacturing (X_5) for the 1940-47 period. In this case Per Capita Income (X_2) ranked third in importance in estimating the dependent variable while Capital Invested in Manufacturing (X_5) ranked fourth. Time (X_1) and TVA Investments (X_6) again ranked first and second, respectively. This order of ranking of Time (X_1) and TVA Investments (X_6) also appeared to apply in all cases in Program 4 where both of the variables had beta coefficients.

t-Values Calculated and Regression Coefficients Compared

In this part of the study, the regression coefficients for TVA and non-TVA counties, as recorded in Tables 38 to 47, were compared by t-tests. The results of regressing five independent variables on Per Capita Income for both TVA (b_1) and non-TVA (b_2) counties in Program 4 were recorded in Table 38. For the 1940-47 period, the coefficients for four variables for TVA (b_1) and non-TVA (b_2) counties were significantly different. These variables were Time (X_1), Total Employment (X_4), Capital Invested in Manufacturing (X_5) and TVA Investments (X_6).

In the case of the first variable, Time (X_1), the coefficients indicated that per capita income had increased relative to a unit of time for both TVA (b_1) and non-TVA (b_2) counties. The increase, however, had been greater for non-TVA (b_2) counties than for TVA (b_1) counties as seen by the respective coefficients of 52.21239 and 50.67593.

For Total Employment (X_4) the coefficient for TVA (b_1) counties was 0.00000. The corresponding coefficient for non-TVA (b_2) counties was -0.01004. For Capital Invested in Manufacturing (X_5) the respective coefficients were -0.00319 and 0.01088. For TVA Investments (X_6), the coefficients were both negative. The coefficient for TVA (b_1) counties in this case was -5.70499. The corresponding coefficient for non-TVA (b_2) counties was -0.04867.

For the 1948-63 period the coefficients for only two variables were significantly different. For Time (X_1) the coefficient for TVA (b_1) counties was 33.51233. The coefficient for non-TVA (b_2) counties was 24.61018. The coefficients for TVA Investments (X_6) were also significantly different. In this case the coefficient was positive for TVA (b_1) counties (3.18026) and negative for non-TVA (b_2) counties (-0.26274.

A comparison of results of regressing five independent variables on Total Employment for TVA (b_1) and non-TVA (b_2) counties was recorded in Table 39. In the first part of this table (1940-47) four coefficients were significantly different. The first of these was Time (X_1). This coefficient was negative for both TVA (b_1) (-9486.38269) and non-TVA (b_2) counties (-126.47049). The coefficients for Per Capita Income (X_2) differed in sign and were therefore significantly different. The respective coefficients for this variable were 5.86128 and -1.61082. In the case of Total Income (X_3), the coefficients for TVA (b_1) and non-TVA (b_2) counties were both positive. In this case, however, the

coefficient was greater for the latter category of counties (0.19804) as compared to TVA (b_1) counties (0.09936). The coefficients for the fourth variable TVA Investments (X_6) were negative for both categories of counties. For TVA (b_1) counties the coefficient was -893.17605. The corresponding coefficient for non-TVA (b_2) counties was -2.84933.

For the 1948-63 period, the coefficients for TVA (b_1) and non-TVA (b_2) counties were significantly different for all five variables under study. For Time (X_1), the coefficient for TVA (b_1) counties was -728.95868. The corresponding coefficient for non-TVA (b_2) counties was -334.85301. For Per Capita Income (X_2), Total Income (X_3), Capital Invested in Manufacturing (X_5) and TVA Investments (X_6) the respective coefficients were 2.76009 and -0.17392, o.14441 and 0.07742 and -37.32283 and 2.47983.

When six independent variables were regressed on percentage of population 25 years and over who completed no school for TVA (b_1) and non-TVA (b_2) counties, the coefficients for two variables were significantly different in both periods under study. These variables were Time (X_1) and TVA Investments (X_6). For 1940-47 the coefficients for Time (X_1) for TVA (b_1) and non-TVA (b_2) counties were -0.18407 and -0.12001 respectively. The respective coefficients for TVA Investments (X_6) were 0.02467 and 0.00053. For 1948-60 the respective coefficients for the two variables were -0.00030 and 0.01706 and -0.00228 and -0.00045 as recorded in Table 40, page 114.

Table 41, page 115, showed the results of comparing the regression coefficients of TVA (b_1) and non-TVA (b_2) counties when the percentage of

total population 25 years and over who completed 1-8 years of elementary school was the dependent variable. For the 1940-47 period, the coefficients for three variables were significantly different. These variables and their respective coefficients were Time (X_1) (0.22464 and 0.39105). Per Capita Income (X_2) (-0.00922 and -0.01142) and TVA Investments (X_6) (0.16764 and -0.00181). For 1948-60, the coefficients for TVA (b_1) and non-TVA (b_2) counties were significantly different for only two variables. These variables were Time (X_1) and TVA Investments (X_6). The respective coefficients for these two variables were 0.25948 and 0.04841 and -0.00883 and -0.00384.

When the percentage of total population 25 years and over who completed 1-4 years of high school was the dependent variable, the coefficients for only two variables were significantly different in both periods. These variables were Time (X_1) and TVA Investments (X_6) as seen in Table 42, page 116. The same variables were also the only variables significantly different for both periods when the dependent variable was the percentage of total population 25 years and over who completed 1-4 years or more of college as seen in Table 43, page 117. The respective coefficients for TVA (b_1) and non-TVA (b_2) counties in these two cases were -0.10948 and -0.06439, 0.04362 and -0.00078, 0.27179 and 0.17292, 0.06447 and 0.00065, -0.12442 and 0.24743, 0.00745 and 0.00101, -0.10760 and 0.02935 and -0.02953 and 0.00281.

Tables 44 and 45, pages 118 and 119, showed the results of comparing the regression coefficients of TVA (b_1) and non-TVA (b_2) counties

when the percentage of total consumer units in income category of $0-$2499 and $2500-$3999 were the dependent variables. The coefficients for two variables, namely Time (X_1) and TVA Investments (X_6) again differed significantly. As seen in Table 44, the coefficients for Time (X_1) were both negative. They were -1.02687 and -1.26096. The coefficients for TVA Investments (X_6) (on the same table) were 0.02403 and 0.00191. The corresponding coefficients in Table 45 were 0.00724 and 0.18605 and 0.01087 and 0.00079.

When six corresponding independent variables were regressed on percentage of total consumer units in income categories of $4000-$6999 and $7000 and over for TVA ($b_1$) and non-TVA ($b_2$) counties, the coefficients for one variable were significantly different. For the former case, this variable was Time (X_1) with coefficients of 1.61709 and 1.66880 as seen in Table 46, page 120. For the latter case this variable was TVA Investments (X_6) with coefficients of -0.02877 and 0.00259 as seen in Table 47, page 121.

Comments on Analysis of Program 4

In Program 4, the delineation of TVA and non-TVA counties was conducted in an objective manner, namely, by discriminant analysis for two groups. According to the means of the two groups, as calculated by discriminant analysis for 1960, the variables for the two categories of counties were significantly different. The analysis of data, therefore, could have been expected to produce different results for the two categories of counties. This proved to be the case for some variables when

the data were analyzed by multiple regression analysis. This was not the case, however, when the beta coefficients were calculated.

In the calculation of beta-coefficients, two variables generated coefficients greater than zero fairly consistently for both TVA and non-TVA counties. These variables were Time (X_1) and TVA Investments (X_6) with the coefficients for the former variable consistently being greater than the coefficient for the latter variable. In cases where other variables also generated beta coefficients greater than zero, as did Per Capita Income (X_2) and Capital Invested in Manufacturing (X_5), when Total Employment was the dependent variable, the magnitude of these coefficients was substantially less than the magnitude of coefficients for Time (X_1) and TVA Investments (X_6) as seen in Table 39, page 113.

In the examination by multiple regression analysis of the income and employment benefits in TVA as compared to non-TVA counties, the period under consideration appeared to be an important factor. Differences in per capita income between the two categories of counties were evident for both periods under study. For the 1940-47 period, changes in per capita income relative to time were greater for non-TVA than for TVA counties. This situation was reversed for the 1948-63 period. Also for the 1940-47 period TVA Investments were associated with negative changes in per capita income for both categories of counties with the absolute changes being greater for TVA than for non-TVA counties. In the 1948-63 period, TVA Investments were associated with positive changes in per capita income for TVA counties and negative changes in the same variable for non-TVA counties. These results were recorded in Table 38, page 112.

Differences in changes in total employment were also evident for the two categories of counties. For both periods under study, the changes in employment were negative relative to time. Also, for both periods under study the absolute changes in employment were greater for TVA than for non-TVA counties. In the case of TVA Investments, the relationship between this variable and Total Employment was negative for the 1940-47 period for both categories of counties. For the 1948-63 period, the relationship between these two variables was negative for TVA counties only. Employment in non-TVA counties was positively related to TVA Investments. For Capital Invested in Manufacturing the coefficients were positive for both TVA and non-TVA counties in the 1948-63 period. The changes in Total Employment relative to this variable were significantly greater for TVA than for non-TVA counties as seen in Table 39.

In regard to the analysis on the percentage of population in the different educational levels, two relationships of particular interest pertaining to the welfare aspects appeared. The first of these relationships involved the percentage of population who had completed no school. For 1940-47, the coefficients for Time in TVA and non-TVA counties were both negative. The corresponding coefficients were both positive for TVA Investments. In both cases the coefficients were absolutely greater for TVA than for non-TVA counties. For 1948-60 this was not the case. The coefficient for Time was negative for TVA counties and positive for non-TVA counties. For TVA Investments, however, the coefficients were

both negative with the coefficients for TVA counties being absolutely greater than the coefficients for non-TVA counties.

The other relationship of particular interest was found for the 1948-60 period when the percentage of population who had completed 1-4 or more years of college was the dependent variable. In this case the coefficients were negative for TVA counties for both variables Time and TVA Investments. The corresponding coefficients for non-TVA counties, however, were both positive. These results pertaining to education were recorded in Table 43, page 117.

The welfare aspects of Program 4, as related to the percentage of population in the four different income categories were recorded in Tables 44 to 47, pages 118 to 121, inclusive. In this part of the study it was found that a decrease in the income category of $0-$2499 had occurred relative to Time for both TVA and non-TVA counties. The decrease was greater, however for non-TVA counties. This dependent variable proved to be positively related, on the other hand, relative to TVA Investments for both categories of counties. The coefficient in this case was greater for TVA than for non-TVA counties. The percentage of population in the $7000 and over income category, however, was negatively related to TVA Investments in TVA counties and positively related to the same variable in non-TVA counties.

The coefficients of determination (R^2) for Program 4, as recorded in Tables 38 to 47, pages 112 to 121, inclusive ranged from 0.0081 and 0.9036 for different functions. Seventeen of the 32 coefficients of determination in this program were greater than 0.5000.

CHAPTER XI

ANALYSIS OF PROGRAM 5

Beta-Coefficients Calculated and Compared

Before the beta-coefficients in Program 5 could be calculated, the counties had to be delineated and the data analyzed by multiple regression analysis. The counties were delineated by subjecting the 1960 TVA and non-TVA variables (except TVA Investments) of Program 2 to a discriminant analysis for two groups. The ranking of counties by discriminant analysis was recorded in Table 36, page 95. Thirty-three counties were ranked as TVA counties. The remaining 97 counties were ranked as non-TVA. The analysis of data by multiple regression analysis was again conducted. From this analysis, the appropriate regression coefficients and standard errors of estimates were used to calculate the beta coefficients as recorded in Tables 48 to 57 inclusive.

In Program 5, the pattern of beta-coefficients generated showed that the variables Time (X_1) and TVA Investments (X_6) were again of primary importance, as compared to the other variables, in estimating the dependent variables. In a few cases as in Tables 49, 54 and 56 the variables of Per Capita Income (X_2) and Capital Invested in Manufacturing (X_5) also had beta coefficients greater than zero. In all cases, however, Time (X_1) was the variable with the greatest absolute beta-coefficients. The beta-coefficients of TVA Investments (X_6) ranked second in absolute magnitude.

TABLE 48

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 5 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	51.81698***	6.09467	1.40875	59.96619***	3.59179	1.04025	-20.48673***
x_3 - TI	0.00575***	0.00053	0.00000	0.00407***	0.00061	0.00000	0.00000
x_4 - TE	0.00001	0.00005	0.00000	0.00037	0.00311	0.00000	0.00000
x_5 - CIM	-0.01611***	0.00605	-0.00000	0.01729***	0.00652	0.00000	-79.52380***
x_6 - TVAI	-3.72626	2.57587	-0.04282	0.36256*	0.20609	0.00036	-25.76121***
1948-63							
x_1 - T	33.53552***	2.18027	0.39382	27.00101***	1.03170	0.17329	66.25948***
x_3 - TI	0.00539***	0.00059	0.00000	0.00044	0.00027	0.00000	0.00000
x_4 - TE	0.00231	0.00223	0.00000	0.00550***	0.00101	0.00000	0.00000
x_5 - CIM	-0.02487***	0.00333	-0.00000	0.02072***	0.00232	0.00000	-325.64285***
x_6 - TVAI	2.68754**	1.32575	0.01910	-0.24358***	0.06562	-0.00009	50.78170***

1940-47 $a_1 = -1717.50677$; $R_1^2 = 0.6550$; $\sigma_{y_1} = 224.17487$; $n_1 = 264$

$a_2 = -2096.12265$; $R_2^2 = 0.5902$; $\sigma_{y_2} = 207.05183$; $n_2 = 736$

1948-63 $a_1 = -1057.92139$; $R_1^2 = 0.6522$; $\sigma_{y_1} = 186.51011$; $n_1 = 528$

$a_2 = -702.44701$; $R_2^2 = 0.6188$; $\sigma_{y_2} = 160.74997$; $n_2 = 1472$

TABLE 49

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 5 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	(1)	9270.23413	--	-225.09143***	49.49081	-4.52636	-- ***
x_2 - PCI	14.82098	84.01593	0.00411	0.05223	0.43994	0.00000	2.85616***
x_3 - TI	-0.06557	0.85953	-0.00000	0.15315***	0.00484	0.00000	-4.13459***
x_5 - CIM	1.61911	8.27430	0.00004	1.01537***	0.06818	0.00002	1.18555
x_6 - TVAI	-997.96214	3489.85590	-11.51163	-2.90859	2.45252	-0.00289	-4.63277***
1948-63							
x_1 - T	-585.13594***	44.73574	-7.15607	-480.35821***	29.35357	-3.43387	-50.08951***
x_2 - PCI	0.88882	0.85754	0.00020	3.59027***	0.66053	0.00057	-65.72871***
x_3 - TI	0.18163***	0.00953	0.00000	0.18881***	0.00500	0.00000	-17.09524***
x_5 - CIM	0.16900**	0.06832	0.00000	-0.03169	0.06086	-0.00000	59.55192***
x_6 - TVAI	-52.71066**	26.00135	-0.37467	3.60622**	1.68153	0.00148	-49.73188***

1940-47 $a_1 = 590229.62500$; $R_1^2 = 0.0098$; $\sigma_{y_1} = 302541.21875$; $n_1 = 264$

$a_2 = 13457.48669$; $R_2^2 = 0.9163$; $\sigma_{y_2} = 2461.12396$; $n_2 = 736$

1948-63 $a_1 = 33142.43115$; $R_1^2 = 0.9307$; $\sigma_{y_1} = 3657.94006$; $n_1 = 528$

$a_2 = 25893.27124$; $R_2^2 = 0.8333$; $\sigma_{y_2} = 4106.22119$; $n_2 = 1472$

TABLE 50

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.09016**	0.04389	-0.00277	-0.17660***	0.03513	-0.00360	28.90970***
x_2 - PCI	-0.00078***	0.00040	-0.00000	0 00010	0.00031	0.00000	0.00000
x_3 - TI	0.00000	0.00000	0.00000	0.00001*	0.00001	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00007***	0.00003	-0.00000	0.00000
x_5 - CIM	-0.00003	0.00004	-0.00000	-0.00001	0.00005	-0.00000	0.00000
x_6 - TVAI	0.04394***	0.01646	0.00050	-0.00029	0.00172	-0.00000	43.79207***
1948-60							
x_1 - T	0.03990**	0.01665	0.00051	-0.00490	0.00918	-0.00005	53.33333***
x_2 - PCI	-0.00233***	0.00026	-0.00000	-0.00167***	0.00018	-0.00000	0.00000
x_3 - TI	0.00001**	0.00000	0.00000	0.00001**	0.00000	0.00000	0.00000
x_4 - TE	0.00001	0.00002	0.00000	0.00001**	0.00000	0.00000	0.00000
x_5 - CIM	-0.00006***	0.00002	-0.00000	0.00000	0.00001	-0.00000	0.00000
x_6 - TVAI	-0.01252*	0.00725	-0.00009	0.00013	0.00041	0.00000	-36.14285***

1940-47 $a_1 = 8.00735$; $R_1^2 = 0.1032$; $\sigma_{y_1} = 1.42693$; $n_1 = 264$

$a_2 = 12.28405$; $R_2^2 = 0.0740$; $\sigma_{y_2} = 1.72288$; $n_2 = 736$

1948-60 $a_1 = 2.53064$; $R_1^2 = 0.2251$; $\sigma_{y_1} = 0.99175$; $n_1 = 429$

$a_2 = 4.69075$; $R_2^2 = 0.1848$; $\sigma_{y_2} = 0.98516$; $n_2 = 1196$

TABLE 51

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	0.11239	0.54205	0.00345	0.44294***	0.09788	0.00903	-9.84952***
x_2 - PCI	-0.00901*	0.00489	-0.00000	-0.01264***	0.00086	-0.00000	12.10000***
x_3 - TI	0.00003	0.00005	0.00000	0.00007***	0.00001	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00031***	0.00007	-0.00000	0.00000
x_5 - CIM	-0.00045	0.00048	-0.00000	-0.00056***	0.00015	-0.00000	0.00000
x_6 - TVAI	0.16320	0.20330	0.00188	0.00090	0.00479	0.00000	12.97362***
1948-60							
x_1 - T	0.43757***	0.13224	0.00734	0.03710	0.04683	0.00034	61.32772***
x_2 - PCI	-0.02355***	0.00210	-0.00000	-0.02054***	0.00093	-0.00000	-30.10000***
x_3 - TI	-0.00003	0.00003	-0.00000	0.00006***	0.00001	0.00000	0.00000
x_4 - TE	0.00000	0.00019	0.00000	-0.00031***	0.00009	-0.00000	0.00000
x_5 - CIM	0.00015	0.00019	0.00000	-0.00031***	0.00009	-0.00000	0.00000
x_6 - TVAI	0.07352	0.05761	0.00053	-0.00269	0.00211	-0.00000	27.41366***

1940-47 $a_1 = 65.36024$; $R_1^2 = 0.0425$; $\sigma_{y_1} = 17.62142$; $n_1 = 264$

$a_2 = 59.32288$; $R_2^2 = 0.4997$; $\sigma_{y_2} = 4.80007$; $n_2 = 736$

1948-60 $a_1 = 60.94417$; $R_1^2 = 0.4742$; $\sigma_{y_1} = 7.87516$; $n_1 = 429$

$a_2 = 81.43950$; $R_2^2 = 0.6127$; $\sigma_{y_2} = 5.02419$; $n_2 = 1196$

TABLE 52

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 5 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.17685	0.16608	-0.00543	-0.05849	0.07887	-0.00119	-11.13452***
x_2 - PCI	0.01073	0.00150	0.00000	0.00795***	0.00069	0.00000	0.00000
x_3 - TI	-0.00005	0.00002	-0.00000	-0.00009***	0.00001	-0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	0.00037***	0.00006	0.00000	0.00000
x_5 - CIM	0.00007	0.00015	0.00000	0.00057***	0.00012	0.00000	0.00000
x_6 - TVAI	0.08337	0.06229	0.00096	-0.00241	0.00386	-0.00000	22.33854***
1948-60							
x_1 - T	0.25569***	0.06762	0.00429	0.18677***	0.03854	0.00174	19.97681***
x_2 - PCI	0.01484***	0.00107	0.00000	0.01608***	0.00077	0.00000	0.00000
x_3 - TI	0.00000	0.00002	0.00000	-0.00008***	0.00001	-0.00000	0.00000
x_4 - TE	0.00005	0.00006	0.00000	0.00028***	0.00004	0.00000	0.00000
x_5 - CIM	0.00001	0.00010	0.00000	0.00052***	0.00008	0.00000	0.00000
x_6 - TVAI	0.01649	0.02946	0.00011	0.00010	0.00174	0.00000	11.54225***

1940-47 $a_1 = 18.31289$; $R_1^2 = 0.3997$; $\sigma_{y_1} = 5.39902$; $n_1 = 264$

$a_2 = 14.48907$; $R_2^2 = 0.4556$; $\sigma_{y_2} = 3.86761$; $n_2 = 736$

1948-60 $a_1 = -3.24720$; $R_1^2 = 0.6608$; $\sigma_{y_1} = 4.02714$; $n_1 = 429$

$a_2 = -0.61336$; $R_2^2 = 0.6124$; $\sigma_{y_2} = 4.13436$; $n_2 = 1196$

TABLE 53

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 5 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	-0.16871**	0.07587	-0.00519	-0.25231***	0.03354	-0.00515	17.30849***
x_2 - PCI	0.00546***	0.00068	0.00000	0.00460***	0.00029	0.00000	0.00000
x_3 - TI	-0.00004***	0.00001	-0.00000	0.00000	0.00000	0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	-0.00000	0.00002	-0.00000	0.00000
x_5 - CIM	0.00042***	0.00007	0.00000	0.00100	0.00005	0.00000	0.00000
x_6 - TVAI	0.00814	0.02845	0.00009	0.00100	0.00164	0.00000	4.08000***
1948-60							
x_1 - T	-0.19895***	0.03960	-0.00334	0.03846	0.03369	0.00036	-110.93925***
x_2 - PCI	0.01108***	0.00063	0.00000	0.00634***	0.00067	0.00000	0.00000
x_3 - TI	0.00002*	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000
x_4 - TE	-0.00006	0.00004	-0.00000	0.00004	0.00003	0.00000	0.00000
x_5 - CIM	-0.00005	0.00006	-0.00000	-0.00015**	0.00007	-0.00000	0.00000
x_6 - TVAI	-0.04071**	0.01725	-0.00030	0.00125	0.00152	0.00000	-50.55421***

1940-47 $a_1 = 9.92409$; $R_1^2 = 0.3664$; $\sigma_{y_1} = 2.46635$; $n_1 = 264$

$a_2 = 14.02291$; $R_2^2 = 0.4651$; $\sigma_{y_2} = 1.64453$; $n_2 = 736$

1948-60 $a_1 = 8.76992$; $R_1^2 = 0.6433$; $\sigma_{y_1} = 2.35843$; $n_1 = 429$

$a_2 = -0.35438$; $R_2^2 = 0.2189$; $\sigma_{y_2} = 3.61434$; $n_2 = 1196$

TABLE 54

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.99772***	0.18802	-0.03354	-1.05947	0.13927	-0.02177	4.87757***
x_2 - PCI	-0.03999***	0.00217	-0.00002	-0.03840***	0.00187	-0.00001	-15.90000***
x_3 - TI	0.00003	0.00003	0.00000	0.00000	0.00002	0.00000	0.00000
x_4 - TE	0.00004	0.00011	0.00000	-0.00003	0.00007	-0.00000	0.00000
x_5 - CIM	-0.00027	0.00017	-0.00000	-0.00013	0.00016	-0.00000	0.00000
x_6 - TVAI	0.04397	0.04879	0.00038	0.00254	0.00418	0.00000	13.81000***

$a_1 = 139.24060$; $R_1^2 = 0.7947$; $\sigma_{y_1} = 5.59301$; $n_1 = 264$

$a_2 = 141.85541$; $R_2^2 = 0.6685$; $\sigma_{y_2} = 6.77867$; $n_2 = 736$

TABLE 55

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	0.17026	0.11553	0.00572	0.05246	0.07441	0.00108	15.45932***
x_2 - PCI	0.00014	0.00133	0.00000	0.00431***	0.00100	0.00000	0.00000
x_3 - TI	-0.00008***	0.00002	-0.00000	-0.00000	0.00001	-0.00000	0.00000
x_4 - TE	0.00012*	0.00006	0.00000	0.00001	0.00004	0.00000	0.00000
x_5 - CIM	0.00037***	0.00011	0.00000	-0.00016	0.00008	-0.00000	0.00000
x_6 - TVAI	0.06404**	0.02998	0.00056	-0.00053	0.00223	-0.00000	35.09239***

$a_1 = 20.13088$; $R_1^2 = 0.1019$; $\sigma_{y_1} = 3.43663$; $n_1 = 264$

$a_2 = 22.55463$; $R_2^2 = 0.0378$; $\sigma_{y_2} = 3.62183$; $n_2 = 736$

TABLE 56

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	1.58781***	0.13352	0.05338	1.56012***	0.08619	0.03205	3.14302***
x_2 - PCI	0.02632***	0.00154	0.00001	0.02485***	0.00115	0.00000	0.00000
x_3 - TI	-0.00000	0.00002	-0.00000	-0.00001	0.00001	-0.00000	0.00000
x_4 - TE	0.00005	0.00007	0.00000	0.00001	0.00004	0.00000	0.00000
x_5 - CIM	-0.00008	0.00012	-0.00000	0.00018*	0.00010	0.00000	0.00000
x_6 - TVAI	-0.04694	0.03465	-0.00041	-0.00502*	0.00259	-0.00000	-19.68075***

$a_1 = -97.34538$; $R_1^2 = 0.8216$; $\sigma_{y_1} = 3.97178$; $n_1 = 264$

$a_2 = -94.01831$; $R_2^2 = 0.7744$; $\sigma_{y_2} = 4.19514$; $n_2 = 736$

TABLE 57

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 5 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.76028***	0.07120	-0.02556	-0.55342***	0.05178	-0.01132	-43.27615***
x_2 - PCI	0.01353***	0.00082	0.00000	0.00926***	0.00069	0.00000	0.00000
x_3 - TI	0.00005***	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000
x_4 - TE	-0.00022***	0.00004	-0.00000	0.00001	0.00002	0.00000	0.00000
x_5 - CIM	-0.00002	0,00007	-0.00000	0.00011*	0.00006	0.00000	0.00000
x_6 - TVAI	-0.06108***	0.01847	-0.00053	0.00302*	0.00156	0.00000	-56.22807***

$a_1 = 37.96893$; $R_1^2 = 0.7567$; $\sigma_{y_1} = 2.11791$; $n_1 = 264$

$a_2 = 29.61769$; $R_2^2 = 0.4723$; $\sigma_{y_2} = 2.52024$; $n_2 = 736$

t-Values Calculated and Regression Coefficients Compared

The coefficients for the equations in which Per Capita Income was the dependent variable for TVA (b_1) and non-TVA (b_2) counties were the first to be compared by t-tests in Program 5. The results of this analysis were recorded in Table 48. As seen on this table, the coefficients for three variables were significantly different for TVA (b_1) and non-TVA (b_2) counties for both periods under study. These variables and their respective coefficients for 1940-47 were Time (X_1) (51.81698 and 59.96619), Capital Invested in Manufacturing (X_5) (0.01611 and 0.01729), and TVA Investments (X_6) (-3.72626 and 0.36256). The respective coefficients for the corresponding variables for 1948-63 were 33.53552 and 27.00101, -0.02487 and 0.02072 and 2.68754 and -0.24358.

When Total Employment was the dependent variable the coefficients for four variables during the 1940-47 period were significantly different for TVA (b_1) and non-TVA (b_2) counties. For the variable Time (X_1), the coefficient was too large for computer print-out capacity. A ten digit number (the limit of the computer point-out capacity) was therefore assumed to have been the coefficient calculated for the variable Time (X_1). Under the assumption, the coefficients for Time (X_1) for TVA (b_1) and non-TVA (b_2) counties were rendered significantly different. The other variables which were significantly different for TVA (b_1) and nonOTVA (b_2) counties were Per Capita Income (X_2), Total Income (X_3) and TVA Investments (X_6). The respective coefficients, as seen in Table 49, for these variables were 14.82098 and 0.05223, -0.6557 and 0.15315 and -997.96214 and -2.90859.

For the 1948-63 period all the variables in the analysis where Total Employment was the dependent variable were significantly different. These variables and their respective coefficients were Time (X_1) (-585.13594 and -480.35821), Per Capita Income (X_2) (0.88882 and 3.59027), Total Income (X_3) (0.18163 and 0.18881), Capital Invested in Manufacturing (X_5) (0.16900 and -0.03169) and TVA Investments (X_6) (-52.71066 and 3.60622).

Table 50, page 133, showed the results of comparing the coefficients for TVA (b_1) and non-TVA (b_2) counties when the percentage of population 25 years and over who completed no school was the dependent variable. In the two periods under study, only two variables had coefficients which were significantly different. These variables were Time (X_1) and TVA Investments (X_6). For 1940-47, the coefficients for the first variable were negative for both TVA (b_1) and non-TVA (b_2) counties. They were -0.09016 and -0.17660 respectively. The corresponding coefficients for TVA Investments (X_6) were 0.04394 and -0.00029. For 1948-60 the coefficients for these variables were of opposite signs. The coefficients for Time (X_1) were 0.03990 and -0.00490 while the coefficients for TVA Investments (X_6) were -0.01252 and 0.00013.

Three variables had coefficients which were significantly different in both periods under study when the percentage of population 25 years and over who completed 1-8 years elementary school was the dependent variable. These variables, as seen in Table 51, page 134, were Time (X_1), Per Capita Income (X_2) and TVA Investments (X_6). The

respective TVA (b_1) and non-TVA (b_2) coefficients for 1940-47 were 0.11239 and 0.44294, -0.00901 and -0.01264 and 0.16320 and 0.00090. For 1948-60 the corresponding coefficients were 0.43757 and 0.03710, -0.02355 and -0.02054 and 0.07352 and -0.00269.

Tables 52 and 53, pages 135 and 136, showed the results of the analysis when the percentages of population who had completed at least one year of college were the respective dependent variables. In both tables and for both periods, the coefficients for two variables were significantly different for TVA (b_1) and non-TVA (b_2) counties. These variables were Time (X_1) and TVA Investments (X_6). The respective coefficients for the two periods on the first table were -0.17685 and -0.05849, 0.08337 and -0.00241, 0.25569 and 0.18677 and 0.01649 and 0.00010. In Table 49, page 132, the corresponding coefficients for 1940-47 were -0.16871 and -0.25231 and 0.00814 and 0.00100. For 1948-60 the coefficients for the two variables were both negative for TVA (b_1) counties and positive for non-TVA (b_2) counties. The respective coefficients were -0.19895 and -0.04071 and 0.03846 and 0.00125.

The analysis by t-test of coefficients for TVA (b_1) and non-TVA (b_2) counties when the percentage of total consumer units in income category of \$0-\$2499 was the dependent variable showed that the coefficients for three variables were significantly different. For the first of these variables, Time (X_1), the coefficients for both categories of counties were negative. In absolute terms, however, the coefficient for non-TVA (b_2) counties was larger than the coefficient for TVA (b_1)

counties. The respective coefficients were -1.05947 and -0.99772. For the second variable, Per Capita Income (X_2), the coefficients for TVA (b_1) counties (-0.03999) and non-TVA (b_2) counties (-0.03840) were again negative. For the third variable, TVA Investments (X_6), the coefficients were positive for both categories of counties with the former counties having a larger coefficient (0.04397) than the latter counties (0.00254). These results were recorded in Table 54, page 137.

Tables 55, 56, and 57, pages 138, 139, and 140, showed the results of comparing the coefficients between TVA (b_1) and non-TVA (b_2) counties when the respective dependent variables were the percentage of total consumer units in income categories of $2500-$3999, $4000-$6999 and $7000 and over. For all three cases the variable of Time (X_1) and TVA Investments (X_6) had coefficients for the two categories of counties which were significantly different. The respective coefficients were 0.17026 and 0.05246, 0.06404 and -0.00053, 1.58781 and 1.56012, -0.04694 and -0.00502, -0.76028 and -0.55342 and -0.06108 and 0.00302.

Comments on Analysis of Program 5

In the analysis of Program 5, results were obtained in which certain patterns appeared. The analysis on beta-coefficients again ranked Time (X_1) and TVA Investments (X_6) as first and second, respectively, in importance in estimating the dependent variable. These two variables were also the variables which had beta-coefficients greater than zero most consistently.

The analysis by t-test suggested that increase in per capita income over a period were greater for non-TVA counties than for TVA counties for the first period under study. For 1948-63 this trend was reversed. It was also found that decreases in employment was greater for TVA counties for both periods under study. TVA Investments, on the other hand, were found to be associated over time with a decrease in the percentage of population in the lowest and the highest educational categories in TVA counties. TVA Investments were also found to be associated with an increase in the percentage of population in the lowest income category in TVA and non-TVA counties and decreases in the percentage of population in the highest income category for TVA counties.

The coefficients of determination (R^2) for Program 5 ranged from 0.0098 to 0.9307 as seen on Tables 48 to 57, pages 131 to 140, inclusive. Of the thirty-two coefficients of determination in Program 5, sixteen were greater than, and sixteen were less than 0.5000.

CHAPTER XII

ANALYSIS OF PROGRAM 6

Beta-Coefficients Calculated and Compared

The delineation of counties in Program 6 was conducted by a discriminant analysis for two groups. The data analyzed by discriminant analysis to accomplish the delineation were representative of the 1960 TVA and non-TVA variables (except TVA Investments) of Program 3. Table 37, page 100, showed the counties as delineated for Program 6 in which 47 counties were classified as TVA counties and 78 as non-TVA counties.

Following the delineation of counties, the data were analyzed by multiple regression analysis. From these data were chosen the appropriate coefficients and standard errors used to calculate the beta coefficients recorded in Tables 58 to 67. The beta-coefficients in the tables were characterized by coefficients greater than zero for primarily two variables, namely, Time (X_1) and TVA Investments (X_6). Without exception the beta-coefficients for Time (X_1) were greater than the beta-coefficients for TVA Investments (X_6) in cases where both variables had coefficients in common function. Per Capita Income (X_2) and Capital Invested in Manufacturing (X_5) also had beta-coefficients greater than zero in some cases when total employment and the percentage of total consumer units in income category of $0-$2499 were the dependent variables as recorded in Tables 59 to 64.

TABLE 58

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON PER CAPITA INCOME FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 6 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	52.16468***	4.98446	1.18835	60.91476***	3.86484	1.13835	-29.18639***
x_3 - TI	0.00432***	0.00040	0.00000	0.00473***	0.00064	0.00000	0.00000
x_4 - TE	0.00001	0.00004	0.00000	0.00788**	0.00321	0.00000	0.00000
x_5 - CIM	0.00278	0.00570	0.00000	-0.01684***	0.00626	-0.00000	53.02702***
x_6 - TVAI	-5.06546**	2.04502	-0.04734	0.42646*	0.22393	0.00046	-349.80382***
1948-63							
x_1 - T	32.12628	1.79054	0.30713	28.65726***	1.12443	0.19493	47.75633***
x_3 - TI	0.00155***	0.00038	0.00000	0.00267***	0.00042	0.00000	0.00000
x_4 - TE	0.00377**	0.00163	0.00000	0.00500***	0.00127	0.00000	0.00000
x_5 - CIM	0.00869***	0.00288	0.00000	-0.00569**	0.00245	-0.00000	143.80000***
x_6 - TVAI	3.08778***	1.14398	0.01886	-0.04808	0.07329	-0.00002	75.07445***

1940-47 $a_1 = -1741.14449$; $R_1^2 = 0.5842$; $\sigma_{y_1} = 218.80170$; $n_1 = 377$

$a_2 = -2160.48672$; $R_2^2 = 0.6296$; $\sigma_{y_2} = 206.81253$; $n_2 = 623$

1948-63 $a_1 = -964.93644$; $R_1^2 = 0.6203$; $\sigma_{y_1} = 187.29396$; $n_1 = 752$

$a_2 = -807.83681$; $R_2^2 = 0.5889$; $\sigma_{y_2} = 165.30968$; $n_2 = 1248$

TABLE 59

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR FIVE VARIABLES REGRESSED ON TOTAL EMPLOYMENT FOR TVA - NON-TVA COUNTIES AND t-VALUES
PROGRAM 6 (1940-47 AND 1948-63)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-9382.31018	6535.97198	-242.57500	-215.84901***	56.42593	-4.72155	-27.23030***
x_2 - PCI	10.03588	59.98185	0.00238	1.22620**	0.49971	0.00023	2.85168***
x_3 - TI	0.06858	0.53202	0.00000	0.13194***	0.00641	0.00000	-2.31241***
x_5 - CIM	0.73120	6.59138	0.00001	0.84650***	0.07071	0.00002	-0.33963
x_6 - TVAI	-825.73044	2381.83545	-7.77993	6.08501**	2.79054	0.00658	6.78087***
1948-63							
x_1 - T	-629.50575***	42.03635	-6.31372	-390.39042***	28.83364	-3.05903	-137.68690***
x_2 - PCI	1.88645**	0.81639	0.00036	2.47778***	0.62769	0.00042	17.05596***
x_3 - TI	0.17558***	0.00568	0.00000	0.22850***	0.00685	0.00000	-203.53846***
x_5 - CIM	0.06083	0.06472	0.00000	-0.18823***	0.05429	-0.00000	88.31914***
x_6 - TVAI	-37.38577	25.68776	-0.22913	3.94313**	1.62792	0.00174	-44.06676***

1940-47 $a_1 = 421603.57031$; $R_1^2 = 0.0072$; $\sigma_{y_1} = 252798.16992$; $n_1 = 377$

$a_2 = 12418.41833$; $R_2^2 = 0.9199$; $\sigma_{y_2} = 2579.54945$; $n_2 = 623$

1948-63 $a_1 = 35238.05322$; $R_1^2 = 0.8777$; $\sigma_{y_1} = 4191.20404$; $n_1 = 752$

$a_2 = 2133.57764$; $R_2^2 = 0.8818$; $\sigma_{y_2} = 3679.70917$; $n_2 - 1248$

TABLE 60

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF POPULATION 25 YEARS AND OVER WHO COMPLETED NO SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.14955***	0.04363	-0.00388	-0.13902***	0.03635	-0.03077	-3.92910***
x_2 - PCI	-0.00052	0.00040	-0.00000	0.00003	0.00032	0.00000	0.00000
x_3 - TI	0.00000	0.00000	0.00000	0.00001*	0.00001	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00009***	0.00003	-0.00000	0.00000
x_5 - CIM	-0.00003	0.00004	-0.00000	0.00004	0.00005	0.00000	0.00000
x_6 - TVAI	0.02541	0.01586	0.00024	0.00169	0.00178	0.00000	29.28395***
1948-60							
x_1 - T	0.02320*	0.01272	0.00032	0.00327	0.00994	0.00003	33.77966***
x_2 - PCI	-0.00171***	0.00020	-0.00000	-0.00212***	0.00020	-0.00000	0.00000
x_3 - TI	-0.00000	0.00000	-0.00000	0.00002***	0.00000	0.00000	0.00000
x_4 - TE	0.00002**	0.00001	0.00000	-0.00004***	0.00001	-0.00000	0.00000
x_5 - CIM	-0.00001	0.00002	-0.00000	-0.00004***	0.00001	-0.00000	0.00000
x_6 - TVAI	-0.00125	0.00590	-0.00000	-0.00089**	0.00045	-0.00000	-1.63636***

1940-47 $a_1 = 10.65363$; $R_1^2 = 0.0825$; $\sigma_{y_1} = 1.68284$; $n_1 = 377$

$a_2 = 10.70329$; $R_2^2 = 0.0799$; $\sigma_{y_2} = 1.64227$; $n_2 = 623$

1948-60 $a_1 = 2.87974$; $R_1^2 = 0.1856$; $\sigma_{y_1} = 0.93339$; $n_1 = 611$

$a_2 = 4.76053$; $R_2^2 = 0.2126$; $\sigma_{y_2} = 0.99194$; $n_2 = 1014$

TABLE 61

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-8 YEARS ELEMENTARY SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
1940-47							
x_1 - T	0.14374	0.38888	0.00370	0.45745***	0.10849	0.01012	-15.31039***
x_2 - PCI	-0.00774**	0.00356	-0.00000	-0.01454***	0.00095	-0.00000	40.00000***
x_3 - TI	0.00000	0.00003	0.00000	0.00009***	0.00002	0.00000	0.00000
x_4 - TE	-0.00000	0.00000	-0.00000	-0.00040***	0.00008	-0.00000	0.00000
x_5 - CIM	-0.00045	0.00039	-0.00000	-0.00031**	0.00015	-0.00000	0.00000
x_6 - TVAI	0.12698	0.14135	0.00120	-0.01261**	0.00532	-0.00001	19.17445***
1948-60							
x_1 - T	0.17043*	0.09821	0.00232	0.12918**	0.05032	0.00130	9.66042***
x_2 - PCI	-0.02142***	0.00157	-0.00000	-0.02302***	0.00099	-0.00000	0.00000
x_3 - TI	0.00001	0.00002	0.00000	0.00008***	0.00002	0.00000	0.00000
x_4 - TE	-0.00020**	0.00008	-0.00000	-0.00038***	0.00006	-0.00000	0.00000
x_5 - CIM	-0.00002	0.00014	-0.00000	-0.00012	0.00009	-0.00000	0.00000
x_6 - TVAI	0.01113	0.04560	0.00007	-0.00911***	0.00228	-0.00000	11.00000***

1940-47 $a_1 = 65.01735$; $R_1^2 = 0.0553$; $\sigma_{y_1} = 14.99947$; $n_1 = 377$

$a_2 = 60.41256$; $R_2^2 = 0.5157$; $\sigma_{y_2} = 4.90206$; $n_2 = 623$

1948-60 $a_1 = 74.05389$; $R_1^2 = 0.4881$; $\sigma_{y_1} = 7.20780$; $n_1 = 611$

$a_2 = 78.68565$; $R_2^2 = 0.6146$; $\sigma_{y_2} = 5.01952$; $n_2 = 1014$

TABLE 62

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OF HIGH SCHOOL FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.07388	0.12738	-0.00192	-0.06962	0.08855	-0.00154	-0.57105
x_2 - PCI	0.00816	0.00117	0.00000	0.00901***	0.00078	0.00000	0.00000
x_3 - TI	-0.00002**	0.00001	-0.00000	-0.00009***	0.00001	-0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	0.00041***	0.00006	0.00000	0.00000
x_5 - CIM	0.00077***	0.00013	0.00000	0.00037***	0.00012	0.00000	0.00000
x_6 - TVAI	0.04988	0.04630	0.00047	0.00849*	0.00434	0.00000	17.31799***
1948-60							
x_1 - T	0.33851***	0.05638	0.00311	0.11801***	0.04115	0.00118	84.16031***
x_2 - PCI	0.01466***	0.00090	0.00000	0.01802***	0.00081	0.00000	0.00000
x_3 - TI	-0.00003***	0.00001	-0.00000	-0.00012***	0.00001	-0.00000	0.00000
x_4 - TE	0.00018***	0.00005	0.00000	0.00038***	0.00005	0.00000	0.00000
x_5 - CIM	0.00012	0.00008	0.00000	0.00038***	0.00007	0.00000	0.00000
x_6 - TVAI	0.03808	0.02617	0.00024	0.00681***	0.00187	0.00000	29.50000***

1940-47 $a_1 = 15.53856$; $R_1^2 = 0.3609$; $\sigma_{y_1} = 4.91336$; $n_1 = 377$

$a_2 = 13.80497$; $R_2^2 = 0.4700$; $\sigma_{y_2} = 4.00091$; $n_2 = 623$

1948-60 $a_1 = -7.47236$; $R_1^2 = 0.6326$; $\sigma_{y_1} = 4.13764$; $n_1 = 611$

$a_2 = 1.17159$; $R_2^2 = 0.6171$; $\sigma_{y_2} = 4.10570$; $n_2 = 1014$

TABLE 63

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL POPULATION 25 YEARS AND OVER WHO COMPLETED 1-4 YEARS OR MORE OF COLLEGE FOR TVA - NON-TVA COUNTIES AND t-VALUES PROGRAM 6 (1940-47 AND 1948-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
1940-47							
x_1 - T	-0.09618*	0.05755	-0.00249	-0.29537***	0.03656	-0.00654	60.36061***
x_2 - PCI	0.00342***	0.00053	0.00000	0.00557***	0.00032	0.00000	0.00000
x_3 - TI	-0.00001**	0.00000	-0.00000	-0.00001**	0.00001	-0.00000	0.00000
x_4 - TE	0.00000	0.00000	0.00000	0.00006**	0.00003	0.00000	0.00000
x_5 - CIM	0.00040***	0.00006	0.00000	-0.00003	0.00005	-0.00000	0.00000
x_6 - TVAI	0.01369	0.02092	0.00012	0.00128	0.00179	0.00000	11.49074***
1948-60							
x_1 - T	-0.10230***	0.03293	-0.00139	0.01993	0.03807	0.00020	68.28491***
x_2 - PCI	0.00850***	0.00053	0.00000	0.00712***	0.00075	0.00000	0.00000
x_3 - TI	0.00001	0.00001	0.00000	0.00002*	0.00001	0.00000	0.00000
x_4 - TE	0.00000	0.00003	0.00000	0.00000	0.00004	0.00000	0.00000
x_5 - CIM	0.00003	0.00005	0.00000	-0.00017**	0.00007	-0.00000	0.00000
x_6 - TVAI	-0.02110	0.01529	-0.00013	0.00234	0.00173	0.00000	-37.80645***

1940-47 $a_1 = 7.62649$; $R_1^2 = 0.3694$; $\sigma_{y_1} = 2.21993$; $n_1 = 377$

$a_2 = 15.23858$; $R_2^2 = 0.4840$; $\sigma_{y_2} = 1.65194$; $n_2 = 623$

1948-60 $a_1 = 5.44038$; $R_1^2 = 0.5645$; $\sigma_{y_1} = 2.41693$; $n_1 = 611$

$a_2 = 0.01638$; $R_2^2 = 0.2092$; $\sigma_{y_2} = 3.79790$; $n_2 = 1014$

TABLE 64

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1953-60)

Variable Description	TVA			Non-TVA			
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	t-Value
x_1 - T	-0.93554***	0.14373	-0.02513	-1.43051***	0.17132	-0.03409	49.00990***
x_2 - PCI	-0.04129***	0.00172	-0.00001	-0.03635***	0.00206	-0.00000	0.00000
x_3 - TI	0.00004**	0.00002	0.00000	-0.00007**	0.00003	-0.00000	0.00000
x_4 - TE	0.00003	0.00007	0.00000	0.00001	0.00009	0.00000	0.00000
x_5 - CIM	-0.00054***	0.00013	-0.00000	0.00044***	0.00016	0.00000	0.00000
x_6 - TVAI	0.02839	0.04090	0.00021	-0.01273**	0.00497	-0.00000	19.48815***

$a_1 = 137.61371$; $R_1^2 = 0.8077$; $\alpha_{y_1} = 5.35126$; $n_1 = 376$

$a_2 = 162.43476$; $R_2^2 = 0.6331$; $\sigma_{y_2} = 7.18735$; $n_2 = 624$

TABLE 65

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	0.08197	0.09183	0.00219	0.27809***	0.09064	0.00663	-32.90604***
x_2 - PCI	0.00121	0.00110	0.00000	0.00224**	0.00109	0.00000	0.00000
x_3 - TI	-0.00003**	0.00001	-0.00000	0.00002	0.00002	0.00000	0.00000
x_4 - TE	0.00002	0.00004	0.00000	-0.00002	0.00005	-0.00000	0.00000
x_5 - CIM	0.00015*	0.00008	0.00000	-0.00016*	0.00008	-0.00000	0.00000
x_6 - TVAI	0.02053	0.02613	0.00016	0.00645**	0.00263	0.00000	10.42963***

$a_1 = 23.57915$; $R_1^2 = 0.0392$; $\sigma_{y_1} = 3.41912$; $n_1 = 376$

$a_2 = 10.87526$; $R_2^2 = 0.0393$; $\sigma_{y_2} = 3.80241$; $n_2 = 624$

TABLE 66

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	1.55207***	0.09870	0.04169	1.81103***	0.10379	0.04317	-39.41553***
x_2 - PCI	0.02757***	0.00118	0.00000	0.02444***	0.00125	0.00000	0.00000
x_3 - TI	-0.00004***	0.00001	-0.00000	0.00006***	0.00002	0.00000	0.00000
x_4 - TE	0.00009*	0.00005	0.00000	-0.00007	0.00006	-0.00000	0.00000
x_5 - CIM	0.00027***	0.00009	0.00000	-0.00026***	0.00010	-0.00000	0.00000
x_6 - TVAI	-0.01831	0.02809	-0.00014	0.00294	0.00301	0.00000	-14.65517***

$a_1 = -96.47262$; $R_1^2 = 0.8395$; $\sigma_{y_1} = 3.67492$; $n_1 = 376$

$a_2 = -108.52525$; $R_2^2 = 0.7588$; $\sigma_{y_2} = 4.35430$; $n_2 = 624$

TABLE 67

REGRESSION COEFFICIENTS, STANDARD ERRORS AND BETA-COEFFICIENTS FOR SIX VARIABLES REGRESSED ON PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER FOR TVA - NON-TVA COUNTIES AND t-VALUES, PROGRAM 6 (1953-60)

Variable Description	TVA			Non-TVA			t-Value
	b_1	σ_{b_1}	β_1	b_2	σ_{b_2}	β_2	
x_1 - T	-0.62862***	0.05248	-0.01876	-0.56594***	0.06370	-0.01349	-35.66666***
x_2 - PCI	0.01251***	0.00063	0.00000	0.00926***	0.00077	0.00000	0.00000
x_3 - TI	0.00003***	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000
x_4 - TE	-0.00013***	0.00003	-0.00000	0.00006*	0.00004	0.00000	0.00000
x_5 - CIM	0.00012***	0.00005	0.00000	-0.00003	0.00006	-0.00000	0.00000
x_6 - TVAI	-0.03062***	0.01493	-0.00023	0.00271	0.00185	0.00000	43.28571***

$a_1 = 35.28513$; $R_1^2 = 0.7489$; $\sigma_{y_1} = 1.95391$; $n_1 = 376$

$a_2 = 30.27506$; $R_2^2 = 0.4401$; $\sigma_{y_2} = 2.67236$; $n_2 = 624$

t-Values Calculated and Regression Coefficients Compared

The regression coefficients compared by t-test were recorded in Tables 58 to 67 inclusive. The first coefficients for TVA (b_1) and non-TVA (b_2) counties compared were those for the functions in which Per Capita Income was the dependent variable as recorded in Table 58. In the comparison of these functions, the coefficients for three variables were significantly different for both periods of the study. For the first variable, Time (X_1), the coefficients were larger for non-TVA (b_2) counties (60.91476) than for TVA (b_1) counties (52.16468) for 1940-47. This situation was reversed for 1948-63 when the respective TVA (b_1) and non-TVA (b_2) coefficients were 32.12628 and 28.65726. Capital Invested in Manufacturing (X_5) was the second variable for which the regression coefficients were significantly different for the two periods. The respective TVA (b_1) and non-TVA (b_2) coefficients for the two periods were 0.00278 and -0.01684 and 0.00869 and -0.00569. For the third variable, TVA Investments (X_6), the coefficients were of different signs for the two periods. For 1940-47 the TVA (b_1) coefficient was -5.06546 while the non-TVA (b_2) coefficient was 0.42646. For the 1948-63 period the corresponding coefficients were 3.08778 and -0.04808.

In the comparison of TVA (b_1) and non-TVA (b_2) coefficients when Total Employment was the dependent variable, all the coefficients in the first periods were significantly different with the exception of those for Capital Invested in Manufacturing (X_5). For 1948-63 all the coefficients were significantly different, Table 59. The variables for 1940-47 which differed significantly for the two categories of

counties and their respective coefficients were Time (X_1) (-9382.31018 and -215.84901), Per Capita Income (X_2) (10.03588 and 1.22620), Total Income (X_3) (0.06858 and 0.13194), and TVA Investments (X_6) (-825.73044 and 6.08501). The variables and the coefficients for 1948-63 which were significantly different were Time (X_1) (-629.50575 and -390.39042), Per Capita Income (X_2) (1.88645 and 2.47778), Total Income (X_3) (0.17558 and 0.22850), Capital Invested in Manufacturing (X_5) (0.06083 and -0.18823) and TVA Investments (X_6) (-37.38577 and 3.94313).

Table 60 showed the results of comparing the regression coefficients of TVA (b_1) and non-TVA (b_2) counties when the percentage of population 25 years and over who completed no school was the dependent variable. For 1940-47, the coefficients for Time (X_1) were significantly different. These coefficients were both negative (-0.14955 and -0.13902) with the coefficient for TVA (b_1) counties being the greater in absolute terms. For TVA Investments (X_6), the coefficients were again significantly different. In this case the coefficient for TVA (b_1) counties (0.02541) was larger than the coefficient for non-TVA (b_2) counties (0.00169). For 1948-60, the coefficients for Time (X_1) only were significantly different for the two categories of counties. The respective TVA (b_1) and non-TVA (b_2) coefficients were 0.02320 and 0.00327.

The variables which were significantly different for the two categories of counties for 1940-47 when the percentage of population 25 years and over who completed 1-8 years elementary school was the

dependent variable were Time (X_1), Per Capita Income (X_2) and TVA Investments (X_6). Their respective coefficients, as seen in Table 61, page 150, were 0.14374 and 0.45745, -0.00774 and -0.01454 and 0.12698 and -0.01261. For 1948-60 the coefficients for the corresponding regression model which were significantly different were representative of Time (X_1) (0.17043 and 0.12918) and TVA Investments (X_6) (0.01113 and -0.00911).

Table 62, page 151 showed the results of comparing the TVA (b_1) and non-TVA (b_2) regression coefficients when the percentage of population who had completed 1-4 years of high school was the dependent variable. For the 1940-47 period the coefficients for TVA Investments (X_6) only were significantly different. The respective coefficients for the two categories of counties were 0.04988 and 0.00849. For 1948-60 the coefficients for Time (X_1) and TVA Investments (X_6) were significantly different. In this case the respective coefficients were 0.33851 and 0.11801 and 0.03808 and 0.00681.

Two variables had coefficients which were significantly different for both periods when the percentage of population who had completed at least one year of college was the dependent variable. Those variables and their respective TVA (b_1) and non-TVA (b_2) coefficients for the two periods were Time (X_1) (-0.09618, -0.29537, -0.10230 and 0.01993) and TVA Investments (X_6) (0.01369, 0.00128, -0.02110 and 0.00234). These results were recorded in Table 63, page 152.

Tables 64, 65, 66, and 67, pages 153, 154, 155, and 156, showed the results of comparing the regression coefficients for TVA (b_1) and non-TVA counties when the percentages of population in the four

different income categories were the dependent variables. In the four regression models, two variables consistently had coefficients which were significantly different. These variables and their respective coefficients for the four equations were Time (X_1) (-0.93554 and -1.43051, 0.08197 and 0.27809, 1.55207 and 1.81103, -0.69862 and -0.56594) and TVA Investments (X_6) (0.02839 and -0.01273, 0.02053 and 0.00645, -0.01831 and 0.00294, -0.03062 and 0.00271).

Comments on Analysis of Program 6

In Program 6, a pattern of coefficients similar to those noted in previous programs analyzed was evident. The analysis of beta coefficients again produced a series of coefficients greater than zero which was determined by the coefficients for the variables of Time and TVA Investments.

In the comparison by t-test of regression coefficients, it was noted that the coefficients for per capita income were greater for non-TVA than for TVA counties for 1940-47 but not for 1948-63. It was also noted that there was a negative relationship between TVA investments and per capita income for TVA counties for 1940-47 but a positive relationship for non-TVA counties for the same period. For 1948-63 this situation was reversed.

For total employment, it was noted that this variable had decreased relative to time for both TVA and non-TVA counties for both periods as was the case for Programs 4 and 5. In Program 6, as in the two previous programs, the decrease in total employment in TVA counties

was found to be greater for the 1940-47 period than for the period ranging from 1948-63. This observation suggested a situation which might have been anticipated as agricultural land was taken out of production to accommodate water resource projects. For non-TVA counties, the decrease in total employment was found to be greater for 1948-63 than for 1940-47 in Program 6 as well as in Programs 4 and 5. This observation might also have been anticipated as the general rural population decreased in the last few decades.

In examining changes in employment over time it should be noted that the urban centers of Kingsport, Bristol, Johnson City, Knoxville, Chattanooga and Huntsville were located in the region which generally consisted of TVA impacted counties. Growth in these urban centers would have been expected to be associated with an increase in employment at the local level as employment opportunities were provided by these expanding centers. Some residents in rural areas near these urban centers who were forced to move as water resource investments were made would also have been expected to obtain employment in local urban centers. Despite these shifts in population from rural to urban settings, employment in the TVA impacted regions (which generally included these urban centers) decreased over time as did employment in non-TVA impacted regions. In both periods in Programs 4, 5 and 6 the decrease in employment over time was greater for TVA than for non-TVA counties. The increase in employment associated with the growth of these urban centers apparently was not great enough to absorb a shift

in population from TVA impacted counties to maintain a decrease in employment in these counties which was equal to or less than the decrease in employment in non-TVA counties.

In Program 6 employment had also decreased relative to TVA investments in TVA counties for both periods under study. A positive relationship was found on the other hand between TVA investments and employment in non-TVA counties.

The regression analysis involving education tended to suggest that the population in the elementary and high school categories in TVA counties had received the greater benefits over the long run. The analysis involving the different income categories, however, suggested that the percentage of population in the $0-$2499 income category had not improved its welfare position in TVA counties to the extent that its counterpart in non-TVA counties had improved its position. The percentage of population in the $7000 and over income category was also found to decrease relative to Time and TVA investments in TVA counties. For non-TVA counties, the percentage of population in this income category had decreased relative to time but increased relative to TVA investments.

CHAPTER XIII

SUMMARY

The object of this study was to examine the effects of investments in water resources on regional income and employment. To attain this end, two hypotheses were tested. The first hypothesis was that investments in water resources had a favorable impact on income and employment in the immediate areas in which the investments were made. The second hypothesis was that investments in water resources had an impact on income and employment but that the spatial nature of that impact might be diffused and irregular in pattern due to the influence of markets and other institutions.

In testing the hypotheses, seven programs (six of which were recorded in the study) were analyzed by regression analysis, the calculation of beta-coefficients, discriminant analysis and t-tests. These models were applied to each of two categories of counties in each of the six programs. The counties were categorized as either directly impacted by water resource projects (TVA counties) or not directly impacted by water resource projects (non-TVA counties). In all programs the directly impacted counties generally shared a common geographic element in that they were located either near water resource projects or in close proximity to rivers on which water resource projects were located.

Since the directly impacted counties in all six programs shared a common element, the analytical results common to all programs were

examined. The common results examined were those in which the analysis by t-test showed the corresponding coefficients for the two categories of counties to be significantly different in all six programs. These results were assumed to rank in priority to results of separate programs. The rationale for this assumption was that results unique to separate programs only might have been influenced by the arbitrary manner in which counties were delineated as well as any number of other factors.

The first dependent variable in all six programs was Per Capita Income. In the analysis by t-test of corresponding coefficients for TVA and non-TVA counties, two independent variables had coefficients which were significantly different in the 1940-47 period. These variables were, Capital Invested in Manufacturing and TVA Investments. In five of the six programs it was found that changes in Per Capita Income for TVA counties were negative relative to unit changes in the independent variables. For non-TVA counties in the same five programs, some of the coefficients for the two independent variables were positive; others were negative. Those that were negative were smaller in absolute terms than were the corresponding coefficients for TVA counties.

For 1948-63 the coefficients for TVA and non-TVA counties were significantly different where the variables Time and TVA Investments were regressed on Per Capita Income. In all six programs the coefficients for Time were positive while the coefficients for TVA Investments were negative. In absolute terms the coefficients for the two independent variables were greater for TVA than for non-TVA counties in all six cases.

The TVA and non-TVA regression coefficients for four variables were significantly different for 1940-47 when Total Employment was the dependent variable. These variables were Time, Per Capita Income, Total Income and TVA Investments. For the variable Time the regression coefficients in five programs were negative for both TVA and non-TVA counties. In absolute terms the coefficients were greater for TVA counties indicating that employment per unit change in Time had decreased more for TVA than for non-TVA counties. This pattern was assumed to hold for a sixth program in which the regression coefficient for TVA counties was too large for computer point-out capacity.

For Per Capita Income, all variables for TVA counties had positive coefficients. For non-TVA counties, four programs had negative coefficients for this variable, two had positive coefficients. In all six programs the coefficients were greater, in absolute terms, for TVA counties.

For Total Income the coefficients for both categories of counties were positive except for one case. But in all cases the coefficients for non-TVA counties were greater in absolute terms. When TVA Investments was the dependent variable, all but one coefficient for TVA and non-TVA counties indicating that employment had decreased more, relative to TVA Investments in TVA counties.

For 1948-63, significant t-values were recorded for all variables regressed on Total Employment. The coefficients were all negative for Time and absolutely greater for TVA counties. For Per Capita Income the coefficients were generally positive and larger for TVA counties

in four of six programs. In the remaining two programs the coefficients for this variable were again positive but larger for non-TVA counties.

In the case of Total Income the coefficients for both categories of counties were positive and larger for non-TVA counties in all six programs.

When Capital Invested in Manufacturing was regressed on Total Employment the coefficients for TVA and non-TVA counties were positive in all but two cases. In all cases the coefficients were greater for TVA counties.

The coefficients were all negative for TVA counties and all positive for non-TVA counties when TVA Investments was regressed on Total Employment. In absolute terms the coefficients were all greater for TVA counties indicating a decrease in employment relative to unit changes in TVA Investments in TVA counties as compared to increases in employment for non-TVA counties.

When the percentage of population who had completed no school was the dependent variable, the coefficients for Time were significantly different for both 1940-47 and 1948-60. In general it could be said that both categories of counties experienced a decrease relative to Time in this percentage of the population for 1940-47 with the decrease being greater for non-TVA counties. For 1948-60 both categories of counties experienced an increase in this percentage of the population. It was debatable as to which category of counties experienced the greater increase.

The coefficients for TVA Investments were also significantly different for 1940-47 in all six programs. A definite pattern of coefficients of the same sign was not evident in the results pertaining to this variable.

In the analysis in which the Percentage of Population who had completed 1-8 years of Elementary School was the dependent variable, the coefficients for Time and TVA Investments were significantly different for both periods under study. In no cases was a pattern of coefficients evident. For 1940-47 the coefficients for Per Capita Income were also significantly different. The coefficients for this variable were negative for both categories of counties with TVA counties recording the smaller coefficients, in absolute terms.

When the Percentage of Population Who Had Completed 1-4 Years of High School was the dependent variable the coefficients for TVA Investments were significantly different for both periods. Again a pattern of similar coefficients for this variable was not evident.

For 1948-60 the coefficients for the variable Time were all positive and significantly different. The coefficients for this variable were greater for TVA counties.

An attempt to explain why variables should appear significantly different for two categories of counties and yet now show similarities in sign or magnitude would appear to be in order. Results such as these might be explained by the manner in which counties were delineated. For the first three programs, counties were delineated on a geographic

basis. For the last three programs, the variables for the first three programs were analyzed by discriminant analysis. In the discriminant analysis the ranking of counties would be expected to be influenced by variables such as income and employment, the magnitude of which differed substantially for different counties. It could be hypothesized that the greater differences among counties in these variables outweighed the more subtle differences related to percentages of population in different income or educational groups. Consistent results in all six programs would therefore not necessarily be expected for variables related to percentages of population.

The analysis in which the Percentage of Population Who Had Completed at Least One Year of College was the dependent variable prompted one general observation. This observation was that this percentage of the population had decreased relative to Time in both categories of counties for 1940-47 with the greater decrease being recorded for non-TVA counties.

Only two parts of the analysis on the Percentage of Total Consumer Units in four different income groups produced results consistent in all six programs. In the analysis in which the percentage of the population in the $0-$2499 income category was the dependent variable, it could be concluded that this portion of the population decreased relative to Time for both TVA and non-TVA counties with the latter category of counties experiencing the greater decrease in all programs. The analysis in which the percentages of the population in $4000-$6999

income group was the dependent variable suggested that this percentage of population had increased relative to Time for both TVA and non-TVA counties. In this analysis non-TVA counties reported a greater increase in this percentage of the population in five of six programs.

General observations related to differences in variables for TVA and non-TVA counties could not be drawn from the analysis in which the Percentage of Total Consumer Units in Income Categories of $2500-$3999 and $7000 and Over were the dependent variables.

CHAPTER XIV

CONCLUSION

Six programs were analyzed and recorded in this study. From the analyses several implications were drawn. The analyses implied that residents in counties in close proximity to water resource investment projects enjoyed a greater per capita income in the long run than did residents in counties not near similar projects. The analyses also implied that investments in water resources were in the long run associated with increases in employment in counties removed from the site of investments and decreases in employment in counties near the investments. The analyses further implied that investments in water resources were not associated with an increase in the standard of living for people in the low income and educational groups living near the areas where investments were made as compared to people in the same categories living in areas removed from the sites of investments.

In considering the implications of the analyses as related to the hypotheses tested, the first hypothesis would appear subject to question. The second hypothesis would tend to be favored. The second hypothesis would also tend to be supported by the results of the analysis on beta coefficients. These results revealed that investments in water resources were the second most significant variable of the study in estimating the dependent variables--second only to the variable Time.

indicators is the assumption that if the investments do in fact yield net economic benefits to the residents in the area these benefits will be reflected in the measure variables.

The manner in which counties were delineated in the study also left something to be desired. This was an important part of the study and the best ideas and tools accessible were employed in carrying out this task. The application of a more sophisticated technique which appeared to lend itself well to the delineations of counties was attempted but had to be abandoned for mechanical reasons. This technique was cluster analysis. More refined techniques such as cluster analysis and more imaginative ideas appear to be in demand as research is conducted in areas related to natural resources.

The suggestion has been made that there is also a need to account more fully for the direct or primary consequences of natural resource projects. Mentioned, among others on the positive side are scenic amenities and recreational opportunities; on the negative side are such costs as environmental deterioration. It has further been suggested that the impact of natural resource projects be evaluated on a national basis. For example, the effects of a federal irrigation scheme in a region producing special crops should be evaluated in regard to the effects on a region which might be producing similar crops or utilizing similar inputs. In general, new ideas in recording costs and benefits

of natural resource projects appear to be over due.[1] Developments along these lines should be forthcoming in the following years.

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[1]See: Jack L. Knetsch et al., Federal Natural Resource Development: Basic Issues in Benefit and Cost Measurement (Washington: Natural Resource Policy Center, the George Washington University, May, 1969), pp. 1-12; John Fischer, "The Easy Chair," Harper's, Vol. 239, No. 1432, September, 1969, p. 20.

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APPENDIXES

APPENDIX A

TABLE 68

FIGURES USED TO DEFLATE INCOME AND INVESTMENT DATA

Year	Per Capita and Total Income: Consumer Price Index	Manufacturing and TVA Investments: Total Wholesale Price Index[a]
1940	48.8	46.8
1941	51.3	50.3
1942	56.8	53.9
1943	60.3	54.7
1944	61.3	55.6
1945	62.7	56.3
1946	68.0	61.7
1947	77.8	75.3
1948	83.8	81.7
1949	83.0	80.0
1950	83.8	82.9
1951	90.5	91.5
1952	92.5	89.4
1953	93.2	90.1
1954	93.6	90.4
1955	93.3	92.4
1956	94.7	96.5
1957	98.0	99.2
1958	100.7	99.5
1959	101.5	101.3
1960	103.1	101.3
1961	104.2	100.8
1962	105.4	100.8
1963	106.7	100.7

Source: Economic Almanac, 1967-68 (New York: The MacMillan Company, 1967), pp. 103-104.

[a]All commodities other than farm products and food.

APPENDIX B

TABLE 69

PER CAPITA INCOME FOR EACH OF 125 COUNTIES
(1940-63) (DOLLARS)

	County	Years						
		1940[a]	1941[b]	1942	1943[c]	1944	1945	1946
1.	Anderson	181	254	234	202	317	366	380
2.	Bedford	212	341	374	481	532	616	584
3.	Benton	121	170	179	234	316	366	360
4.	Bledsoe	99	140	114	153	266	307	321
5.	Blount	209	293	235	313	413	478	467
6.	Bradley	227	319	295	384	494	571	495
7.	Campbell	205	289	248	316	513	594	575
8.	Carroll	155	217	213	284	381	441	437
9.	Carter	209	293	258	341	459	530	570
10.	Chester	141	198	194	257	325	434	455
11.	Claiborne	110	154	129	169	449	327	336
12.	Cocke	150	210	209	262	412	476	481
13.	Coffee	182	257	205	247	324	374	571
14.	Cumberland	137	193	172	220	343	397	416
15.	Decatur	137	181	181	235	380	440	442
16.	Dickson	178	250	258	348	521	602	591
17.	Fentress	130	182	156	203	361	417	438
18.	Franklin	185	261	240	311	468	541	558
19.	Giles	176	247	255	334	403	566	467
20.	Grainger	88	123	123	164	264	306	310
21.	Greene	183	257	247	325	432	499	495
22.	Grundy	115	161	144	186	308	356	373
23.	Hamblen	275	83	353	466	688	795	687
24.	Hamilton	506	711	1020	1330	1397	1308	1162
25.	Hancock	63	88	79	101	288	333	334
26.	Hardin	118	165	170	233	370	429	436
27.	Hawkins	135	189	174	234	335	388	401
28.	Henderson	152	213	232	303	436	504	516
29.	Henry	91	269	299	383	492	569	571
30.	Hickman	99	139	138	184	302	349	353
31.	Houston	108	152	159	217	306	355	347
32.	Humphreys	150	212	216	288	446	516	541
33.	Jefferson	119	166	134	184	313	362	363
34.	Johnson	103	143	132	208	289	334	350
35.	Knox	455	654	738	1013	1199	1146	1140
36.	Lawrence	184	258	242	316	498	575	541
37.	Lewis	190	266	260	342	587	678	653

TABLE 69 (Continued)

County	Years						
	1940[a]	1941[b]	1942	1943[c]	1944	1945	1946
38. Lincoln	188	265	265	342	511	591	591
39. Loudon	261	336	273	338	575	664	622
40. McMinn	226	308	298	391	622	719	638
41. McNairy	130	183	185	263	399	462	461
42. Marion	191	258	221	295	455	526	539
43. Marshall	233	327	334	436	575	665	682
44. Maury	224	322	324	425	593	686	616
45. Meigs	71	100	98	127	217	251	264
46. Monroe	130	183	164	219	347	394	398
47. Moore	68	95	105	135	263	304	320
48. Morgan	180	141	123	157	278	321	306
49. Perry	120	168	170	224	345	398	446
50. Polk	222	320	241	508	515	595	604
51. Rhea	202	283	266	346	580	671	646
52. Roane	183	261	248	253	401	463	480
53. Rutherford	231	323	315	385	534	617	543
54. Sequatchie	90	127	111	147	237	274	288
55. Sevier	138	192	166	220	355	411	422
56. Stewart	96	135	149	201	350	405	388
57. Sullivan	300	466	435	591	673	778	879
58. Unicoi	197	277	244	326	504	583	592
59. Union	81	115	108	138	225	261	273
60. Van Buren	60	84	79	104	178	204	213
61. Washington	326	498	454	616	800	925	904
62. Wayne	98	138	127	171	272	315	330
63. Williamson	169	237	233	305	461	533	522
64. Bland	150	225	206	274	413	458	430
65. Dickenson	216	320	271	343	517	573	536
66. Grayson	265	409	392	611	777	861	790
67. Lee	192	288	278	379	584	648	602
68. Russell	167	249	260	334	468	519	484
69. Scott	143	214	210	270	379	420	402
70. Smyth	281	421	367	477	749	830	733
71. Tazewell	337	502	431	550	830	920	870
72. Washington	324	487	493	651	836	941	876
73. Wise	281	43	394	517	764	846	799
74. Wythe	303	456	429	562	828	917	836
75. Avery	87	129	119	145	279	273	271
76. Buncombe	495	722	889	1158	1293	1247	1039
77. Cherokee	173	256	217	307	468	457	455
78. Clay	55	82	84	129	230	224	239
79. Graham	99	145	119	146	249	243	261

TABLE 69 (Continued)

County	Years						
	1940[a]	1941[b]	1942	1943[c]	1944	1945	1946
80. Haywood	265	392	395	529	728	711	713
81. Henderson	365	536	580	667	950	927	870
82. Jackson	207	306	300	428	604	590	600
83. Macon	188	278	274	374	524	512	502
84. Madison	153	188	199	269	476	465	464
85. Mitchell	192	284	286	383	536	524	587
86. Swain	134	196	185	255	314	307	318
87. Transylvania	274	407	439	595	645	630	653
88. Watauga	195	289	284	384	549	536	544
89. Yancey	124	185	195	279	394	385	888
90. Alcorn	229	337	384	521	677	682	619
91. Itawamba	64	92	126	215	231	233	232
92. Prentiss	145	214	238	415	500	504	507
93. Tishomingo	103	130	140	255	359	362	360
94. Calloway	203	287	314	451	498	518	511
95. Graves	225	320	375	542	546	568	533
96. Livingston	113	160	185	281	293	304	299
97. Lyon	141	204	185	263	353	366	309
98. McCracken	491	683	720	1067	1047	980	923
99. Marshall	120	177	199	289	319	332	327
100. Trigg	138	186	204	303	390	406	384
101. Catoosa	111	155	126	176	300	291	245
102. Dade	116	161	129	164	286	277	260
103. Fannin	107	157	131	187	298	288	273
104. Gilmer	125	174	152	207	304	296	285
105. Lumpkin	175	244	239	328	469	481	422
106. Rabun	236	359	341	446	699	679	644
107. Towns	110	151	129	177	331	322	327
108. Union	102	145	131	177	291	282	285
109. Walker	249	308	273	375	65	622	589
110. Whitfield	336	509	423	606	791	767	642
111. Blount	105	161	171	265	360	360	391
112. Colbert	217	337	357	498	582	582	633
113. Cullman	168	273	303	433	548	548	554
114. DeKalb	119	184	200	297	395	395	425
115. Etowah	283	455	461	637	743	744	673
116. Franklin	145	227	249	365	481	481	530
117. Jackson	122	190	204	286	401	401	445
118. Lauderdale	305	601	482	609	927	928	975
119. Lawrence	89	138	160	214	278	278	298
120. Limestone	129	200	232	331	407	407	440
121. Madison	273	421	418	594	744	746	689
122. Marion	119	185	200	279	432	432	467
123. Marshall	198	308	342	475	614	614	662
124. Morgan	203	361	409	569	598	598	635
125. Winston	107	186	194	284	362	363	396

TABLE 69 (Continued)

County	Years					
	1947	1948	1949	1950	1951	1952
1. Anderson	435	996	958	1128	1163	1602
2. Bedford	663	784	754	822	853	799
3. Benton	404	459	361	394	401	618
4. Bledsoe	359	325	313	341	351	473
5. Blount	537	551	785	856	882	1026
6. Bradley	559	600	803	876	902	863
7. Campbell	666	824	613	668	691	718
8. Carroll	504	577	555	605	621	618
9. Carter	652	714	814	888	912	1072
10. Chester	524	523	503	248	562	518
11. Claiborne	385	358	344	375	381	554
12. Cocke	563	534	513	559	571	509
13. Coffee	626	681	655	714	731	709
14. Cumberland	478	458	440	480	491	591
15. Decatur	508	523	503	548	562	445
16. Dickson	671	735	653	712	731	636
17. Fentress	505	428	376	410	421	445
18. Franklin	631	629	605	660	682	672
19. Giles	543	588	565	616	632	663
20. Grainger	359	345	332	362	371	436
21. Greene	568	535	727	793	822	709
22. Grundy	430	398	383	418	431	509
23. Hamblen	807	861	828	903	933	945
24. Hamilton	1373	1329	1239	1351	1394	1291
25. Hancock	406	371	357	389	401	381
26. Hardin	492	494	410	447	461	482
27. Hawkins	461	443	491	535	552	627
28. Henderson	598	611	587	640	662	527
29. Henry	649	768	738	805	832	718
30. Hickman	407	400	385	420	431	536
31. Houston	381	415	399	435	441	455
32. Humphreys	632	622	598	652	672	700
33. Jefferson	408	411	708	772	792	672
34. Johnson	386	354	421	459	472	455
35. Knox	1344	1341	1250	1363	1403	1341
36. Lawrence	628	613	589	642	661	600
37. Lewis	718	704	584	637	651	600
38. Lincoln	685	734	706	770	792	681
39. Loudon	731	728	700	763	782	627
40. McMinn	748	782	752	820	842	754
41. McNairy	530	538	517	564	581	563
42. Marion	622	594	571	623	642	691

TABLE 69 (Continued)

County	Years					
	1947	1948	1949	1950	1951	1952
43. Marshall	780	898	863	941	973	818
44. Maury	706	852	819	893	922	845
45. Meigs	276	271	433	472	481	491
46. Monroe	465	444	467	509	522	582
47. Moore	399	411	652	711	732	564
48. Morgan	347	324	312	340	351	591
49. Perry	526	496	477	520	531	435
50. Polk	695	638	613	668	691	790
51. Rhea	758	767	609	664	682	736
52. Roane	550	535	514	560	571	890
53. Rutherford	615	711	777	847	872	881
54. Sequatchie	326	305	389	424	431	600
55. Sevier	493	455	437	477	491	600
56. Stewart	448	453	435	474	491	491
57. Sullivan	813	986	926	1010	1043	1431
58. Unicoi	694	634	610	665	682	1026
59. Union	302	283	384	419	431	445
60. Van Buren	269	245	236	257	261	381
61. Washington	941	944	881	961	992	1071
62. Wayne	371	361	347	378	391	464
63. Williamson	600	647	622	678	702	663
64. Bland	468	392	578	552	595	643
65. Dickenson	584	423	640	611	650	868
66. Grayson	820	691	743	710	760	677
67. Lee	611	486	655	626	660	665
68. Russell	530	417	726	693	737	598
69. Scott	486	390	662	632	682	632
70. Smyth	780	626	689	658	705	812
71. Tazewell	1132	901	888	848	903	1026
72. Washington	980	800	890	850	903	868
73. Wise	868	689	655	676	671	958
74. Wythe	882	736	728	695	737	823
75. Avery	376	284	345	351	382	569
76. Buncombe	1503	1416	1239	1262	1382	1257
77. Cherokee	656	509	420	428	470	539
78. Clay	352	267	250	255	275	470
79. Graham	363	262	245	249	265	588
80. Haywood	992	799	747	761	833	1147
81. Henderson	1213	1076	1005	1023	1117	898
82. Jackson	847	646	604	604	615	676
83. Macon	712	579	473	482	530	578
84. Madison	650	512	426	434	470	439
85. Mitchell	829	633	591	602	657	578

TABLE 69 (Continued)

County	Years					
	1947	1948	1949	1950	1951	1952
86. Swain	441	322	301	306	353	559
87. Transylvania	873	709	663	675	735	789
88. Watauga	747	586	1143	920	1009	459
89. Yancy	535	413	386	393	431	569
90. Alcorn	734	759	893	644	768	857
91. Itawamba	358	336	395	285	337	631
92. Prentiss	603	598	703	507	603	842
93. Tishomingo	427	416	489	352	416	691
94. Calloway	706	721	801	793	851	708
95. Graves	744	751	776	768	823	862
96. Livingston	423	422	436	431	458	450
97. Lyon	436	420	434	430	459	603
98. McCracken	1175	1059	1059	1080	1133	1260
99. Marshall	462	450	465	460	496	738
100. Trigg	512	507	524	519	562	508
101. Catoosa	313	281	335	339	375	1261
102. Dade	337	267	358	362	465	725
103. Fannin	328	264	310	723	344	904
104. Gilmer	366	306	315	319	354	593
105. Lumpkin	521	476	489	495	547	499
106. Rabun	779	649	667	675	749	499
107. Towns	406	331	340	344	385	301
108. Union	441	272	309	313	344	452
109. Walker	734	654	673	681	759	1234
110. Whitfield	809	719	739	748	830	1158
111. Blount	512	460	491	447	470	485
112. Colbert	820	799	779	709	751	1193
113. Cullman	732	556	896	815	867	682
114. DeKalb	564	511	526	478	504	495
115. Etowah	894	967	920	837	1032	1199
116. Franklin	685	601	586	533	569	648
117. Jackson	590	495	483	439	462	537
118. Lauderdale	1273	1142	1096	997	1065	1070
119. Lawrence	396	352	384	349	372	477
120. Limestone	579	517	599	345	578	622
121. Madison	914	856	835	760	809	835
122. Marion	618	524	601	547	578	537
123. Marshall	685	790	770	700	743	682
124. Morgan	860	930	907	825	883	827
125. Winston	518	444	629	572	611	588

TABLE 69 (Continued)

County	Years					
	1953	1954	1955	1956	1957	1958
1. Anderson	1375	1397	1525	1615	1591	1573
2. Bedford	925	938	959	1015	1026	1109
3. Benton	778	790	826	878	901	997
4. Bledsoe	571	582	629	670	686	775
5. Blount	995	1010	1006	1062	1073	1098
6. Bradley	957	970	986	1041	1052	1074
7. Campbell	701	708	739	783	801	834
8. Carroll	805	820	854	906	932	1043
9. Carter	991	1012	1007	1064	1070	1108
10. Chester	669	680	726	770	792	932
11. Claiborne	572	579	625	665	683	974
12. Cocke	613	623	666	709	729	829
13. Coffee	843	854	892	944	962	1003
14. Cumberland	653	63	697	739	759	822
15. Decatur	603	615	656	696	722	878
16. Dickson	773	787	821	871	891	988
17. Fentress	529	538	578	615	635	725
18. Franklin	792	803	846	896	912	980
19. Giles	847	865	885	938	952	1056
20. Grainger	543	554	595	634	659	820
21. Greene	822	837	855	906	924	1040
22. Grundy	565	575	616	656	676	727
23. Hamblen	1007	1022	1033	1090	1106	1136
24. Hamilton	1325	1350	1370	1447	1437	1414
25. Hancock	479	489	534	572	595	794
26. Hardin	635	645	696	739	757	859
27. Hawkins	747	762	793	840	857	947
28. Henderson	699	711	766	815	832	996
29. Henry	994	1013	1038	1099	1111	1215
30. Hickman	753	765	829	882	896	998
31. Houston	625	635	686	733	753	886
32. Humphreys	902	915	960	1019	1035	1116
33. Jefferson	821	833	879	931	947	1030
34. Johnson	609	620	662	703	726	863
35. Knox	1333	1359	1382	1460	1446	1429
36. Lawrence	699	712	733	778	794	902
37. Lewis	730	742	775	821	847	914
38. Lincoln	832	847	880	931	950	1064
39. Loudon	822	834	861	910	927	971
40. McMinn	857	872	914	967	978	1024
41. McNairy	656	665	709	753	776	896
42. Marion	754	766	995	841	862	890

TABLE 69 (Continued)

	County	Years					
		1953	1954	1955	1956	1957	1958
43.	Marshall	985	995	1064	1124	1128	1210
44.	Maury	986	1002	1007	1075	1087	1137
45.	Meigs	607	616	670	711	726	814
46.	Monroe	648	657	706	749	766	855
47.	Moore	683	692	736	781	803	979
48.	Morgan	598	608	639	678	695	754
49.	Perry	625	640	680	724	751	896
50.	Polk	476	756	785	830	844	890
51.	Rhea	791	806	831	879	900	952
52.	Roane	909	923	954	1008	1021	1040
53.	Rutherford	1080	1100	1119	1184	1194	1267
54.	Sequatchie	632	642	671	709	731	782
55.	Sevier	714	725	767	813	826	910
56.	Stewart	671	681	728	774	801	929
57.	Sullivan	1342	1380	1331	1406	1395	1401
58.	Unicoi	950	970	978	1032	1041	1088
59.	Union	534	543	577	613	635	770
60.	Van Buren	493	501	565	406	617	793
61.	Washington	1078	1098	1121	1186	1183	1210
62.	Wayne	563	572	616	656	677	789
63.	Williamson	827	840	907	961	962	1045
64.	Bland	642	617	703	735	782	893
65.	Dickenson	684	650	700	734	789	855
66.	Grayson	787	753	857	901	957	1089
67.	Lee	598	568	621	654	715	816
68.	Russell	656	627	695	732	790	870
69.	Scott	690	663	726	764	820	943
70.	Smyth	800	766	837	880	934	978
71.	Tazewell	906	865	948	994	1044	1061
72.	Washington	889	838	905	952	1012	1078
73.	Wise	815	777	840	882	939	964
74.	Wythe	820	790	835	878	931	997
75.	Avery	620	594	662	698	773	868
76.	Buncombe	1271	1230	1295	1359	1426	1392
77.	Cherokee	644	618	685	722	791	853
78.	Clay	566	542	605	640	715	833
79.	Graham	701	673	750	789	861	927
80.	Haywood	1049	1019	1063	1116	1179	1202
81.	Henderson	1012	977	1038	1090	1157	1167
82.	Jackson	656	628	694	732	803	873
83.	Macon	652	624	688	725	794	884
84.	Madison	628	604	678	718	799	940
85.	Mitchell	649	621	693	731	799	893

TABLE 69 (Continued)

County	Years					
	1953	1954	1955	1956	1957	1958
86. Swain	653	627	734	771	823	873
87. Transylvania	904	868	940	989	1068	1082
88. Watauga	627	604	677	716	790	892
89. Yancy	576	550	613	648	715	826
90. Alcorn	863	833	839	924	890	939
91. Itawamba	645	620	654	723	699	831
92. Prentiss	733	702	725	800	773	880
93. Tishomingo	645	617	652	722	703	807
94. Calloway	966	963	1013	1046	1112	1177
95. Graves	1039	1037	1058	1092	1150	1221
96. Livingston	651	649	721	751	794	897
97. Lyon	646	641	690	714	761	836
98. McCracken	1320	1323	1352	1389	1439	1393
99. Marshall	898	893	939	969	1023	1083
100. Trigg	705	708	778	808	852	957
101. Catoosa	1033	1053	1081	1157	1178	1217
102. Dade	690	705	750	807	833	884
103. Fannin	829	843	893	958	984	1046
104. Gilmer	538	545	599	648	676	772
105. Lumpkin	722	738	824	891	921	1006
106. Rabun	651	666	734	796	826	896
107. Towns	537	554	623	680	714	863
108. Union	527	537	601	652	680	806
109. Walker	1154	1172	1219	1308	1315	1335
110. Whitfield	1079	1094	1115	1193	1212	1230
111. Blount	682	691	716	787	856	977
112. Colbert	1093	1113	1080	1177	1233	1251
113. Cullman	668	678	688	757	823	935
114. DeKalb	628	635	669	736	800	926
115. Etowah	1187	1206	1169	1274	1334	1344
116. Franklin	743	750	769	842	907	994
117. Jackson	630	637	672	739	800	895
118. Lauderdale	1064	1083	1055	1152	1217	1260
119. Lawrence	609	615	642	708	777	884
120. Limestone	719	728	735	806	866	963
121. Madison	906	919	916	1001	1065	1134
122. Marion	611	616	642	707	773	874
123. Marshall	734	742	768	841	903	992
124. Morgan	941	955	954	1044	1107	1158
125. Winston	746	753	789	865	928	1028

TABLE 69 (Continued)

County	Years				
	1959	1960	1961	1962	1963
1. Anderson	1706	1806	1650	1721	1836
2. Bedford	1201	1155	1373	1441	1513
3. Benton	1028	1069	1188	1246	1338
4. Bledsoe	820	805	765	810	877
5. Blount	1198	1264	1388	1445	1512
6. Bradley	1158	1179	1362	1423	1483
7. Campbell	921	930	893	940	987
8. Carroll	1128	1121	1130	1189	1247
9. Carter	1205	1222	1229	1286	1354
10. Chester	990	971	987	1036	1082
11. Claiborne	849	820	816	862	905
12. Cocke	891	869	900	949	995
13. Coffee	1097	1127	1394	1454	1517
14. Cumberland	880	888	870	916	958
15. Decatur	930	872	986	1039	1089
16. Dickson	1056	1037	1164	1219	1278
17. Fentress	777	754	666	704	756
18. Franklin	1061	1054	1204	1261	1315
19. Giles	1147	1149	1090	1151	1208
20. Grainger	888	808	874	920	989
21. Greene	1106	1115	1136	1154	1203
22. Grundy	780	790	858	908	957
23. Hamblen	1226	1261	1360	1428	1506
24. Hamilton	1532	1606	1722	1809	1888
25. Hancock	871	744	679	688	788
26. Hardin	915	882	965	1018	1071
27. Hawkins	1019	1007	1003	1047	1097
28. Henderson	1052	980	956	1007	1057
29. Henry	1287	1291	1323	1399	1466
30. Hickman	1057	1020	940	982	1031
31. Houston	921	910	975	1025	1072
32. Humphreys	1178	1196	1099	1144	1197
33. Jefferson	1105	1093	1163	1214	1265
34. Johnson	873	879	826	872	913
35. Knox	1544	1602	1695	1774	1850
36. Lawrence	958	986	1046	1096	1141
37. Lewis	1036	943	977	1025	1079
38. Lincoln	1132	1125	1198	1260	1311
39. Loudon	1057	1075	1249	1303	1365
40. McMinn	1112	1148	1212	1270	1322
41. McNairy	964	934	890	938	970
42. Marion	965	1007	1030	1079	1128

TABLE 69 (Continued)

	County	Years				
		1959	1960	1961	1962	1963
43.	Marshall	1299	1279	1204	1261	1337
44.	Maury	1235	1270	1331	1388	1457
45.	Meigs	854	876	724	762	843
46.	Monroe	915	915	935	982	1028
47.	Moore	1040	926	1035	1084	1136
48.	Morgan	816	820	888	916	975
49.	Perry	929	894	933	981	1028
50.	Polk	984	989	1091	1139	1169
51.	Rhea	1032	1049	1003	1049	1096
52.	Roane	1133	1173	1302	1356	1417
53.	Rutherford	1351	1416	1364	1426	1485
54.	Sequatchie	835	847	919	963	1008
55.	Sevier	984	966	1031	1084	1135
56.	Stewart	1185	968	939	994	1048
57.	Sullivan	1516	1591	1587	1658	1737
58.	Unicoi	1197	1181	1136	1184	1255
59.	Union	820	749	865	906	947
60.	Van Buren	1115	744	679	717	750
61.	Washington	1313	1333	1458	1547	1608
62.	Wayne	861	839	883	928	951
63.	Williamson	1117	1111	1313	1382	1438
64.	Bland	930	841	1110	1065	1069
65.	Dickenson	906	885	954	895	899
66.	Grayson	1163	1068	1029	961	966
67.	Lee	868	809	830	780	785
68.	Russell	933	885	1033	972	977
69.	Scott	985	921	1027	964	960
70.	Smyth	1032	1049	1351	1283	1289
71.	Tazewell	1122	1128	1197	1127	1132
72.	Washington	1142	1113	1352	1280	1282
73.	Wise	1021	1036	1144	1076	1081
74.	Wythe	1059	1081	1115	1056	1062
75.	Avery	934	983	1042	1088	1163
76.	Buncombe	1482	1651	1794	1866	1946
77.	Cherokee	910	1008	1013	1081	1120
78.	Clay	791	959	863	927	973
79.	Graham	982	1038	887	940	987
80.	Haywood	1283	1436	1603	1658	1723
81.	Henderson	1246	1367	1541	1610	1684
82.	Jackson	927	1016	1176	1236	1290
83.	Macon	928	1016	1059	1121	1174
84.	Madison	980	1013	1046	1118	1173
85.	Mitchell	946	1016	1103	1165	1221

TABLE 69 (Continued)

County	Years				
	1959	1960	1961	1962	1963
86. Swain	916	999	960	1026	1083
87. Transylvania	1152	1250	1468	1532	1586
88. Watauga	927	991	1161	1227	1292
89. Yancy	877	915	1044	1110	1147
90. Alcorn	1064	1145	1056	1137	1185
91. Itawamba	926	905	938	1015	1038
92. Prentiss	988	996	932	1011	1034
93. Tishomingo	894	939	927	1003	1039
94. Calloway	1240	1296	1419	1518	1599
95. Graves	1307	1376	1366	1449	1532
96. Livingston	954	1005	1177	1252	1323
97. Lyon	895	870	1483	1569	1678
98. McCracken	1495	1548	1698	1800	1896
99. Marshall	1167	1187	1345	1419	1492
100. Trigg	1008	1016	953	1018	1099
101. Catoosa	1317	1297	1298	1360	1480
102. Dade	936	928	1035	1100	1181
103. Fannin	1128	1108	1041	1111	1206
104. Gilmer	841	789	890	960	1028
105. Lumpkin	1104	988	1165	1245	1363
106. Rabun	962	915	996	1067	1175
107. Towns	905	765	964	1034	1114
108. Union	867	794	882	947	1031
109. Walker	1460	1420	1372	1446	1572
110. Whitfield	1326	1308	1405	1483	1591
111. Blount	1035	1007	985	1043	1097
112. Colbert	1341	1375	1332	1403	1471
113. Cullman	1009	1005	980	1040	1096
114. DeKalb	987	954	946	1002	1056
115. Etowah	1450	1463	1310	1389	1457
116. Franklin	1067	1061	988	1045	1098
117. Jackson	953	931	973	1032	1079
118. Lauderdale	1349	1369	1393	1475	1552
119. Lawrence	937	914	846	894	933
120. Limestone	1013	1034	1026	1089	1132
121. Madison	1183	1320	1627	1725	1762
122. Marion	935	914	927	985	1038
123. Marshall	1056	1082	1162	1230	1292
124. Morgan	1248	1296	1382	1460	1541
125. Winston	1088	1080	1037	1103	1163

TABLE 69 (Continued)

[a]For 1940, per capita income was computed by dividing the Effective Buying Income (per family) by 4.2. The national average for number of persons in a family was 4.2, as given in 1937 Sales Management Survey of Buying Power, p. 674.

[b]For 1941, 1944, 1945, 1946 and 1947, per capita income was computed by dividing the Effective Buying Income (per family) by 3.61. The 1940 census revealed that 3.61 was the average family size for the nation, as given in 1948 Sales Management Survey of Buying Power, p. 38.

[c]For 1943, per capita income was arrived at by dividing the Effective Buying Income estimate for the county by the revised population estimate for the county as given in 1944 Sales Management Survey of Buying Power, pp. 20-26.

Source of per capita income data: Sales Management Survey of Buying Power for years 1941-1964 (Philadelphia, Pennsylvania: Bill Brothers Publishing Corporation, 1941-1964).

APPENDIX C

TABLE 70

TOTAL INCOME PER COUNTY FOR 1940-63 ($000.00)

	County	Years					
		1940	1941	1942	1943	1944	1945
1.	Anderson	4543	5485	6047	7504	10170	12816
2.	Bedford	5492	7631	8413	10818	12298	15500
3.	Benton	1526	1842	2031	2648	3427	4322
4.	Bledsoe	731	883	974	1159	1635	2054
5.	Blount	8349	10080	11113	14255	16704	21045
6.	Bradley	6551	7909	8720	10757	12672	15966
7.	Campbell	5791	6992	7709	9710	12970	16345
8.	Carroll	4361	5265	5805	7379	9766	12312
9.	Carter	6806	8217	9059	11705	13254	16697
10.	Chester	1567	1892	2086	2671	3517	4436
11.	Claiborne	2456	2965	3269	3975	5510	6944
12.	Cocke	3315	4002	4412	5677	7437	9376
13.	Coffee	3546	4281	4720	6414	7952	10018
14.	Cumberland	1989	2401	2647	3370	4458	5620
15.	Decatur	1406	1598	1762	2209	3158	3982
16.	Dickson	3608	4356	4803	5854	8086	10195
17.	Fentress	1572	1898	2093	2670	3517	4436
18.	Franklin	4302	5194	5726	7303	9632	12136
19.	Giles	5306	6406	7063	8720	9894	12403
20.	Grainger	1192	1439	1587	1956	2666	3365
21.	Greene	6951	8392	9252	11694	13568	17101
22.	Grundy	1242	1500	1654	1969	2778	3503
23.	Hamblen	5212	6293	6938	8522	11670	14706
24.	Hamilton	17704	117961	189917	243268	249674	235465
25.	Hancock	615	743	819	1038	2289	3012
26.	Hardin	2029	2450	2701	3307	4547	5734
27.	Hawkins	3619	4369	4817	6546	8109	10220
28.	Henderson	2945	3556	3921	5083	6608	8330
29.	Henry	5545	6695	7381	9491	12432	15664
30.	Hickman	1407	1699	1873	2240	3158	3982
31.	Houston	688	831	916	1193	1546	1953
32.	Humphreys	1869	2256	2487		4189	5280
33.	Jefferson	2121	2561	2824	3221	4748	5986
34.	Johnson	1213	1464	1614	2389	2710	3415
35.	Knox	84537	102064	138093	200273	225721	235475
36.	Lawrence	5046	6092	6716	8347	11312	14253
37.	Lewis	1044	1260	1389	1677	2330	2936
38.	Lincoln	5270	6363	7015	8470	11805	14870

TABLE 70 (Continued)

	County	Years					
		1940	1941	1942	1943	1944	1945
39.	Loudon	5001	5538	6106	7538	11200	14114
40.	McMinn	7017	8472	9340	10896	15725	19810
41.	McNairy	2644	3192	3519	4363	5914	7448
42.	Marion	3301	3985	4393	5598	7392	9313
43.	Marshall	4169	5033	5549	6978	9341	11770
44.	Maury	9750	12071	13308	15971	21840	27522
45.	Meigs	418	505	557	650	941	1185
46.	Monroe	2907	3510	3870	4996	6518	8216
47.	Moore	294	355	391	501	950	1196
48.	Morgan	1300	1570	1731	1963	2912	3667
49.	Perry	890	1075	1185	1410	1994	2508
50.	Polk	3023	3750	4134	7108	5765	7259
51.	Rhea	3182	3842	4236	4947	7123	8972
52.	Roane	4908	5926	6533	8045	10998	13862
53.	Rutherford	8089	9766	10767	13586	18121	22834
54.	Sequatchie	421	508	560	689	941	1185
55.	Sevier	2917	3522	3883	4908	6541	8242
56.	Stewart	1235	1491	1644	1934	2778	3503
57.	Sullivan	20258	27058	29832	46841	47382	59707
58.	Unicoi	2523	3046	3358	4395	5645	7107
59.	Union	687	829	914	1116	1546	1953
60.	Van Buren	225	272	300	363	515	643
61.	Washington	15987	21002	23155	30305	35817	45140
62.	Wayne	1268	1531	1688	2065	2845	3592
63.	Williamson	4306	5199	5732	6891	9654	12161
64.	Bland	898	1157	1405	1672	2088	2527
65.	Dickenson	3731	4807	5839	6834	7654	9250
66.	Grayson	5519	7311	8880	10809	11783	14243
67.	Lee	6641	8556	4489	12499	15405	18632
68.	Russell	3792	4886	5935	8026	8793	10628
69.	Scott	3480	4484	5446	6971	8074	9757
70.	Smyth	6755	8703	10571	12550	15683	18959
71.	Tazewell	12397	15973	19401	23493	28768	34785
72.	Washington	14702	18942	23007	30900	34104	41230
73.	Wise	13067	16836	20449	25417	30322	36659
74.	Wythe	6312	8133	9878	12033	14639	17701
75.	Avery	1009	1287	1537	1714	2520	2670
76.	Buncombe	53934	68777	89410	115825	118592	124063
77.	Cherokee	2917	3720	4443	5110	6417	6803
78.	Clay	324	413	493	606	913	964
79.	Graham	541	690	824	1746	2340	2480
80.	Haywood	8482	10816	12919	16449	18660	19772
81.	Henderson	9660	12319	14714	16206	21252	22517
82.	Jackson	3467	4421	5281	6842	7627	8085

TABLE 70 (Continued)

	County	Years					
		1940	1941	1942	1943	1944	1945
83.	Macon	2750	3507	4189	5231	6050	6411
84.	Madison	3121	3280	3918	4847	6866	7280
85.	Mitchell	2727	3478	4154	5435	5999	6358
86.	Swain	1393	1776	2121	3186	3065	3253
87.	Transylvania	3067	3911	4671	7374	6747	7152
88.	Watauga	3152	4019	4800	6066	6934	7343
89.	Yancey	1875	2391	2856	3680	4125	4376
90.	Alcorn	6458	8205	9968	12709	15635	16596
91.	Itawamba	1194	1517	1843	3499	3249	3449
92.	Prentiss	3044	3867	4698	7595	8299	8807
93.	Tishomingo	1712	1875	2278	3775	4668	4955
94.	Calloway	4437	5393	5869	7583	8636	9704
95.	Graves	8311	10102	10994	15350	16163	18150
96.	Livingston	1144	1390	1513	2188	2217	2493
97.	Lyon	1176	1429	1555	1628	2295	2572
98.	McCracken	24856	30211	32878	46729	48353	49304
99.	Marshall	2192	2764	3008	3839	4260	4785
100.	Triggs	1813	2104	2290	2999	3520	3954
101.	Catoosa	1213	1445	1529	2002	2710	2874
102.	Dade	598	712	753	952	1344	1421
103.	Fannin	1392	1758	1860	2512	3114	3299
104.	Gilmer	1028	1225	1296	1867	2307	2450
105.	Lumpkin	1038	1237	1309	1839	2330	2471
106.	Rabun	1694	2218	2346	2990	3786	4020
107.	Towns	483	575	608	724	1075	1146
108.	Union	748	891	943	1221	1680	1782
109.	Walker	7651	8116	8585	11250	17136	18180
110.	Whitfield	8544	11179	11826	16599	19130	20290
111.	Blount	2901	3870	4991	6521	7540	8209
112.	Colbert	7508	10015	12915	18168	19526	21264
113.	Cullman	7530	10544	13598	18200	19578	21319
114.	DeKalb	4938	6587	8495	11162	12844	13980
115.	Etowah	20442	28268	36455	50545	53144	57858
116.	Franklin	3736	4984	6427	8863	9724	10583
117.	Jackson	4684	6248	8057	10466	12168	13251
118.	Lauderdale	16858	23987	30289	28620	38836	42284
119.	Lawrence	2320	3095	3991	5461	6032	6565
120.	Limestone	4348	5800	7480	10809	11310	12314
121.	Madison	17469	23302	30050	41376	45422	49453
122.	Marion	3124	4167	5375	6398	8112	8830
123.	Marshall	8095	10798	13925	18862	21060	22930
124.	Morgan	10044	15398	19857	26663	26104	28428
125.	Winston	1808	2712	3497	4629	4706	5128

TABLE 70 (Continued)

County	Years						
	1946	1947	1948	1949	1950	1951	1952
1. Anderson	13356	15231	55768	59373	67700	76043	106722
2. Bedford	15184	17274	18963	18468	19646	20461	19026
3. Benton	4501	5133	5595	4473	4610	4646	6982
4. Bledsoe	2136	2436	2798	2719	2967	3056	4066
5. Blount	21931	25009	27667	39965	47337	50292	59625
6. Bradley	16638	18973	20828	28422	28470	29761	28563
7. Campbell	16034	18285	27206	20462	23246	24263	25049
8. Carroll	12825	14625	16165	15700	16214	16717	16499
9. Carter	17399	19841	27761	31979	38006	39768	46937
10. Chester	4626	5275	5907	5732	6247	6405	5854
11. Claiborne	7230	8245	9015	8812	9375	9489	13583
12. Cocke	9772	11144	12434	12117	13025	13193	11505
13. Coffee	15439	17606	19274	18792	16636	18869	18496
14. Cumberland	5855	6677	7461	7266	9120	9524	11519
15. Decatur	4147	4729	5285	5130	5261	5339	4135
16. Dickson	10627	12119	13368	12074	13528	13822	11831
17. Fentress	4626	5269	5900	5261	6191	6402	6910
18. Franklin	12648	14423	15854	15422	17028	17664	17213
19. Giles	12981	14803	16476	15999	16755	16993	17444
20. Grainger	3511	4004	4352	4246	4815	4895	5618
21. Greene	17815	20316	22383	30810	32830	34101	29126
22. Grundy	3646	4158	4662	4515	5309	5479	6414
23. Hamblen	13326	15196	16787	16392	21853	23223	23804
24. Hamilton	241377	283704	267661	252798	283710	296609	274983
25. Hancock	3136	3576	4041	3924	3579	3605	3277
26. Hardin	5970	6808	7461	6267	7688	7886	8047
27. Hawkins	10648	12143	13368	15034	16532	17155	19437
28. Henderson	8679	9897	10881	10633	11136	11378	8857
29. Henry	1635	18605	20517	19938	19401	19801	16651
30. Hickman	4147	4729	5284	5153	5670	5781	7078
31. Houston	2032	2317	2487	2434	2349	2291	2228
32. Humphreys	5501	6273	6840	6639	7237	7390	7556
33. Jefferson	6241	7117	7772	13587	15286	15680	13179
34. Johnson	3563	4063	4352	5221	5692	5800	5455
35. Knox	250257	292977	302396	282905	306266	322568	311514
36. Lawrence	13846	15789	17413	16915	18682	19183	17154
37. Lewis	3063	3493	3730	3155	3949	4038	3659
38. Lincoln	15492	17666	19585	19125	20020	20432	17240
39. Loudon	13700	15623	17405	16939	17854	18603	19756
40. McMinn	18639	21255	23315	22707	16568	27374	24280
41. McNairy	7762	8851	9638	9362	11618	11918	11326
42. Marion	9700	11061	12124	11822	12958	13481	14432
43. Marshall	12263	13984	15544	15110	16844	17509	14634

TABLE 70 (Continued)

County	Years						
	1946	1947	1948	1949	1950	1951	1952
44. Maury	28672	32642	36060	35143	36434	37541	33875
45. Meigs	1240	1414	1546	2511	2926	2981	2994
46. Monroe	8564	9766	10881	11587	12572	12837	14075
47. Moore	1250	1425	1561	2541	2844	2926	2254
48. Morgan	3824	4361	4663	4517	5406	5585	9274
49. Perry	2615	2982	3420	3338	3380	3399	2700
50. Polk	7564	8626	9637	9385	9486	9678	10749
51. Rhea	9345	10657	11813	9504	10757	10981	11627
52. Roane	14440	16467	18342	17850	17920	18503	28840
53. Rutherford	23785	27123	29843	33259	34812	36452	26917
54. Sequatchie	1240	1414	1554	2025	2459	2545	3539
55. Sevier	8585	9790	10881	10587	11257	11538	13855
56. Stewart	3646	4158	4663	4529	4456	4468	4271
57. Sullivan	62209	65003	84993	82373	97162	103943	145962
58. Unicoi	7407	8447	9325	9083	10707	11049	16522
59. Union	2031	2316	2488	3422	3687	3796	3868
60. Van Buren	667	761	932	919	1054	1069	1524
61. Washington	47029	48682	52014	49146	58044	60724	65652
62. Wayne	3740	4265	4663	4547	5292	5479	6399
63. Williamson	12669	14447	15855	15490	16611	17048	15787
64. Bland	2530	2596	2430	3697	3588	3865	4180
65. Dickenson	9250	9491	8881	13819	14481	15461	20757
66. Grayson	14240	14611	13672	15149	15478	16409	14487
67. Lee	18629	19115	17887	24743	23099	24034	23821
68. Russell	10630	10907	10206	18293	18988	20059	16138
69. Scott	9760	10014	9371	16353	17190	18427	16925
70. Smyth	18959	19453	18203	20615	20266	21703	25021
71. Tazewell	34789	40811	38189	38718	41228	44134	50589
72. Washington	41229	42304	39585	44488	46910	49549	47940
73. Wise	36659	37485	35077	34301	35995	38642	55207
74. Wythe	17699	18160	16994	17246	16541	17478	19424
75. Avery	2854	3813	3494	4344	4739	5159	7621
76. Buncombe	120650	164634	164780	147326	157245	174443	157908
77. Cherokee	7270	9712	8900	7514	7961	8750	10028
78. Clay	1026	1371	1256	1198	1556	1677	2864
79. Graham	2651	3541	3245	3109	1743	1880	4177
80. Haywood	21136	28235	25875	24713	29146	32138	44394
81. Henderson	24076	32162	29473	28153	32020	35647	28995
82. Jackson	8649	11554	10588	10141	11993	13183	11813
83. Macon	6853	9155	8390	7007	7905	8739	9545
84. Madison	7783	10397	9527	8091	9114	9785	9001
85. Mitchell	7499	10018	9180	8813	9271	10053	8735

TABLE 70 (Continued)

County	Years						
	1946	1947	1948	1949	1950	1951	1952
86. Swain	3475	4642	4254	4062	3121	3330	5477
87. Transylvania	7644	10211	9357	8945	10463	11617	12618
88. Watauga	7847	10482	9606	19200	17112	18770	8485
89. Yancy	4683	6256	5734	5481	6524	7117	9269
90. Alcorn	15579	17111	18599	21957	17646	20974	23303
91. Itawamba	4612	6065	5505	6480	4959	5798	10728
92. Prentiss	9223	10130	11012	13010	10140	12004	16666
93. Tishomingo	5193	5704	6200	7289	5526	6492	10715
94. Calloway	9576	13471	12835	14412	16098	17363	14305
95. Graves	17919	25208	24016	25114	24422	26181	28610
96. Livingston	2458	3458	3295	3445	3146	3300	3598
97. Lyon	2537	3569	3399	3559	2967	3072	3801
98. McCracken	48672	62248	59305	60271	51981	67498	105336
99. Marshall	4729	6653	6338	6696	6302	6699	10400
100. Triggs	3900	5486	5226	5505	5138	5450	4722
101. Catoosa	2885	3352	3264	3621	5187	5881	20056
102. Dade	1427	1658	1631	2148	2715	3120	5658
103. Fannin	3317	3854	3539	4056	4836	5297	13740
104. Gilmer	2463	2862	2726	2832	3190	3542	5869
105. Lumpkin	2483	2885	2714	2790	3317	3720	3391
106. Rabun	4041	4696	4351	4739	5063	5619	3690
107. Towns	1156	1346	1359	1361	1686	1848	1417
108. Union	1789	2079	1904	2130	2316	2546	3296
109. Walker	18274	21235	19957	20985	26355	30071	49340
110. Whitfield	20396	23701	22302	21960	26180	29956	42602
111. Blount	9107	10919	10863	11584	13142	13819	14079
112. Colbert	23582	28274	28126	27420	28289	20410	48311
113. Cullman	23649	28355	28208	45537	40506	43161	33556
114. DeKalb	15507	18593	18497	19034	21845	23124	22451
115. Etowah	59607	72036	84419	81434	79599	100902	118775
116. Franklin	11736	14071	13998	13652	13965	14805	16449
117. Jackson	14697	17621	17529	17036	17253	18029	20463
118. Lauderdale	46909	56243	58128	63687	54735	59401	59822
119. Lawrence	7288	8738	8693	9476	9598	10181	12840
120. Limestone	13655	16372	16287	18878	19729	20927	22151
121. Madison	54852	65869	70706	67097	56164	62680	64218
122. Marion	9794	11743	11682	13392	15152	15956	14555
123. Marshall	25435	30496	30337	29575	31920	34036	30895
124. Morgan	31535	38979	44082	44518	44220	47776	44489
125. Winston	5690	6822	6786	9623	10592	11303	10698

TABLE 70 (Continued)

County	Years					
	1953	1954	1955	1956	1957	1958
1. Anderson	84006	81993	89220	95785	92249	93898
2. Bedford	21931	22048	22538	23846	24219	23562
3. Benton	8640	8612	8925	8953	9105	9073
4. Bledsoe	4853	4885	5282	5627	5766	5733
5. Blount	59011	60192	61043	65712	67782	70840
6. Bradley	31872	32309	33029	35093	35769	38129
7. Campbell	24482	24645	25792	27410	28187	27025
8. Carroll	21414	21575	22381	23638	24315	25146
9. Carter	43815	44833	45021	47986	47188	49870
10. Chester	7489	7543	8054	7780	7924	7645
11. Claiborne	13835	13827	14806	15622	15980	15887
12. Cocke	13609	13584	14389	15162	15447	17410
13. Coffee	22249	21863	23361	25306	26355	30681
14. Cumberland	12859	13127	13931	14937	15552	16695
15. Decatur	5486	5472	5772	5711	5774	5182
16. Dickson	14216	14246	14780	15589	15865	16894
17. Fentress	8042	8127	8730	9293	9657	10072
18. Franklin	20200	20232	21225	22406	22799	23924
19. Giles	21863	22223	22486	23552	23707	26284
20. Grainger	6893	6922	7372	7797	8039	10007
21. Greene	33609	33883	34554	38318	41124	43775
22. Grundy	7065	7132	7634	8131	8386	7562
23. Hamblen	25877	26465	27163	31292	34291	35220
24. Hamilton	283620	288280	306691	342521	355036	360929
25. Hancock	3975	3915	4162	4348	4415	6195
26. Hardin	10424	10448	11206	11562	12952	14089
27. Hawkins	23170	23538	24582	26123	26824	31537
28. Henderson	11537	11440	12184	11977	11984	12255
29. Henry	22554	22495	22728	23748	23997	23208
30. Hickman	9795	9797	10531	11113	11202	10878
31. Houston	2938	2920	3087	3224	3237	3631
32. Humphreys	9563	9521	9886	10390	10452	10932
33. Jefferson	15931	15912	16693	17600	17796	19986
34. Johnson	7181	7195	7609	8019	8202	9924
35. Knox	314171	321200	330918	354028	355812	356272
36. Lawrence	19771	19863	20317	21385	21759	22470
37. Lewis	4453	4454	4651	4927	5079	5578
38. Lincoln	20729	20741	21373	23373	23852	24994
39. Loudon	19803	20198	21011	22392	23070	27592
40. McMinn	27429	27648	28877	32865	33658	34601
41. McNairy	12991	12963	13685	16638	17378	16215
42. Marion	15767	15924	16600	17655	18264	10002

TABLE 70 (Continued)

County	Years					
	1953	1954	1955	1956	1957	1958
43. Marshall	17633	17710	18936	20007	20191	19485
44. Maury	39136	39195	39464	45682	45743	47185
45. Meigs	3702	3693	4017	4267	4354	4964
46. Monroe	15498	15450	16454	17313	17609	20596
47. Moore	2733	2766	2942	3124	3293	3621
48. Morgan	9331	9358	9777	10312	10569	9420
49. Perry	3813	3778	3945	4125	4205	3854
50. Polk	9921	9833	10045	10456	10466	1124
51. Rhea	12345	12328	12632	13275	13507	15325
52. Roane	29536	29918	31115	33059	33791	42345
53. Rutherford	45673	46623	47876	51146	52654	57017
54. Sequatchie	3792	3854	4091	4398	4607	5085
55. Sevier	16286	16306	17111	17959	18181	22843
56. Stewart	5568	5450	5680	5885	5929	6692
57. Sullivan	138056	147897	146574	156261	158741	154201
58. Unicoi	15287	15521	15643	16515	16761	16757
59. Union	4594	4615	4908	5208	5394	7087
60. Van Buren	1972	2004	2258	2417	2469	2366
61. Washington	66407	67519	69308	74846	75461	80208
62. Wayne	7712	7784	8314	8790	9066	8837
63. Williamson	19351	19319	20595	21526	21352	24658
64. Bland	4175	4013	4501	4559	4848	5534
65. Dickenson	16410	16390	17713	18424	19252	20695
66. Grayson	16691	16710	19027	19558	21154	19383
67. Lee	21105	21063	22925	23595	23805	24158
68. Russell	17578	17442	19248	19903	21814	24965
69. Scott	18363	18439	19964	20462	22630	26771
70. Smyth	24653	24525	26862	27812	29241	30526
71. Tazewell	45029	44377	49003	50909	52951	53072
72. Washington	49356	48965	51966	53867	57489	60913
73. Wise	47047	46703	50637	52450	53358	51569
74. Wythe	19268	19438	20541	21238	22054	22683
75. Avery	8307	7842	8602	9009	9891	11027
76. Buncombe	163626	160154	171538	182172	193144	190548
77. Cherokee	11971	11424	12469	13143	14388	15533
78. Clay	3454	3253	3570	3777	4220	4917
79. Graham	5044	4842	5403	5700	6373	6949
80. Haywood	40917	39638	41049	44414	47279	48679
81. Henderson	33311	32326	34349	36523	29570	40277
82. Jackson	12733	12062	13124	13754	15022	16246
83. Macon	10818	10304	11278	11888	13025	14497
84. Madison	12758	12013	13219	13854	15266	17767

TABLE 70 (Continued)

County	Years					
	1953	1954	1955	1956	1957	1958
85. Mitchell	9737	9188	10055	10530	11419	12680
86. Swain	6268	5894	6749	7016	7407	7768
87. Transylvania	14738	14235	15415	16420	17945	18399
88. Watauga	11602	11113	12246	12951	14303	16154
89. Yancy	9335	8805	9628	10105	11080	12716
90. Alcorn	23212	22416	22485	24219	23144	24048
91. Itawamba	10772	10160	10391	10404	9722	11960
92. Prentiss	14290	13406	13491	14006	13225	15578
93. Tishomingo	9866	9251	9514	9533	8997	10730
94. Calloway	19409	19732	16514	21765	21452	22607
95. Graves	34172	36924	35023	38650	39087	36984
96. Livingston	5076	5130	5121	5330	5082	5920
97. Lyon	3939	3783	5173	4714	4945	5186
98. McCracken	118644	111164	99262	108615	99435	84147
99. Marshall	12399	13701	14930	17838	18827	18311
100. Triggs	6349	6226	6143	6137	7489	7944
101. Catoosa	16836	17373	18156	19546	20262	21291
102. Dade	5522	5783	6296	6860	7250	7513
103. Fannin	12599	12728	13211	13886	14168	14963
104. Gilmer	5327	5337	5750	6093	6291	7099
105. Lumpkin	4980	5165	5685	6150	6450	7044
106. Rabun	4816	4929	5284	5652	5862	6359
107. Towns	2472	2495	2681	2787	2856	3366
108. Union	3850	3919	4324	4628	4826	5722
109. Walker	47193	38619	51569	55735	56925	58745
110. Whitfield	40900	41236	42910	46273	47493	49074
111. Blount	19652	19819	19411	21018	22262	25120
112. Colbert	44584	45730	46873	51669	57445	59668
113. Cullman	32646	32730	32622	35516	38124	43025
114. DeKalb	28365	28320	29187	31809	34145	39258
115. Etowah	119982	124138	120383	131570	138752	141163
116. Franklin	18579	18517	18453	19882	21325	23062
117. Jackson	23634	23578	24135	26074	28396	31425
118. Lauderdale	59896	60853	59704	65149	70940	76212
119. Lawrence	16194	16238	16495	17982	19506	22022
120. Limestone	25384	25570	25206	27311	29608	32743
121. Madison	69700	69651	75453	86085	93515	102163
122. Marion	16386	16380	16512	17879	18311	20367
123. Marshall	33100	33404	33848	36745	40996	45055
124. Morgan	50729	51114	50467	55007	60358	63231
125. Winston	13499	13561	12933	13843	13543	14597

TABLE 70 (Continued)

County	Years				
	1959	1960	1961	1962	1963
1. Anderson	110860	108366	99341	103604	119863
2. Bedford	25712	26681	31571	32866	34488
3. Benton	14391	11329	12470	12956	13777
4. Bledsoe	6561	6280	5893	6154	6576
5. Blount	74861	72951	80493	84128	88324
6. Bradley	44598	45737	53666	56645	59909
7. Campbell	26433	25581	23668	24254	24983
8. Carroll	29447	26018	25877	26749	27687
9. Carter	53623	50726	50087	53096	55775
10. Chester	8815	9228	9180	9429	9740
11. Claiborne	18771	15253	14778	15088	15467
12. Cocke	20587	20345	21147	22307	23380
13. Coffee	31936	32693	41391	43761	46562
14. Cumberland	19630	16962	16695	17578	18385
15. Decatur	6424	7148	8088	8313	8606
16. Dickson	21217	19493	21890	22920	24033
17. Fentress	11578	9959	8653	9005	9598
18. Franklin	25781	26973	30824	32283	33664
19. Giles	27985	25283	23539	24294	25126
20. Grainger	11094	10101	10839	11316	12061
21. Greene	51877	47069	48152	48947	51121
22. Grundy	10214	9001	9700	10083	10525
23. Hamblen	39964	42623	47333	5227	56334
24. Hamilton	387866	384896	419881	445288	479578
25. Hancock	6623	5656	5092	5020	5673
26. Hardin	16834	15340	16784	17719	18741
27. Hawkins	35365	30715	30580	31936	33393
28. Henderson	14407	15684	15195	15817	16484
29. Henry	29720	28667	29114	31058	32104
30. Hickman	12583	11932	10907	11198	11654
31. Houston	4696	4367	4581	4717	4933
32. Humphreys	13902	13759	12750	13267	14006
33. Jefferson	22533	23600	25468	26708	28081
34. Johnson	14409	9316	8587	8897	9226
35. Knox	380198	403877	435597	460738	486348
36. Lawrence	28160	27505	29274	30586	31828
37. Lewis	5182	5940	6155	6458	6791
38. Lincoln	29551	26556	28268	29354	30412
39. Loudon	27592	25593	29735	31019	32615
40. McMinn	37912	38698	41208	43313	45357
41. McNairy	18409	16721	15663	16219	16595
42. Marion	20834	21247	21724	22759	23924
43. Marshall	21432	21483	20106	20939	22054
44. Maury	51258	52692	55763	58031	60892

TABLE 70 (Continued)

County	Years				
	1959	1960	1961	1962	1963
45. Meigs	6064	4469	3622	3732	4047
46. Monroe	24695	21226	21605	22498	23430
47. Moore	4265	3148	3519	3578	3749
48. Morgan	10447	11642	12525	12730	13454
49. Perry	5388	4648	4759	4808	4933
50. Polk	10622	11868	12877	13210	13332
51. Rhea	17441	16579	15846	16471	17205
52. Roane	46907	46553	52717	55882	59374
53. Rutherford	64987	75354	74765	79571	84490
54. Sequatchie	6014	4996	5513	5779	6048
55. Sevier	2578	23472	25221	26443	27796
56. Stewart	8002	7552	7139	7353	7648
57. Sullivan	172426	183970	187154	198120	212390
58. Unicoi	16875	17713	16930	17520	18454
59. Union	8359	6370	7351	7610	7956
60. Van Buren	2699	2679	2443	2511	2624
61. Washington	83107	87038	95926	102241	106900
62. Wayne	9907	9898	10244	10584	10650
63. Williamson	28036	28119	33472	35240	36813
64. Bland	6326	5048	6549	6175	6198
65. Dickenson	21561	17708	18699	17186	17000
66. Grayson	18840	18266	17183	15657	15451
67. Lee	24640	20235	19913	17870	17428
68. Russell	24084	23270	27066	25372	25487
69. Scott	30633	23660	26185	24390	24095
70. Smyth	32396	32623	72295	40149	40463
71. Tazewell	54879	50298	53011	49571	49487
72. Washington	62576	61531	75171	71283	71648
73. Wise	53928	49839	53998	49926	49527
74. Wythe	22980	23667	24200	22700	22718
75. Avery	11389	11694	12294	12625	13371
76. Buncombe	203153	215122	235134	247114	258626
77. Cherokee	16739	16335	16203	17072	17476
78. Clay	8226	5274	4660	4915	5159
79. Graham	7461	6643	5679	5924	6217
80. Haywood	54134	51136	64440	66834	69792
81. Henderson	42128	50016	57495	60686	64507
82. Jackson	17609	17992	20580	21389	22184
83. Macon	16895	15034	15572	16249	16912
84. Madison	19694	17214	17366	18109	18646
85. Mitchell	13908	14015	15107	15724	16355
86. Swain	8972	8290	7876	8207	8552
87. Transylvania	19129	20500	24229	25439	26481

TABLE 70 (Continued)

County	Years				
	1959	1960	1961	1962	1963
88. Watauga	18086	17343	20195	21231	22229
89. Yancey	13686	12628	14200	14760	15023
90. Alcorn	26813	28735	26291	28075	29753
91. Itawamba	14082	13484	13791	14622	14734
92. Prentiss	17785	17731	16404	17592	17791
93. Tishomingo	14043	12958	12612	13436	13825
94. Calloway	25039	27079	29918	32636	34549
95. Graves	39484	41017	40706	42893	45192
96. Livingston	6485	7034	8239	8636	9128
97. Lyon	5550	5045	8602	9844	9395
98. McCracken	85510	89491	99493	107640	114868
99. Marshall	18901	20181	23405	25109	26857
100. Triggs	8668	8938	8288	8756	9345
101. Catoosa	23838	27896	28823	31008	33745
102. Dade	8428	8170	9215	9897	10745
103. Fannin	16351	14959	13840	14557	15921
104. Gilmer	7910	6942	7739	8158	8839
105. Lumpkin	7064	7209	8502	9086	10085
106. Rabun	6925	6859	7470	8003	8812
107. Towns	3931	3494	4338	4548	4900
108. Union	6327	5158	5871	6393	6969
109. Walker	54737	65029	63818	70108	77345
110. Whitfield	53844	55856	61545	67940	74629
111. Blount	28165	25381	24435	25442	26447
112. Colbert	64507	64614	63944	68190	72532
113. Cullman	49840	45414	44218	46486	48659
114. DeKalb	43250	39229	38593	40486	42342
115. Etowah	145316	142248	128026	144473	151920
116. Franklin	24644	23021	21040	21831	22628
117. Jackson	34592	33990	35333	31135	38636
118. Lauderdale	82160	85020	88179	94399	100588
119. Lawrence	24553	22218	20378	21289	22008
120. Limestone	38507	37628	37655	39979	45046
121. Madison	128209	157035	206962	229422	269230
122. Marion	22523	19562	19381	19994	20663
123. Marshall	51958	52150	56469	60154	63682
124. Morgan	62621	79062	85964	91858	98023
125. Winston	16095	15764	14832	15338	15822

Source: Sales Management Survey of Buying Power for years 1941-1964 (Philadelphia, Pennsylvania: Bill Brothers Publishing Corporation, 1941-1964).

Note: For 1940-47, total income figures are gross total income. For 1948-63, total income figures are net total income.

APPENDIX D

TABLE 71

TOTAL EMPLOYMENT BY COUNTY FOR 1940, 1950 AND 1960

County		1940	1950	1960
1.	Anderson	7095	19628	19866
2.	Bedford	8374	8946	9255
3.	Benton	3094	3642	3531
4.	Bledsoe	2038	2274	2327
5.	Blount	12257	16644	18148
6.	Bradley	8706	10913	13872
7.	Campbell	7605	8524	7322
8.	Carroll	8016	9354	8390
9.	Carter	9007	13357	12295
10.	Chester	2987	3553	3194
11.	Claiborne	6167	6542	5328
12.	Cocke	6620	6639	6945
13.	Coffee	6158	7838	9063
14.	Cumberland	3709	5141	5119
15.	Decatur	2541	2984	2642
16.	Dickson	6259	6288	6378
17.	Fentress	3146	3570	3324
18.	Franklin	7376	7833	8568
19.	Giles	9565	9345	8149
20.	Grainger	4088	4087	4002
21.	Greene	12446	14757	14525
22.	Grundy	2114	2971	2787
23.	Hamblen	5904	8433	12095
24.	Hamilton	64550	79660	87543
25.	Hancock	2960	2523	2005
26.	Hardin	4653	5077	5704
27.	Hawkins	8130	9481	9107
28.	Henderson	5212	5407	5545
29.	Henry	8608	8494	8024
30.	Hickman	4127	4162	4039
31.	Houston	1653	1502	1437
32.	Humphreys	3434	3738	3685
33.	Jefferson	5470	6430	7510
34.	Johnson	3165	3346	2725
35.	Knox	62280	78561	89514
36.	Lawrence	8538	9053	8725
37.	Lewis	1362	1961	1919
38.	Lincoln	8828	9010	9028

TABLE 71 (Continued)

County	1940	1950	1960
39. Loudon	6453	7635	8124
40. McMinn	9343	10522	11658
41. McNairy	5511	6183	5625
42. Marion	4505	5574	5847
43. Marshall	5694	6488	6225
44. Maury	14466	14478	14963
45. Meigs	1735	1741	1408
46. Monroe	6396	6457	6517
47. Moore	1289	1435	1358
48. Morgan	3317	3935	3255
49. Perry	1829	1953	1783
50. Polk	3660	3556	3488
51. Rhea	1898	5058	5021
52. Roane	7908	9828	12828
53. Rutherford	11093	14825	18974
54. Sequatchie	1127	1465	1871
55. Sevier	6151	7648	8086
56. Stewart	3422	2617	2385
57. Sullivan	22476	33160	40314
58. Unicoi	3338	4862	4890
59. Union	2276	2618	2616
60. Van Buren	796	1173	1041
61. Washington	14763	19783	21203
62. Wayne	3946	4128	3516
63. Williamson	8261	8341	8831
64. Bland	1991	1888	1729
65. Dickenson	4443	5620	4284
66. Grayson			
67. Lee	9562	9237	5689
68. Russell	6998	7195	7008
69. Scott	7497	7963	6903
70. Smyth	7406	8775	9594
71. Tazewell	11129	12887	11627
72. Washington	10740	11158	11844
73. Wise	11639	14654	11845
74. Wythe	6474	7435	6940
75. Avery	3100	3769	3421
76. Burcombe	36291	45189	48689
77. Cherokee	4243	5041	4174
78. Clay	1589	1646	1420
79. Graham	1427	1857	1570
80. Haywood	9325	12290	13572

TABLE 71 (Continued)

County		1940	1950	1960
81.	Henderson	8435	10834	12910
82.	Jackson	4647	5585	5286
83.	Macon	3791	4689	4538
84.	Madison	6466	6346	5099
85.	Mitchell	4058	4570	4056
86.	Swain	2319	2655	2149
87.	Transylvania	3767	4809	5080
88.	Watauga	5071	5484	5503
89.	Yancey	4387	4705	3748
90.	Alcorn	8208	8843	8610
91.	Itawamba	5315	5529	5533
92.	Prentiss	5763	6752	6128
93.	Tishomingo	4083	4605	4658
94.	Calloway	6276	6836	7371
95.	Graves	10632	12324	10798
96.	Livingston	2509	2234	2033
97.	Lyon	2215	1800	1602
98.	McCracken	16208	18448	19794
99.	Marshall	4855	4673	5079
100.	Trigg	3452	3216	2827
101.	Catoosa	4761	5235	7303
102.	Dade	1435	2256	2586
103.	Fannin	3810	4513	3706
104.	Gilman	2898	3150	2799
105.	Lumpkin	1647	1892	2227
106.	Rabun	2085	2115	2333
107.	Towns	1307	1300	1141
108.	Union	2051	2116	1893
109.	Walker	10761	13518	16131
110.	Whitfield	9902	13152	16014
111.	Blount	8687	9213	8106
112.	Colbert	9024	12691	14521
113.	Cullman	13965	15595	14090
114.	DeKalb	13192	14736	13629
115.	Etowah	13192	32422	29915
116.	Franklin	6757	7297	6315
117.	Jackson	11095	11371	11032
118.	Lauderdale	11716	18063	19797
119.	Lawrence	7048	7472	6445
120.	Limestone	9460	10287	11313
121.	Madison	17764	22629	42098
122.	Marion	7573	7944	6819

TABLE 71 (Continued)

County	1940	1950	1960
123. Marshall	12138	15323	16058
124. Morgan	13508	17297	20005
125. Winston	4983	5312	4296

Source: Growth Patterns in Employment by County, 1940-50 and 1950-60, Vol. 5, Southeast, U. S. Department of Commerce, Office of Business Economics (Washington: U. S. Government Printing Office, 1965).

Note: Total employment data for years 1941-49, 1951-59, 1961-63 obtained by interpolation.

APPENDIX E

TABLE 72

CAPITAL INVESTED PER PRODUCTION WORKER
IN TOTAL MANUFACTURING (DOLLARS)

1940	6055
1941	5709
1942	5727
1943	5332
1944	5331
1945	5713
1946	7081
1947	7767
1948	8815
1949	8089
1950	8969
1951	11134
1952	11896
1953	9855
1954	10888
1955	11498
1956	14875
1957	13035
1958	17557
1959	17528
1960	18227
1961	19974
1962	20602
1963	21498

Source: Economic Almanac, for years 1951-52, 1953-54, 1958, 1960, 1964, 1967-68 (New York: The Macmillan Company).

APPENDIX F

TABLE 73

TOTAL NUMBER OF PRODUCTION WORKERS ENGAGED IN MANUFACTURING BY COUNTY

County		1939	1947	1954	1958	1963
1.	Anderson	938	1015	4399	4205	4314
2.	Bedford	1844	1972	2092	2414	3029
3.	Benton		53	137	223	310
4.	Bledsoe		179	97	327	410
5.	Blount	4159	8942	6128	5362	5743
6.	Bradley	2971	3325	3652	4568	5988
7.	Campbell	889	368	265	1320	1190
8.	Carroll	100	816	1642	2201	3015
9.	Carter	4036	4962	3204	3746	3516
10.	Chester	9	338	367	328	622
11.	Claiborne		41	68	196	210
12.	Cocke	570	605	669	1269	1842
13.	Coffee	1335	1868	1992	1760	2630
14.	Cumberland	113	189	241	334	965
15.	Decatur		462		553	1045
16.	Dickson	911	706	1054	1014	1297
17.	Fentress	167	130	188	1017	242
18.	Franklin	493	1085	948	959	1479
19.	Giles	500	1066	971	1049	1601
20.	Grainger	19	71	62	70	101
21.	Greene	586	1019	1983	2365	3126
22.	Grundy	40	86	222	89	797
23.	Hamblen	1081	1842	3532	4153	6191
24.	Hamilton	19972	28979	30552	27850	27366
25.	Hancock			25	16	18
26.	Hardin	176	766	1020	1262	1498
27.	Hawkins	170	360	306	676	720
28.	Henderson	255	266	493	624	1748
29.	Henry	503	585	1023	1084	1338
30.	Hickman	257	704	514	691	790
31.	Houston	143	77	187	246	499
32.	Humphreys	175	317	242	295	876
33.	Jefferson	264	524	761	1452	2480
34.	Johnson	115	49	45	40	345
35.	Knox	14640	17314	16945	14941	17442
36.	Lawrence	588	801	987	2171	3007
37.	Lewis		519	295	653	980
38.	Lincoln	410	610	822	1076	1462

TABLE 73 (Continued)

County		1939	1947	1954	1958	1963
39.	Loudon	2528	1501	2357	2396	2531
40.	McMinn	2045	2092	2934	3885	3966
41.	McNairy	20	391	773	1060	1789
42.	Marion	561	884	708	684	896
43.	Marshall	864	1719	1759	1723	1811
44.	Maury	1791	2421	3072	2987	3226
45.	Meigs	40	58	40	35	30
46.	Monroe	676	631	1225	1192	1465
47.	Moore		107		252	297
48.	Morgan	113	266	231	232	227
49.	Perry		115	203	205	375
50.	Polk	290	574	599	558	1415
51.	Rhea	701	913	959	1086	2118
52.	Roane	2103	2823	6094	5941	4466
53.	Rutherford	650	1113	806	1315	1868
54.	Sequatchie	12	24	365	560	746
55.	Sevier	173	231	246	640	674
56.	Stewart		36	51	94	247
57.	Sullivan	8360	15179	13909	13798	14657
58.	Unicoi	537	1326	1042	440	781
59.	Union		22		25	11
60.	Van Buren		24		110	514
61.	Washington	2405	2860	2970	2764	3246
62.	Wayne	113	398	543	614	969
63.	Williamson	478	498	395	312	780
64.	Bland	273	194	223	298	464
65.	Dickenson		13	44	85	167
66.	Grayson	950	1674	1408	1649	2210
67.	Lee		76	22	44	35
68.	Russell	8	20	35	242	425
69.	Scott		156	216	259	125
70.	Smyth	2090	2828	3083	3339	3181
71.	Tazewell	318	843	809	1116	1482
72.	Washington	398	1777	1075	942	836
73.	Wise	387	441	363	373	506
74.	Wythe	1067	748	1245	844	981
75.	Avery	132	182	309	344	447
76.	Buncombe	6683	10024	8758	9597	12504
77.	Cherokee	241	279	872	684	1074
78.	Clay	118	294	91	195	189
79.	Graham			222	236	319
80.	Haywood	2152	3584	3856	4218	3654
81.	Henderson	1380	1634	2064	2725	2891

TABLE 73 (Continued)

County		1939	1947	1954	1958	1963
82.	Jackson	367	579		576	933
83.	Macon	77	332	330	677	513
84.	Madison	65	53	138	395	532
85.	Mitchell	415	673	543	625	934
86.	Swain	163	221	325	239	585
87.	Transylvania	901	2220	2244	2228	2354
88.	Watauga	49	45	133	207	800
89.	Yancey	90	183	670	551	565
90.	Alcorn	1011	1064	1590	1682	2522
91.	Itawamba	215	458	847	113	1838
92.	Prentiss	280	676	760	1252	1930
93.	Tishomingo	72	132	546	1122	1241
94.	Calloway	180	400	816	873	921
95.	Graves	1255	2739	2447	2448	2656
96.	Livingston		13	6		5
97.	Lyon		30	28	32	16
98.	McCracken	2485	3120	3800	3614	3284
99.	Marshall	179	369	892	1183	1531
100.	Trigg	14	91	171	175	195
101.	Catoosa	92	154	300	484	612
102.	Dade		103	134	157	62
103.	Fannin	23	483	177	180	506
104.	Gilmer	473	495	760	735	876
105.	Lumpkin		235	37	385	385
106.	Rabun		163	541	742	948
107.	Towns			21	31	41
108.	Union		44	69	35	151
109.	Walker	3878	4707	5172	4901	3476
110.	Whitfield	5281	5478	8077	7911	9364
111.	Blount	209	411	578	576	402
112.	Colbert	486	5589	4421	5670	6198
113.	Cullman	636	754	1259	1191	1886
114.	DeKalb	929	1216	1584	1606	1999
115.	Etowah	8829	13730	11309	10015	8059
116.	Franklin	433	779	402	481	869
117.	Jackson	974	958	1261	1796	2178
118.	Lauderdale	844	932	1588	1456	1462
119.	Lawrence		11	155	266	790
120.	Limestone	55	110	598	544	614
121.	Madison	2959	4119	3944	4549	8415
122.	Marion	434	500	1250	1572	2446

TABLE 73 (Continued)

County	1939	1947	1954	1958	1963
123. Marshall	1061	1419	1571	2229	3195
124. Morgan	2390	3785	3263	3063	4487
125. Winston	436	527	866	786	1072

Note: Data on number of production workers engaged in manufacturing for years 1940-46, 1948-53, 1955-57 and 1959-62 obtained by interpolation.

Data for variable "Capital Invested in Manufacturing" (X_5) were generated by multiplying figures in "Total Number of Production Workers Engaged in Manufacturing by County," Appendix F, by corresponding figures in "Capital Invested Per Production Worker in Total Manufacturing," Appendix E.

Source: Census of Manufactures, for years 1939, 1947, 1958 and 1963, Bureau of the Census, U. S. Department of Commerce (Washington: U. S. Government Printing Office).

APPENDIX G

TABLE 74

WATER RESOURCE PROJECTS AND ADDITIONS CONSTRUCTED BY TVA, EXPENDITURES BY FISCAL YEARS
(MILLIONS OF DOLLARS)

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Kentucky Dam and Reservoir	11.4	13.8	18.1	23.8	27.4	11.3	4.8	1.4	0.5															
Pickwick Dam and Reservoir																								
Addition: gen units 3-4	0.1	2.9	1.6	0.1																				
gen units 5-6											0.9	3.0	3.9	1.2	0.1									
Wilson Dam and Reservoir																								
Addition: gen units 9-18	0.2	1.5	3.9	2.9					0.1															
gen units 19-21										1.7	5.2	0.2												
new navig lock and RR alterations																				1.6	8.6	8.5	2.4	0.2
Wheeler Dam and Reservoir																	0.8	7.5	15.6	8.5	2.6	0.8	1.2	0.1
Addition: gen units 3-4	1.9	1.6																						
gen units 5-8								0.9	3.4															
Rehabilitation, navig lock										4.1	2.2													
Addition: gen units 9-11																						0.5	5.9	0.2
new navig lock																				0.1	1.4	7.3	7.8	3.0
Guntersville Dam and Reservoir																					0.2	2.9	7.9	4.3
Addition: gen unit 4																								
new navig lock											1.0	2.2	1.2	0.3									0.1	2.1
Hales Bar Dam and Reservoir																								
Addition: gen units 15-16											1.8	4.7	6.2	1.2	0.2									
Chicamauga Dam and Reservoir																								
Addition: gen unit 4											1.2	1.4	1.6											
Hiwassee River Dredg																								
Watts Bar Dam and Reservoir	6.9	13.9	10.8	2.7	1.3	0.1	1.3																	

TABLE 74 (Continued)

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Fort Loudoun Dam and Reservoir	0.8	2.8	15.2	14.2	2.9	0.2	0.1																	
Addition: gen units 3-4							1.0	1.7	2.0	2.0														
Hiwassee Dam and Reservoir																								
Addition: gen unit 2														0.1	1.3	3.6	1.3							
Cherokee Dam and Reservoir																								
Addition: gen units 3-4												0.2	2.7	2.4	0.2									
Ocoee No. 3 Dam and Reservoir			5.4	3.1	0.3																			
Apalachia Dam and Reservoir			13.1	9.5	0.6	0.2	0.7																	
Chatuge Dam and Reservoir			6.1	0.6			0.3																	
Addition: gen unit 1														0.2	1.6	0.3	0.1							
Nottely Dam and Reservoir			4.7	0.5			0.2																	
Addition: gen unit 1															0.3	1.8	0.5							
Fontana Dam and Reservoir			7.4	23.1	28.8	10.3	0.6	0.8	0.6															
Addition: gen unit 3												0.1	2.0	1.8	0.4									
Douglas Dam and Reservoir			14.3	24.0	1.9																			
Addition: gen unit 3								0.1	0.6	1.4														
gen unit 4													0.1	1.3	1.4	0.1								
Watauga Dam and Reservoir			1.8	2.2		0.3	0.3	9.0	11.5															
South Holston Dam and Reservoir			2.9	3.6				0.1	3.0	6.1	1.0	0.1												
Boone Dam and Reservoir										8.8	9.4	3.2	0.2											
Fort Patrick Henry Dam and Reservoir												7.6	12.7	7.0		0.1								
Melton Hill Dam and Reservoir												0.6	1.5	7.4	2.7	0.2					0.4	6.2	15.1	12.5

Source: Courtesy of Edward R. Brabham, Administrative Officer, Office of Engineering Design and Construction, TVA, Knoxville, Tennessee, January, 1969.

APPENDIX H

TABLE 75

MAJOR COMPLETED STEAM GENERATING PLANTS, EXPENDITURES BY FISCAL YEARS (MILLIONS OF DOLLARS)

Plant	Generating Units	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Johnsonville	1 - 6	1.1	8.7	36.6	37.1	8.8	1.4	0.6								
	7 - 10								0.4	15.0	35.9	22.1	2.3			
Widows Creek	1 - 6		1.4	12.0	40.7	19.8	16.2	1.8	1.0	0.7	0.2					
	7										3.2	24.4	38.9	5.1		
	8												0.3	8.1	20.9	14.2
Kingston	1 - 9			2.9	19.0	43.3	73.6	41.2	8.1	1.9	2.1	2.2	3.1	0.8		
Colbert	1 - 4				4.8	12.5	51.2	27.2	3.5							
	5											0.6	8.3	28.1	21.5	4.9
Shawnee	1 - 10			9.2	46.2	57.6	63.4	26.8	5.8	2.5	1.6	0.4				
John Sevier	1 - 4					8.1	19.4	45.4	11.1	18.4	3.2	0.3				

Source: Courtesy of Edward R. Brabham, Administrative Officer, Office of Engineering Design and Construction, TVA, Knoxville, Tennessee, January, 1969.

APPENDIX I

TABLE 76

PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $0-$2499 BY COUNTY FOR 1953-60

County	1953	1954	1955	1956	1957	1958	1959	1960
1. Anderson	20.9	23.2	20.8	20.1	14.4	15.2	13.6	10.6
2. Bedford	48.4	51.4	46.0	44.5	41.0	42.2	37.9	30.4
3. Benton	57.8	60.5	54.2	52.3	48.2	49.4	44.3	34.8
4. Bledsoe	68.4	70.4	63.0	60.9	56.9	58.0	51.9	40.8
5. Blount	35.9	39.5	35.3	34.1	29.9	31.2	28.0	21.8
6. Bradley	43.2	46.4	41.6	40.2	36.0	37.2	33.4	26.4
7. Campbell	51.2	54.4	48.7	47.1	43.0	44.3	39.8	31.2
8. Carroll	58.7	61.1	54.7	52.9	48.7	49.8	44.7	35.1
9. Carter	40.1	43.0	38.5	37.2	32.9	34.0	30.5	24.0
10. Chester	63.7	66.0	59.1	57.2	52.9	54.0	48.4	38.0
11. Claiborne	65.3	67.7	60.7	58.7	54.5	55.6	49.9	39.2
12. Cooke	64.9	67.2	60.2	58.1	54.0	55.1	49.4	38.8
13. Coffee	5.8	55.6	49.8	48.2	44.2	45.4	40.7	32.0
14. Cumberland	60.5	62.9	56.4	54.5	50.1	51.3	46.0	36.1
15. Decatur	69.1	71.1	63.8	61.7	57.3	58.4	52.4	41.2
16. Dickson	57.4	59.8	53.6	51.8	47.9	49.0	44.0	34.9
17. Fentress	69.2	71.3	63.9	61.8	57.6	58.6	52.6	41.3
18. Franklin	55.5	58.2	52.1	50.4	45.6	46.8	42.0	33.0
19. Giles	55.3	57.7	51.7	50.0	45.9	47.0	42.2	32.8
20. Grainger	70.8	72.9	65.3	63.1	58.8	59.9	53.7	42.2
21. Greene	54.1	56.7	50.8	49.1	44.9	46.0	41.3	32.0
22. Grundy	67.3	69.5	62.2	60.2	55.9	57.0	51.2	40.2
23. Hamblen	40.7	44.0	39.3	38.0	32.9	34.1	30.6	24.0
24. Hamilton	33.1	36.0	32.3	31.2	26.3	27.4	24.5	19.3
25. Hancock	78.3	80.1	71.8	69.4	64.6	65.7	58.9	46.3

TABLE 76 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
26. Hardin	65.9	68.1	61.0	59.0	54.7	55.8	50.1	39.3
27. Hawkins	55.7	57.9	52.0	50.2	45.9	46.9	42.1	33.1
28. Henderson	64.4	66.6	59.7	57.7	53.5	54.6	49.0	38.4
29. Henry	52.8	55.3	49.5	47.8	43.8	44.9	40.3	31.5
30. Hickman	62.2	64.4	57.6	55.7	51.2	52.2	46.8	36.8
31. Houston	70.0	72.0	64.5	62.4	58.1	59.0	53.0	41.6
32. Humphreys	52.2	54.9	49.1	47.5	43.0	44.2	39.6	31.1
33. Jefferson	55.5	58.2	52.0	50.3	45.8	47.0	42.2	33.1
34. Johnson	66.4	68.4	61.3	59.3	55.0	56.1	50.3	39.5
35. Knox	33.4	36.2	32.5	31.4	25.4	26.4	23.7	18.2
36. Lawrence	60.7	63.0	56.5	54.6	50.6	51.8	46.4	36.0
37. Lewis	58.5	61.1	54.8	53.0	48.4	49.6	44.5	35.0
38. Lincoln	53.7	56.3	50.4	48.7	44.4	45.5	40.8	32.1
39. Loudon	45.8	48.6	43.6	42.1	38.9	40.0	35.9	28.2
40. McMinn	51.2	53.7	48.0	46.5	42.4	43.5	39.0	30.4
41. McNairy	62.4	65.0	58.2	56.3	52.2	53.4	47.9	37.6
42. Marion	52.6	55.4	49.6	48.0	43.2	44.4	39.8	31.3
43. Marshall	47.2	50.2	45.0	43.5	39.3	40.5	36.4	28.6
44. Maury	45.8	48.6	43.5	42.1	38.3	39.5	35.4	27.8
45. Meigs	63.7	66.0	59.2	57.2	52.8	53.9	48.4	38.1
46. Monroe	60.7	63.1	56.5	54.7	50.6	51.8	46.5	36.5
47. Moore	62.3	64.8	58.1	56.1	52.1	53.3	47.8	37.5
48. Morgan	60.5	62.9	56.4	54.5	50.2	51.4	46.1	36.2
49. Perry	69.6	71.4	63.9	61.7	57.4	58.3	52.4	41.1
50. Polk	49.3	52.1	46.7	45.1	41.6	42.8	38.4	30.2
51. Rhea	51.2	53.8	48.2	46.7	42.8	43.9	39.4	30.9
52. Roane	42.4	45.2	40.6	39.2	35.5	36.7	32.9	25.8
53. Rutherford	45.1	47.9	42.9	41.5	35.0	36.2	32.4	25.3
54. Sequatchie	60.2	62.7	56.2	54.4	49.6	50.7	45.5	35.7
55. Sevier	57.8	60.4	54.1	52.3	48.3	49.5	44.4	34.9

TABLE 76 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
56. Stewart	66.0	68.4	61.3	59.2	55.0	56.1	50.3	39.5
57. Sullivan	31.8	30.4	27.8	26.8	22.0	23.0	20.6	16.1
58. Unicoi	36.3	39.2	35.2	34.0	30.3	31.4	28.2	22.1
59. Union	68.1	70.2	62.8	60.8	56.5	57.6	51.7	41.2
60. Van Buren	77.2	79.0	70.8	68.5	65.4	66.3	59.4	42.2
61. Washington	41.7	44.5	39.8	38.5	33.3	34.3	30.2	24.1
62. Wayne	69.4	71.5	64.0	61.9	57.5	58.7	52.6	41.3
63. Williamson	55.2	57.6	51.6	49.9	45.9	46.9	42.1	33.2
64. Bland	54.8	57.2	51.2	49.6	42.5	45.5	40.8	32.1
65. Dickenson	39.4	43.2	38.3	37.5	31.6	35.2	31.5	24.8
66. Grayson	51.4	54.2	48.6	47.0	39.7	42.9	38.4	30.2
67. Lee	52.7	56.0	50.1	48.5	41.4	44.8	40.2	31.6
68. Russell	56.6	59.1	53.0	51.3	43.1	46.1	41.4	32.5
69. Scott	54.7	57.0	51.0	49.3	42.2	45.0	40.4	25.9
70. Smyth	45.3	48.3	43.4	41.9	34.0	37.1	33.3	25.9
71. Tazewell	32.4	36.2	32.4	31.4	24.7	28.0	25.1	19.7
72. Washington	46.8	49.6	44.4	42.9	33.9	36.7	32.9	26.0
73. Wise	37.7	41.5	37.1	35.9	29.5	32.9	29.5	23.2
74. Wythe	46.6	48.9	44.4	42.9	36.1	39.1	35.1	27.9
75. Avery	65.5	67.9	60.8	58.7	49.9	53.0	47.5	30.1
76. Buncombe	32.9	36.1	32.3	31.2	21.8	24.5	22.0	14.1
77. Cherokee	61.7	64.0	57.3	55.4	46.9	49.8	44.6	28.3
78. Clay	67.5	69.9	62.5	60.5	51.3	54.4	48.8	30.9
79. Graham	59.8	62.1	55.7	53.9	44.7	47.5	42.7	27.0
80. Haywood	35.5	38.0	34.0	32.9	26.6	29.1	26.2	16.6
81. Henderson	46.4	49.3	44.1	42.7	35.3	38.3	34.4	22.0
82. Jackson	60.4	63.0	56.4	54.5	45.8	48.8	43.8	27.8
83. Macon	60.2	62.6	56.0	54.2	46.0	48.9	43.9	27.9
84. Madison	72.0	74.0	66.2	67.0	54.9	57.6	51.7	32.8
85. Mitchell	60.4	62.9	56.3	54.4	46.2	49.2	44.2	28.0

TABLE 76 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
86. Swain	61.8	64.1	57.4	55.5	47.2	50.1	45.0	28.5
87. Transylvania	50.8	53.5	47.9	46.3	34.8	37.5	33.6	21.3
88. Watauga	70.9	72.7	65.2	63.0	53.8	56.5	50.7	32.1
89. Yancy	63.6	66.1	59.2	57.2	48.7	51.9	46.5	29.5
90. Alcorn	59.3	61.7	55.3	53.4	53.3	56.5	48.2	30.5
91. Itawamba	67.0	69.2	62.0	60.0	60.1	63.2	53.9	34.2
92. Prentiss	61.0	63.7	57.1	55.2	55.2	58.8	50.1	31.8
93. Tishomingo	65.4	67.8	60.7	58.7	58.8	62.1	52.9	33.6
94. Calloway	56.6	59.3	53.1	51.3	46.3	49.5	44.4	35.3
95. Graves	45.8	48.9	43.7	42.3	39.1	42.5	38.1	30.7
96. Livingston	69.6	71.7	64.2	62.1	57.6	60.7	54.4	42.7
97. Lyon	59.3	62.0	55.5	53.8	49.8	53.0	47.6	37.3
98. McCracken	36.9	39.8	35.7	34.5	30.6	33.7	30.3	24.3
99. Marshall	51.1	54.1	48.4	46.8	43.4	46.7	41.9	32.9
100. Triggs	68.5	70.4	63.0	60.9	56.8	59.4	53.3	41.8
101. Catoosa	30.1	33.4	29.9	28.0	24.5	25.6	23.0	18.1
102. Dade	55.5	57.8	51.7	48.3	42.1	43.1	38.7	30.4
103. Fannin	47.5	50.2	45.0	42.1	37.1	38.2	34.2	26.9
104. Gilmer	65.8	68.3	61.2	57.2	53.1	54.2	48.7	38.2
105. Lumpkin	72.4	74.0	66.3	62.0	58.9	59.7	53.6	42.1
106. Rabun	69.2	71.0	63.5	59.4	55.2	56.1	50.3	39.5
107. Towns	83.2	84.4	75.6	70.8	67.6	68.4	61.2	48.1
108. Union	73.5	75.5	67.5	63.2	58.9	60.1	53.9	42.4
109. Walker	31.9	35.3	31.6	29.5	25.1	26.3	23.6	18.5
110. Whitfield	33.5	37.0	33.2	31.1	25.7	27.0	24.2	19.3
111. Blount	63.1	65.3	58.4	56.5	47.9	49.0	44.0	34.5
112. Colbert	37.2	40.0	35.8	34.6	26.7	27.6	24.8	19.8
113. Cullman	66.5	68.6	61.4	59.4	50.3	51.4	46.1	35.9
114. DeKalb	66.7	68.7	61.6	59.5	51.0	52.0	46.7	36.7

TABLE 76 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
115. Etowah	31.7	34.8	31.1	30.1	23.3	24.3	21.8	17.7
116. Franklin	55.7	58.3	52.2	50.5	42.8	43.9	39.4	30.9
117. Jackson	65.3	67.5	60.4	58.4	49.8	50.8	45.6	35.8
118. Lauderdale	44.6	47.2	42.3	40.9	32.7	33.6	30.2	24.2
119. Lawrence	67.3	69.6	62.3	60.2	51.3	52.4	47.0	36.9
120. Limestone	60.7	63.0	56.4	54.5	46.2	47.3	42.4	33.6
121. Madison	51.3	53.8	48.2	46.6	38.1	39.1	35.1	27.6
122. Marion	63.6	66.1	59.2	57.2	49.0	50.1	45.0	35.3
123. Marshall	59.4	61.7	55.3	53.4	45.7	46.8	42.0	32.8
124. Morgan	51.1	53.6	48.0	46.4	38.3	39.8	35.7	27.6
125. Winston	61.9	64.2	57.5	55.6	46.8	47.8	42.9	33.7

Source: Sales Management Survey of Buying Power for years 1954-1961 (Philadelphia, Pa.: Bill Brothers Publication, 1954-1961).

NOTE:

The figures for the percentage of total consumer units in the four different income categories were adjusted in the following manner:

The upper limits of the income categories were divided by the Consumer Price Indexes for the respective years. The percentage of population in the adjusted income categories were then calculated. The difference in percentage change of population in the lower income categories was added or subtracted to the percentage in the next highest income category. The percentage of population in the $7000 and over income category was obtained by adding the percentages of population in the other three income categories and subtracting this figure from 100.

Example (1953):

Upper limit of income category	$2499	$3999	$6999
Adjusted limit of income category after divided by C. P. Index	$2682	$4291	$7510

Calculations for income category of		Adjusted percentage of pop.
($0 - $2499)	$\frac{2499}{2682} \times 20.9 = 19.4$	19.4
($2500-$3999)	$\frac{3999}{4291} \times 24.4 = 22.7$	24.2
	$20.9 - 19.4 = 1.5$	
	$22.7 + 1.5 = 24.2$	
($4000-$6999)	$\frac{6999}{7510} \times 38.5 = 35.9$	37.6
	$24.4 - 22.7 = 1.7$	
	$35.9 + 1.7 = 37.6$	
		81.2 (sub-total)
($7000 and over)	$100 - 81.2 = 18.8$	18.8

APPENDIX J

TABLE 77

PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $2500-$3999 BY COUNTY FOR 1953-60

County	1953	1954	1955	1956	1957	1958	1959	1960
1. Anderson	24.4	23.2	23.7	23.2	19.2	19.3	18.5	18.5
2. Bedford	33.1	30.5	33.3	33.3	30.8	30.0	30.7	34.6
3. Benton	28.4	26.1	30.2	30.7	29.0	28.2	29.8	35.0
4. Bledsoe	21.3	19.6	25.3	26.2	24.5	23.7	26.7	34.0
5. Blount	38.5	35.6	36.8	36.2	32.4	31.8	31.1	32.2
6. Bradley	34.7	32.0	34.1	34.0	30.9	30.2	30.3	33.2
7. Campbell	34.2	31.4	34.4	34.4	32.0	31.1	31.8	35.7
8. Carroll	25.8	23.8	28.1	28.7	27.2	26.6	28.4	33.9
9. Carter	31.1	28.9	30.9	30.7	27.8	27.3	27.5	30.1
10. Chester	25.4	23.4	28.3	28.9	27.7	26.9	29.1	35.3
11. Claiborne	26.5	24.3	29.3	29.9	29.0	28.2	30.4	36.7
12. Cooke	24.0	22.0	27.1	28.0	27.4	26.6	28.9	35.3
13. Coffee	30.0	27.6	31.1	31.3	29.3	28.6	29.7	34.1
14. Cumberland	26.8	24.7	29.2	29.6	28.1	27.2	29.2	34.8
15. Decatur	22.3	20.5	26.2	27.0	26.8	26.0	28.8	35.8
16. Dickson	25.7	23.7	27.9	28.4	27.3	26.6	28.3	33.6
17. Fentress	22.6	20.8	26.5	27.3	26.6	25.8	28.7	35.8
18. Franklin	29.4	27.0	30.8	31.1	28.9	28.1	29.5	34.2
19. Giles	26.3	24.3	28.4	28.7	27.1	26.4	28.0	32.7
20. Grainger	22.7	20.7	26.6	27.5	27.0	26.1	29.1	36.4
21. Greene	28.4	26.2	29.9	30.1	28.3	27.6	28.9	33.4
22. Grundy	23.8	21.9	27.4	28.1	27.4	26.6	29.2	35.9
23. Hamblen	35.3	32.6	34.5	34.2	30.8	30.2	30.0	32.2
24. Hamilton	31.8	29.6	30.9	30.4	26.9	26.5	26.1	27.5
25. Hancock	18.6	17.0	23.8	25.0	25.7	24.8	28.5	37.0

TABLE 77 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
26. Hardin	23.5	21.6	26.8	27.6	27.0	26.1	28.7	35.3
27. Hawkins	24.5	22.7	26.8	27.3	25.6	25.0	26.8	31.9
28. Henderson	23.9	21.9	27.0	27.6	26.8	26.0	28.4	34.8
29. Henry	26.8	22.8	28.5	28.8	27.0	26.4	27.8	32.3
30. Hickman	22.9	21.0	26.1	26.6	25.0	24.3	26.7	32.9
31. Houston	21.5	19.7	25.4	26.4	26.1	25.3	28.3	35.6
32. Humphreys	29.4	27.1	30.6	30.7	28.5	27.8	28.9	33.2
33. Jefferson	28.3	26.0	29.9	30.3	28.1	27.4	28.9	33.7
34. Johnson	22.8	21.0	26.4	27.1	26.2	25.6	28.2	34.9
35. Knox	30.7	28.6	29.9	29.6	25.9	25.5	25.1	26.2
36. Lawrence	25.3	23.2	27.9	28.5	27.6	26.8	28.8	34.4
37. Lewis	29.1	26.7	30.8	31.1	29.1	28.3	29.9	35.1
38. Lincoln	27.7	25.6	29.3	29.6	27.8	27.1	28.4	33.0
39. Loudon	31.4	29.1	31.8	31.7	29.4	28.7	29.3	32.8
40. McMinn	26.7	24.8	28.4	28.5	26.7	26.1	27.4	31.6
41. McNairy	27.7	25.4	30.2	30.5	29.3	24.8	30.4	36.3
42. Marion	30.5	28.1	31.5	31.7	29.2	28.5	29.6	33.8
43. Marshall	33.1	30.5	33.2	33.1	30.4	29.7	30.2	33.6
44. Maury	30.6	28.4	31.1	31.1	28.7	28.0	28.6	32.1
45. Meigs	24.9	22.9	27.8	28.5	27.0	26.3	28.6	34.9
46. Monroe	26.6	24.5	29.1	29.6	28.4	27.6	29.5	35.2
47. Moore	26.7	24.6	29.3	29.8	28.8	27.8	29.9	35.8
48. Morgan	26.9	24.8	29.2	29.8	28.1	27.4	29.3	34.9
49. Perry	18.9	17.5	23.4	24.5	24.6	24.0	27.0	34.3
50. Polk	30.7	28.4	31.5	29.5	28.7	29.6	33.6	20.1
51. Rhea	28.7	26.5	30.0	30.0	28.1	27.5	28.7	32.9
52. Roane	31.1	28.9	31.1	31.0	28.4	27.9	28.2	31.0

TABLE 77 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
53. Rutherford	30.8	28.5	31.2	31.0	27.6	27.1	27.5	30.3
54. Sequatchie	27.3	25.1	29.6	30.0	27.7	27.0	28.9	34.5
55. Sevier	28.1	25.8	30.9	30.3	28.9	28.1	29.7	34.9
56. Stewart	25.6	23.5	28.6	29.3	27.5	26.7	29.2	35.7
57. Sullivan	29.1	27.3	28.2	27.9	24.3	24.1	23.5	24.4
58. Unicoi	32.0	29.2	31.3	31.0	28.0	27.6	27.4	29.4
59. Union	22.5	20.7	26.3	27.1	26.6	25.8	28.6	33.9
60. Van Buren	19.5	17.8	24.4	25.6	24.4	23.8	27.6	35.8
61. Washington	29.6	27.5	29.8	29.7	26.6	26.2	26.5	29.1
62. Wayne	22.7	20.8	26.6	27.4	27.2	26.3	29.1	36.1
63. Williamson	25.7	22.7	27.7	28.1	26.6	26.0	27.6	32.7
64. Bland	26.7	24.7	28.7	29.1	26.6	25.4	27.0	31.8
65. Dickenson	41.8	38.4	39.6	39.0	31.5	30.2	30.1	32.5
66. Grayson	31.1	28.6	31.9	31.9	28.0	26.7	27.8	32.0
67. Lee	35.7	32.7	35.8	35.7	30.9	29.3	30.3	34.5
68. Russell	28.3	26.1	30.1	30.4	27.2	25.9	27.5	32.4
69. Scott	24.4	22.7	26.7	27.2	25.3	24.3	26.0	30.9
70. Smyth	33.8	31.2	33.5	33.4	27.8	26.9	27.4	30.4
71. Tazewell	41.9	38.6	39.2	38.4	29.9	29.1	28.4	29.7
72. Washington	30.6	28.3	31.1	31.1	25.7	25.2	25.8	29.3
73. Wise	40.1	36.9	38.1	37.5	30.1	29.1	28.9	31.0
74. Wythe	31.6	29.2	31.8	31.8	27.3	26.3	27.1	30.9
75. Avery	25.0	22.9	28.0	28.8	27.1	25.5	27.8	37.8
76. Buncombe	34.1	31.6	32.8	32.2	24.5	24.7	24.2	25.9
77. Cherokee	24.9	22.9	27.7	28.3	26.1	24.9	26.9	36.1
78. Clay	26.1	23.9	29.2	29.9	27.7	26.0	28.4	38.7
79. Graham	25.7	23.7	28.1	28.6	25.7	24.6	26.5	35.0
80. Haywood	27.4	25.8	27.6	27.4	22.4	22.7	22.9	26.4

TABLE 77 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
81. Henderson	31.2	28.8	31.6	31.4	26.7	25.9	26.6	32.3
82. Jackson	26.9	24.7	29.2	29.7	26.8	25.6	27.4	36.1
83. Macon	25.5	23.5	28.1	28.6	26.4	25.2	27.1	36.0
84. Madison	21.1	19.3	25.4	26.3	24.5	23.1	26.1	38.1
85. Mitchell	26.8	24.7	29.2	29.8	27.3	25.9	27.8	36.5
86. Swain	24.0	22.0	26.8	27.4	26.0	24.7	26.8	36.2
87. Transylvania	28.8	26.6	29.9	30.0	24.1	23.8	24.7	30.4
88. Watauga	19.9	18.3	24.3	25.4	24.1	22.7	25.7	37.4
89. Yancy	27.3	25.0	29.8	30.4	28.3	26.5	28.6	38.0
90. Alcorn	26.2	24.1	28.4	29.1	28.7	26.5	30.4	39.9
91. Itawamba	23.5	21.6	27.0	27.7	27.5	25.2	30.3	42.0
92. Prentiss	29.5	27.1	31.4	31.8	31.6	28.9	32.7	42.3
93. Tishomingo	26.3	24.2	29.2	29.8	29.7	27.1	31.8	42.7
94. Calloway	29.5	27.2	31.0	31.4	28.9	27.2	28.9	34.5
95. Graves	33.3	30.7	33.3	33.1	30.6	29.0	29.8	33.9
96. Livingston	22.7	20.8	26.6	27.4	27.3	25.1	28.2	35.8
97. Lyon	28.2	25.9	30.2	30.5	29.2	27.3	29.4	35.3
98. McCracken	32.1	29.8	31.4	31.2	28.0	27.2	27.3	30.2
99. Marshall	30.9	28.4	31.7	31.7	29.9	28.1	29.5	34.2
100. Triggs	19.4	17.8	23.6	24.6	23.3	21.8	25.2	33.0
101. Catoosa	36.2	33.7	34.4	33.0	29.2	28.9	28.0	28.8
102. Dade	24.7	22.9	27.1	28.0	24.4	24.0	25.5	30.0
103. Fannin	30.1	27.9	30.7	30.8	27.9	27.4	28.0	31.2
104. Gilmer	26.9	24.6	29.7	30.8	29.8	28.9	31.0	36.9
105. Lumpkin	17.1	15.8	22.2	24.5	19.7	19.1	22.9	31.1
106. Rabun	19.4	17.9	23.8	25.7	23.9	23.4	26.3	33.2
107. Towns	12.6	11.5	19.4	22.5	21.9	21.2	25.6	35.0

TABLE 77 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
108. Union	20.9	19.1	25.4	27.4	26.9	26.0	29.0	36.3
109. Walker	36.7	34.0	34.9	33.6	29.8	29.3	28.4	29.3
110. Whitfield	38.9	36.0	36.8	35.4	31.5	30.9	29.9	30.9
111. Blount	23.9	22.0	27.1	27.7	26.0	25.4	27.3	32.8
112. Colbert	29.4	27.4	29.2	29.1	23.2	23.1	23.1	25.2
113. Cullman	22.5	20.7	26.2	27.0	25.5	24.7	27.0	32.9
114. DeKalb	22.3	20.6	26.0	26.9	26.4	25.7	27.9	33.9
115. Etowah	33.8	31.5	32.5	32.0	24.9	24.8	24.2	25.7
116. Franklin	28.4	26.2	30.1	30.3	27.2	26.7	27.9	32.3
117. Jackson	23.3	21.4	26.7	27.5	26.2	25.6	27.7	33.4
118. Lauderdale	27.7	25.8	28.5	28.5	23.8	23.6	24.1	27.4
119. Lawrence	24.0	21.9	27.3	28.2	26.7	26.0	28.2	34.2
120. Limestone	24.7	22.9	27.6	28.2	26.2	25.6	27.3	32.6
121. Madison	27.1	25.1	28.7	28.9	24.9	24.5	25.6	29.4
122. Marion	26.8	24.5	29.4	30.0	28.2	27.5	29.3	34.7
123. Marshall	25.3	23.4	27.9	28.4	26.6	26.0	27.6	32.6
124. Morgan	26.6	24.6	28.2	25.0	24.6	25.7	29.4	22.0
125. Winston	25.0	23.0	27.8	28.3	25.9	25.3	27.1	32.4

Source: Sales Management Survey of Buying Power for years 1954-1961 (Philadelphia, Pa.: Bill Brothers Publication, 1954-1961).

APPENDIX K

TABLE 78

PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $4000-$6999 BY COUNTY FOR 1953-60

County	1953	1954	1955	1956	1957	1958	1959	1960
1. Anderson	38.5	36.7	37.9	38.1	43.6	42.4	39.9	40.7
2. Bedford	13.8	13.2	15.5	16.7	21.6	21.1	22.2	25.4
3. Benton	10.7	10.2	12.2	13.3	18.1	17.6	19.1	22.5
4. Bledsoe	7.6	7.2	8.7	9.7	14.2	13.9	15.3	18.4
5. Blount	20.3	19.3	21.9	23.2	29.4	28.5	29.1	32.5
6. Bradley	17.4	16.6	19.0	20.1	25.8	25.1	26.0	29.0
7. Campbell	11.4	10.9	13.3	14.7	20.1	19.6	21.2	24.9
8. Carroll	13.4	12.8	14.6	15.5	20.0	19.5	20.6	23.7
9. Carter	22.4	21.4	23.4	24.3	29.6	28.8	28.8	31.5
10. Chester	8.9	8.4	10.2	11.3	16.0	15.6	17.2	20.6
11. Claiborne	5.8	5.5	7.4	8.6	13.2	12.8	14.8	18.5
12. Cooke	9.2	8.8	10.5	11.5	15.6	15.1	16.8	20.2
13. Coffee	13.8	13.2	15.2	16.3	21.2	20.5	21.8	25.1
14. Cumberland	10.1	9.7	11.5	12.7	17.6	17.2	18.5	21.9
15. Decatur	7.4	7.1	8.6	9.7	13.8	13.3	15.0	18.5
16. Dickson	13.5	12.9	14.6	15.6	19.7	19.2	20.3	23.5
17. Fentress	6.8	6.4	8.0	9.1	13.4	13.1	14.7	18.2
18. Franklin	11.5	11.0	13.1	14.2	19.8	19.2	20.5	23.9
19. Giles	14.3	13.6	15.3	16.3	20.8	20.3	21.2	24.5
20. Grainger	5.9	5.7	7.3	8.4	12.7	12.4	14.1	17.6
21. Greene	14.1	13.5	15.4	16.5	21.4	20.8	21.8	25.3
22. Grundy	7.1	6.7	8.4	9.5	13.9	13.5	15.2	18.7
23. Hamblen	19.5	18.6	21.0	22.1	28.6	27.8	28.4	31.4
24. Hamilton	25.9	24.8	26.7	27.6	33.4	32.4	32.0	34.2
25. Hancock	2.5	2.3	3.7	4.8	8.7	8.4	10.5	14.2

TABLE 78 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
26. Hardin	8.4	8.0	9.7	10.7	15.0	14.7	16.1	19.6
27. Hawkins	16.5	15.8	17.3	18.2	22.8	22.3	22.7	35.6
28. Henderson	8.7	8.4	10.0	11.1	15.4	15.0	16.5	19.9
29. Henry	15.1	14.4	16.2	17.2	21.7	21.1	21.8	25.0
30. Hickman	10.7	10.3	11.8	12.8	17.5	17.1	18.1	21.0
31. Houston	5.4	5.2	6.8	7.8	11.8	11.6	13.3	16.9
32. Humphreys	13.9	13.2	15.2	16.3	21.6	21.0	22.1	25.2
33. Jefferson	12.6	12.0	14.0	15.0	20.3	19.7	20.8	24.1
34. Johnson	8.8	8.4	10.2	11.0	15.3	14.8	16.3	19.7
35. Knox	26.1	24.9	26.8	27.6	34.1	32.2	32.4	35.0
36. Lawrence	11.5	11.0	12.7	13.7	17.8	17.3	18.6	22.4
37. Lewis	11.1	10.7	12.7	13.9	19.5	19.0	20.4	23.7
38. Lincoln	15.2	14.5	16.4	17.4	22.3	21.6	22.6	35.7
39. Loudon	18.9	18.0	20.0	21.1	25.5	24.7	25.5	28.5
40. McMinn	7.6	16.8	18.5	19.4	24.0	23.3	23.8	26.9
41. McNairy	8.5	8.1	10.1	11.3	15.9	15.4	17.2	20.8
42. Marion	14.0	13.4	15.5	16.6	22.4	21.7	22.8	26.0
43. Marshall	14.5	13.8	16.1	17.3	22.8	22.1	23.3	26.5
44. Maury	19.0	18.1	20.1	21.1	25.9	25.2	25.8	28.7
45. Meigs	8.2	7.8	9.5	10.6	15.4	15.0	16.4	19.8
46. Monroe	9.8	9.3	1.1	12.2	16.7	16.2	17.7	21.2
47. Moore	8.7	8.2	10.1	11.3	15.7	15.4	17.0	20.5
48. Morgan	10.1	9.6	11.5	12.6	17.5	16.9	18.4	21.8
49. Perry	10.5	10.0	11.3	12.1	15.7	15.3	16.5	19.7
50. Polk	16.7	16.0	18.0	19.1	23.6	23.0	23.9	27.0
51. Rhea	17.6	16.9	18.7	19.7	24.3	23.7	24.2	27.4
52. Roane	22.1	21.1	23.1	24.0	28.8	27.9	28.2	31.0
53. Rutherford	18.0	17.2	19.2	20.3	27.4	26.6	26.9	29.7

TABLE 78 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
54. Sequatchie	10.8	10.3	12.2	13.4	19.2	18.7	19.9	23.2
55. Sevier	10.9	10.4	12.3	13.5	18.1	17.6	19.0	22.5
56. Stewart	7.2	6.5	8.6	9.8	14.9	14.5	16.0	19.7
57. Sullivan	31.8	30.4	32.0	32.6	38.0	36.9	35.7	37.4
58. Unicoi	25.0	23.8	25.8	26.7	31.6	30.6	30.5	33.2
59. Union	8.5	8.1	9.7	10.7	14.8	14.5	16.0	20.7
60. Van Buren	1.1	1.0	2.5	3.6	7.1	6.9	9.2	17.5
61. Washington	20.9	19.9	21.8	22.7	28.6	27.7	27.7	30.5
62. Wayne	6.1	5.8	7.4	8.5	12.6	12.2	14.2	17.8
63. Williamson	13.2	12.6	14.3	15.3	19.6	19.1	20.1	23.1
64. Bland	15.6	14.9	16.6	17.5	25.4	23.7	24.1	26.8
65. Dickenson	15.2	14.5	17.4	18.9	30.3	28.4	28.8	31.9
66. Grayson	13.1	12.6	14.7	15.9	25.3	23.7	24.3	27.2
67. Lee	10.2	9.7	12.3	13.7	24.2	22.6	23.6	27.0
68. Russell	12.1	11.6	13.5	14.6	24.1	22.7	23.2	26.1
69. Scott	17.2	16.4	18.0	18.8	25.9	24.4	24.5	27.1
70. Smyth	16.1	15.4	17.7	18.8	29.7	27.9	28.0	30.9
71. Tazewell	19.3	18.4	21.3	22.6	34.8	32.8	23.6	35.2
72. Washington	17.8	17.0	19.0	20.1	31.2	29.3	29.2	31.4
73. Wise	17.5	16.6	19.4	20.7	32.1	30.1	30.3	33.0
74. Wythe	17.1	16.3	18.4	19.5	28.6	27.0	27.0	29.5
75. Avery	8.0	7.6	9.4	10.5	19.7	18.4	19.5	25.0
76. Buncombe	24.5	23.4	25.5	26.5	38.8	36.6	35.4	38.5
77. Cherokee	10.7	10.3	12.0	13.0	22.0	20.6	21.4	26.5
78. Clay	5.5	5.2	7.2	8.3	18.5	17.3	18.5	24.3
79. Graham	11.8	11.3	13.1	14.1	24.1	22.6	23.0	28.0
80. Haywood	29.8	28.4	30.0	30.6	38.1	36.0	34.5	37.5

TABLE 78 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
81. Henderson	16.6	15.8	17.9	19.0	28.6	26.9	27.0	31.3
82. Jackson	10.2	9.7	11.6	12.7	22.5	21.0	21.8	27.1
83. Macon	11.3	10.7	12.5	13.5	22.0	20.9	21.6	26.6
84. Madison	5.6	5.4	6.9	8.0	17.5	16.3	17.4	22.6
85. Mitchell	9.9	9.4	11.3	12.4	21.5	20.2	21.0	26.5
86. Swain	10.0	9.6	11.3	12.2	20.6	19.2	20.1	25.4
87. Transylvania	15.8	15.1	17.0	18.1	31.3	29.5	29.1	33.0
88. Watauga	7.2	6.9	8.3	9.2	18.1	16.9	17.8	23.1
89. Yancy	6.7	6.4	8.4	9.6	19.0	17.8	19.0	24.9
90. Alcorn	11.1	10.7	12.5	13.5	13.7	12.9	15.3	22.0
91. Itawamba	7.8	7.4	9.1	10.2	10.2	9.5	12.3	19.1
92. Prentiss	7.3	7.0	9.1	10.4	10.4	9.6	13.0	20.5
93. Tishomingo	7.2	6.8	8.7	9.9	9.9	9.2	12.3	19.5
94. Calloway	11.7	11.2	13.3	14.4	20.5	19.2	20.4	23.2
95. Graves	17.0	16.3	18.5	19.7	24.3	22.8	23.7	26.4
96. Livingston	5.1	4.9	6.5	7.7	11.8	11.1	13.0	16.5
97. Lyon	10.1	9.7	11.7	12.8	17.3	16.2	17.7	21.2
98. McCracken	23.0	22.0	24.0	24.9	30.0	28.2	28.3	30.5
99. Marshall	14.5	13.8	15.9	17.1	21.5	20.2	21.3	24.6
100. Triggs	8.6	8.2	9.6	10.5	14.6	13.8	14.9	17.9
101. Catoosa	27.9	26.6	28.9	30.8	36.0	35.0	34.5	37.0
102. Dade	17.1	16.3	17.9	19.6	26.9	26.2	26.1	28.6
103. Fannin	18.9	18.1	20.1	22.0	28.0	27.2	27.5	30.3
104. Gilmer	5.8	5.5	7.4	9.9	14.5	14.2	15.9	19.9
105. Lumpkin	8.6	8.2	9.3	11.0	16.7	16.3	16.8	19.4
106. Rabun	9.6	9.1	10.5	12.2	16.9	16.4	17.5	20.5
107. Towns	3.1	3.0	3.9	5.5	8.7	8.5	10.2	13.4

TABLE 78 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
108. Union	4.7	4.5	6.1	8.6	12.4	12.0	13.9	17.4
109. Walker	24.1	23.0	25.3	27.4	33.4	32.4	32.3	35.0
110. Whitfield	22.8	21.8	24.4	26.7	33.7	32.8	32.8	35.5
111. Blount	10.8	10.4	12.0	13.0	21.6	21.0	21.7	24.7
112. Colbert	26.3	25.1	26.9	27.6	37.3	36.2	34.8	36.5
113. Cullman	18.7	8.3	9.8	10.8	19.8	19.2	20.1	23.3
114. DeKalb	8.6	8.2	9.7	10.7	18.6	18.1	19.1	22.3
115. Etowah	26.8	25.6	27.7	28.6	38.5	37.4	36.2	37.6
116. Franklin	12.7	12.1	14.1	15.2	24.2	23.5	24.1	27.1
117. Jackson	8.9	8.5	10.1	11.1	19.6	19.0	19.9	23.1
118. Lauderdale	21.9	20.9	22.6	23.5	32.9	32.0	31.3	32.9
119. Lawrence	7.0	6.8	8.5	9.5	18.6	18.1	19.2	22.4
120. Limestone	11.1	10.6	12.3	13.3	21.9	21.3	22.0	24.7
121. Madison	17.1	16.3	18.0	19.0	28.6	27.8	27.5	30.1
122. Marion	7.6	7.3	9.2	10.4	19.3	18.8	20.0	23.3
123. Marshall	11.9	11.3	13.0	14.1	22.1	21.5	22.2	25.2
124. Morgan	16.8	16.0	17.7	18.6	27.2	26.4	26.3	29.2
125. Winston	8.7	8.2	10.0	11.1	20.4	19.9	20.7	23.6

Source: Sales Management Survey of Buying Power for years 1954-1961 (Philadelphia, Pa.: Bill Brothers Publication, 1954-1961).

APPENDIX L

TABLE 79

PERCENTAGE OF TOTAL CONSUMER UNITS IN INCOME CATEGORY OF $7000 AND OVER BY COUNTY FOR 1953-60

County	1953	1954	1955	1956	1957	1958	1959	1960
1. Anderson	16.2	16.9	17.6	18.6	22.8	23.1	28.0	30.2
2. Bedford	4.7	4.9	5.2	5.5	6.6	6.7	9.2	9.6
3. Benton	3.1	3.2	3.4	3.7	4.7	4.8	6.8	7.7
4. Bledsoe	2.7	2.8	3.0	3.2	4.4	4.4	6.1	6.8
5. Blount	5.3	5.6	6.0	6.5	8.3	8.5	11.8	13.5
6. Bradley	4.7	5.0	5.3	5.7	7.3	7.5	10.3	11.4
7. Campbell	3.2	3.3	3.6	3.8	4.9	5.0	6.6	8.2
8. Carroll	2.1	2.3	2.6	2.9	4.0	4.1	6.5	7.3
9. Carter	6.4	6.7	7.2	7.8	9.7	9.9	13.2	14.4
10. Chester	2.0	2.2	2.4	2.6	3.4	3.5	5.3	6.1
11. Claiborne	2.4	2.5	2.6	2.8	3.3	3.4	4.9	5.5
12. Cooke	1.9	2.0	2.2	2.4	3.0	3.2	4.9	5.7
13. Coffee	3.4	3.6	3.9	4.2	5.3	5.5	7.8	8.8
14. Campbell	2.6	2.7	2.9	3.2	4.2	4.3	6.3	7.2
15. Decatur	1.2	1.3	1.4	1.6	2.1	2.3	3.8	4.5
16. Dickson	3.4	3.6	3.9	4.2	5.1	5.2	7.4	8.4
17. Fentress	1.4	1.5	1.6	1.8	2.4	2.5	4.0	4.7
18. Franklin	3.6	3.8	4.0	4.3	5.7	5.9	8.0	8.9
19. Giles	4.1	4.4	4.6	3.3	6.2	6.3	8.6	10.0
20. Grainger	.6	.7	.8	1.0	1.5	1.6	3.1	3.8
21. Greene	3.4	3.6	3.9	4.3	5.4	5.6	8.0	9.3
22. Grundy	1.8	1.9	2.0	2.2	2.8	2.9	4.4	5.2
23. Hamblen	4.5	4.8	5.2	5.7	7.7	7.9	11.0	12.4
24. Hamilton	9.2	9.6	10.1	10.8	13.4	13.7	17.4	19.0

TABLE 79 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
25. Hancock	.6	.6	.7	.8	1.0	1.1	2.1	2.5
26. Hardin	2.2	2.3	2.5	2.7	3.3	3.4	5.1	5.8
27. Hawkins	3.3	3.6	3.9	4.3	5.7	5.8	8.4	9.4
28. Henderson	3.0	3.1	3.3	3.6	4.3	4.4	6.1	6.9
29. Henry	5.3	5.5	5.8	6.2	7.5	7.6	10.1	11.2
30. Hickman	4.2	4.3	4.5	4.9	6.3	6.4	8.4	9.3
31. Houston	3.1	3.1	3.2	3.4	4.0	9.1	5.4	5.9
32. Humphreys	14.5	4.8	5.1	5.5	6.9	7.0	9.4	10.5
33. Jefferson	3.6	3.8	4.1	4.4	5.8	5.9	8.1	9.1
34. Johnson	2.0	2.2	2.3	2.5	3.5	3.5	5.2	5.9
35. Knox	9.8	10.3	10.8	11.4	14.6	14.9	18.8	20.6
36. Lawrence	2.5	2.7	2.9	3.2	4.0	4.1	6.1	7.2
37. Lewis	1.3	1.5	1.7	2.0	3.0	3.1	5.2	6.2
38. Lincoln	3.4	3.6	3.9	4.3	5.5	5.8	8.2	9.2
39. Loudon	3.9	4.3	4.6	5.1	6.2	6.5	9.3	10.5
40. McMinn	4.5	14.7	5.5	5.6	6.9	7.1	9.8	11.1
41. McNairy	1.4	1.5	1.7	1.9	2.6	2.8	4.5	5.3
42. Marion	2.9	3.1	3.4	3.7	5.2	5.4	7.8	8.9
43. Marshall	5.2	5.5	5.7	6.1	7.5	7.7	10.1	11.3
44. Maury	14.6	4.9	5.3	6.0	7.1	7.3	10.2	11.4
45. Meigs	3.2	3.3	3.5	3.7	4.8	4.8	6.6	7.2
46. Monroe	2.9	3.1	2.3	3.5	4.3	4.4	6.3	7.1
47. Moore	2.3	2.4	2.5	2.8	3.4	3.5	5.3	6.2
48. Morgan	2.5	2.7	2.9	3.1	4.2	4.3	6.2	3.1
49. Perry	1.0	1.1	1.4	1.7	2.3	2.4	4.1	4.9
50. Polk	3.3	3.5	3.4	5.3	5.3	5.5	8.1	9.2
51. Rhea	2.5	2.8	3.1	3.6	4.8	4.9	7.7	8.8
52. Roane	4.4	4.8	5.2	5.8	7.3	7.5	10.6	12.0

TABLE 79 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
53. Rutherford	6.1	6.4	6.7	7.2	10.0	10.1	13.2	14.7
54. Sequatchie	1.7	1.9	2.2	2.2	3.5	3.6	5.7	6.6
55. Sevier	3.2	3.4	3.6	3.9	4.7	4.8	6.9	7.7
56. Stewart	1.2	1.3	1.5	1.7	2.6	2.7	4.5	5.1
57. Sullivan	10.8	11.3	12.0	12.7	15.7	16.0	20.2	22.1
58. Unicoi	6.7	7.2	7.7	8.3	10.1	10.4	13.9	15.3
59. Union	.9	1.0	1.2	1.4	2.1	2.1	3.7	4.2
60. Van Buren	2.2	2.0	2.3	2.3	3.1	3.0	3.8	4.5
61. Washington	7.8	8.1	8.6	9.1	11.5	11.8	15.0	16.3
62. Wayne	1.8	1.9	2.0	2.2	2.7	2.8	4.1	4.8
63. Williamson	5.9	6.1	6.4	6.7	7.9	8.0	10.2	11.0
64. Bland	2.9	3.2	3.5	3.8	5.5	5.4	8.1	9.3
65. Dickenson	3.6	3.9	4.2	4.6	6.6	6.2	9.6	10.8
66. Grayson	4.4	4.6	4.8	5.2	7.0	6.7	9.5	10.6
67. Lee	1.4	1.6	1.8	2.1	3.5	3.3	5.9	6.9
68. Russell	3.0	3.2	3.4	3.7	5.6	5.3	7.9	9.0
69. Scott	3.7	3.9	4.3	4.7	6.6	6.3	9.1	10.3
70. Smyth	4.8	5.1	5.4	5.9	8.5	8.1	11.3	12.8
71. Tazewell	6.4	6.8	7.1	7.6	10.6	10.1	13.9	15.4
72. Washington	4.8	5.1	5.5	5.9	9.2	8.8	12.1	13.3
73. Wise	4.7	5.0	5.4	5.9	9.2	7.9	11.3	12.8
74. Wythe	4.7	5.0	5.4	5.8	8.0	7.6	10.8	11.7
75. Avery	1.5	1.6	1.8	2.0	3.3	3.1	5.2	7.1
76. Buncombe	8.5	8.9	9.4	9.9	14.9	14.2	18.4	21.5
77. Cherokee	2.7	2.8	3.0	3.6	5.0	4.7	7.1	9.1
78. Clay	.9	1.0	1.1	1.3	2.5	2.3	4.3	6.1

TABLE 79 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
79. Graham	2.7	2.9	3.1	3.4	5.5	5.3	7.8	10.0
80. Haywood	7.3	7.8	8.3	9.1	12.9	12.2	16.4	19.5
81. Henderson	5.8	6.1	6.4	6.9	9.4	8.9	11.7	14.4
82. Jackson	2.5	2.6	2.8	3.1	4.9	4.6	7.0	9.0
83. Macon	3.0	3.2	3.4	3.7	5.4	5.0	7.4	9.5
84. Madison	1.3	1.3	1.5	1.7	4.1	3.0	4.8	6.5
85. Mitchell	2.9	3.0	3.2	3.4	5.0	4.7	7.0	9.0
86. Swain	4.2	4.3	4.5	4.8	6.2	6.0	8.1	9.9
87. Transylvania	4.6	4.8	5.2	5.6	9.8	9.2	12.6	15.3
88. Watauga	2.0	2.1	2.2	2.4	4.0	3.9	5.8	7.4
89. Yancy	2.4	2.5	2.6	2.8	4.0	3.8	5.9	7.6
90. Alcorn	3.4	3.5	3.8	4.0	4.3	4.1	6.9	7.6
91. Itawamba	1.7	1.8	1.9	2.1	2.2	2.1	3.5	4.7
92. Prentiss	2.2	2.2	2.4	2.6	2.8	2.7	4.2	5.4
93. Tishomingo	1.1	1.2	1.4	1.6	1.6	1.6	3.0	4.2
94. Calloway	2.2	2.3	2.6	2.9	4.3	4.1	6.3	7.0
95. Graves	3.9	4.1	4.5	4.9	6.0	5.7	8.4	9.0
96. Livingston	2.6	2.6	2.7	2.8	3.3	3.1	4.4	5.0
97. Lyon	2.4	2.4	2.6	2.9	3.7	5.3	6.2	6.0
98. McCracken	8.0	8.4	8.9	9.4	11.4	10.9	14.1	15.0
99. Marshall	3.5	3.7	4.0	4.4	5.2	5.0	7.3	8.3
100. Triggs	3.5	3.6	3.8	4.0	5.3	5.0	6.6	7.3
101. Catoosa	5.8	6.3	6.8	8.2	10.3	10.5	14.5	16.1
102. Dade	2.7	3.0	3.3	4.1	6.6	6.7	9.7	11.0
103. Fannin	3.5	3.8	4.2	5.1	7.0	7.2	10.3	11.6
104. Gilmer	1.5	1.6	1.7	2.1	2.6	2.7	4.4	5.0
105. Lumpkin	1.9	2.0	2.3	2.5	4.7	4.9	6.7	7.4

TABLE 79 (Continued)

County	1953	1954	1955	1956	1957	1958	1959	1960
106. Rabun	1.8	2.0	2.2	2.7	4.0	4.1	5.9	6.8
107. Towns	1.1	1.1	1.1	1.2	1.8	1.9	3.0	3.5
108. Union	.9	.9	1.0	1.2	1.8	1.9	3.2	3.9
109. Walker	7.3	7.2	8.2	9.5	11.7	12.0	15.7	17.4
110. Whitfield	4.8	5.2	5.6	6.6	9.1	9.3	13.1	14.3
111. Blount	2.2	2.3	2.5	2.8	4.5	4.6	7.0	8.0
112. Colbert	7.1	7.5	8.1	8.7	12.8	13.1	17.3	18.5
113. Cullman	2.3	2.4	2.6	2.8	4.4	4.7	6.8	7.9
114. DeKalb	2.4	2.5	2.7	2.9	4.0	4.2	6.3	7.1
115. Etowah	7.7	8.1	8.7	9.3	13.3	13.5	17.8	19.0
116. Franklin	3.2	3.4	3.6	3.9	5.8	5.9	8.6	9.7
117. Jackson	2.5	2.6	2.6	3.0	4.4	4.6	6.8	7.7
118. Lauderdale	5.8	6.1	6.6	7.1	10.6	10.5	14.4	15.5
119. Lawrence	1.7	1.7	1.9	2.1	3.4	3.5	5.6	6.5
120. Limestone	3.3	3.5	3.7	4.0	5.7	5.8	8.3	9.1
121. Madison	4.5	4.8	5.1	5.5	8.4	8.6	11.8	12.9
122. Marion	2.0	2.1	2.2	2.4	3.5	3.6	5.7	6.7
123. Marshall	3.4	3.6	3.8	4.1	5.6	5.7	8.2	9.4
124. Morgan	5.5	5.8	6.1	6.6	9.0	9.2	12.3	13.8
125. Winston	4.4	4.6	4.7	5.0	6.9	7.0	9.3	10.3

Source: Sales Management Survey of Buying Power for years 1954-1961 (Philadelphia, Pa.: Brothers Publication, 1954-1961).

APPENDIX M

TABLE 80

PERCENTAGE OF SCHOOL YEARS COMPLETED BY TOTAL POPULATION AT LEAST 25 YEARS OLD, BY COUNTY, FOR 1940

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
1.	Anderson	5	72	16	7
2.	Bedford	2	64	15	7
3.	Benton	5	79	11	2
4.	Bledsoe	5	73	16	5
5.	Blount	4	63	22	10
6.	Bradley	2	68	22	7
7.	Campbell	6	76	13	5
8.	Carroll	3	73	17	6
9.	Carter	7	66	19	7
10.	Chester	3	76	14	6
11.	Claiborne	4	76	10	5
12.	Cocke	5	74	12	5
13.	Coffee	4	68	21	6
14.	Cumberland	4	75	15	5
15.	Decatur	3	81	11	4
16.	Dickson	3	76	15	5
17.	Fentress	6	81	8	4
18.	Franklin	4	65	20	8
19.	Giles	4	68	20	6
20.	Grainger	4	80	10	3
21.	Greene	3	68	19	7
22.	Grundy	5	75	13	4
23.	Hamblen	4	64	21	9
24.	Hamilton	3	56	29	9
25.	Hancock	6	76	8	3
26.	Hardin	8	69	17	5
27.	Hawkins	5	74	12	6
28.	Henderson	6	76	12	4
29.	Henry	4	70	19	6
30.	Hickman	4	78	13	4
31.	Houston	4	77	14	3
32.	Humphreys	5	74	14	5
33.	Jefferson	11	62	17	8
34.	Johnson	7	73	12	5
35.	Knox	3	56	27	11
36.	Lawrence	3	77	14	4
37.	Lewis	5	78	13	3

TABLE 80 (Continued)

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
38.	Lincoln	3	66	23	6
39.	Loudon	4	74	15	5
40.	McMinn	3	72	17	7
41.	McNairy	4	78	12	4
42.	Marion	3	71	17	5
43.	Marshall	2	59	25	6
44.	Maury	4	63	25	7
45.	Meigs	4	72	17	5
46.	Monroe	6	73	13	6
47.	Moore	3	70	21	5
48.	Morgan	5	79	12	3
49.	Perry	4	78	13	4
50.	Polk	4	72	15	6
51.	Rhea	3	64	23	8
52.	Roane	4	71	17	6
53.	Rutherford	4	59	22	10
54.	Sequatchie	2	74	17	5
55.	Sevier	5	74	14	6
56.	Stewart	5	80	11	3
57.	Sullivan	4	59	24	10
58.	Unicoi	8	67	16	8
59.	Union	7	83	7	2
60.	Van Buren	6	79	10	4
61.	Washington	4	58	23	11
62.	Wayne	3	83	10	4
63.	Williamson	6	65	20	7
64.	Bland	3	71	16	8
65.	Dickenson	7	79	9	4
66.	Grayson	5	72	16	6
67.	Lee	7	74	14	5
68.	Russell	9	71	13	6
69.	Scott	5	71	18	5
70.	Smyth	16	58	16	8
71.	Tazewell	5	67	18	9
72.	Washington	6	65	20	9
73.	Wise	7	69	17	7
74.	Wythe	5	66	18	10
75.	Avery	6	65	21	7
76.	Buncombe	3	48	33	15
77.	Cherokee	5	65	22	7
78.	Clay	5	70	21	4
79.	Graham	7	72	16	4
80.	Haywood	6	58	27	9

TABLE 80 (Continued)

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
81.	Henderson	3	54	29	11
82.	Jackson	6	63	22	7
83.	Macon	4	71	19	6
84.	Madison	6	68	18	6
85.	Mitchell	4	69	19	5
86.	Swain	5	70	17	6
87.	Transylvania	3	54	32	10
88.	Watauga	5	67	19	8
89.	Yancey	7	69	18	5
90.	Alcorn	4	67	22	6
91.	Itawamba	3	74	18	3
92.	Prentiss	5	67	19	5
93.	Tishomingo	4	74	17	4
94.	Calloway	2	72	16	8
95.	Graves	3	72	19	6
96.	Livingston	4	78	11	4
97.	Lyon	4	79	12	4
98.	McCracken	3	61	27	8
99.	Marshall	2	73	18	6
100.	Trigg	7	77	10	5
101.	Catoosa	1	71	21	4
102.	Dade	3	69	18	3
103.	Fannin	7	74	14	4
104.	Gilmer	10	75	12	3
105.	Lumpkin	10	72	9	7
106.	Rabun	5	65	20	8
107.	Towns	4	74	15	7
108.	Union	4	75	13	4
109.	Walker	3	69	22	5
110.	Whitfield	4	70	17	6
111.	Blount	4	73	17	4
112.	Colbert	5	62	24	8
113.	Cullman	3	75	17	4
114.	DeKalb	3	73	18	4
115.	Etowah	5	62	26	7
116.	Franklin	5	69	20	4
117.	Jackson	6	70	78	4
118.	Lauderdale	4	66	20	8
119.	Lawrence	5	74	15	4
120.	Limestone	7	67	18	5
121.	Madison	5	67	20	6

TABLE 80 (Continued)

County	No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
122. Marion	4	71	20	5
123. Marshall	4	71	19	5
124. Morgan	4	62	25	7
125. Winston	4	73	17	4

Percentages will not necessarily add to a 100 percent for 1940 due to the "School Years Not Reported" category being omitted. Percentages in different categories obtained by tabulations from "Years of School Completed" category for males and females 25 years old and over.

Source: Census of Population, Vol. II, "Characteristics of the Population, 1940," U. S. Department of Commerce, Bureau of the Census (Washington: U. S. Government Printing Office, 1942).

APPENDIX N

TABLE 81

PERCENTAGE OF SCHOOL YEARS COMPLETED BY TOTAL POPULATION AT LEAST 25 YEARS OLD, BY COUNTY, FOR 1950

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
1.	Anderson	1	42	33	23
2.	Bedford	2	57	31	8
3.	Benton	2	73	18	5
4.	Bledsoe	5	73	16	4
5.	Blount	2	56	29	13
6.	Bradley	3	65	23	8
7.	Campbell	5	73	16	6
8.	Carroll	2	67	22	7
9.	Carter	3	62	24	8
10.	Chester	3	76	14	6
11.	Claiborne	4	76	10	5
12.	Cocke	5	74	12	5
13.	Coffee	4	68	21	6
14.	Cumberland	4	75	15	5
15.	Decatur	3	74	17	3
16.	Dickson	2	69	20	5
17.	Fentress	6	77	11	5
18.	Franklin	3	54	26	8
19.	Giles	3	61	28	6
20.	Grainger	5	78	12	3
21.	Greene	2	63	25	7
22.	Grundy	3	73	13	3
23.	Hamblen	3	62	24	9
24.	Hamilton	2	49	35	11
25.	Hancock	6	78	11	2
26.	Hardin	4	72	17	4
27.	Hawkins	4	71	18	5
28.	Henderson	2	75	16	4
29.	Henry	2	63	25	7
30.	Hickman	3	70	20	4
31.	Houston	5	68	19	4
32.	Humphreys	2	68	22	11
33.	Jefferson	3	64	21	10
34.	Johnson	5	73	15	6
35.	Knox	2	48	32	13
36.	Lawrence	2	73	19	4

TABLE 81 (Continued)

County	No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
37. Lewis	1	75	18	3
38. Lincoln	2	63	27	6
39. Loudon	3	68	20	6
40. McMinn	3	68	22	7
41. McNairy	3	73	19	4
42. Marion	3	67	21	6
43. Marshall	2	55	32	7
44. Maury	3	56	31	7
45. Meigs	3	73	17	6
46. Monroe	6	71	16	8
47. Moore	2	69	21	5
48. Morgan	4	76	16	3
49. Perry	4	71	17	5
50. Polk	5	68	18	6
51. Rhea	2	61	25	7
52. Roane	3	64	24	7
53. Rutherford	3	60	27	12
54. Sequatchie	3	74	18	3
55. Sevier	3	72	18	6
56. Stewart	3	77	15	3
57. Sullivan	3	53	30	12
58. Unicoi	3	63	25	69
59. Union	4	79	12	3
60. Van Buren	2	81	11	6
61. Washington	3	55	28	12
62. Wayne	3	76	12	3
63. Williamson	5	59	24	9
64. Bland	4	69	19	6
65. Dickenson	4	76	13	4
66. Grayson	3	71	17	7
67. Lee	4	74	14	5
68. Russell	6	68	16	6
69. Scott	6	70	17	4
70. Smyth	5	62	20	10
71. Tazewell	4	67	19	7
72. Washington	5	63	20	8
73. Wise	5	69	17	7
74. Wythe	4	62	22	9
75. Avery	6	64	22	6
76. Buncombe	2	44	35	15
77. Cherokee	3	69	19	7
78. Clay	3	71	22	4
79. Graham	4	74	17	4

TABLE 81 (Continued)

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
80.	Haywood	3	57	28	10
81.	Henderson	2	53	31	13
82.	Jackson	4	64	23	8
83.	Macon	3	69	19	7
84.	Madison	5	67	19	7
85.	Mitchell	3	69	20	7
86.	Swain	4	71	17	8
87.	Transylvania	1	58	29	11
88.	Watauga	3	66	19	10
89.	Yancey	5	69	19	5
90.	Alcorn	3	62	28	6
91.	Itawamba	3	69	21	5
92.	Prentiss	2	61	29	7
93.	Tishomingo	3	72	21	3
94.	Calloway	1	61	25	12
95.	Graves	1	65	25	7
96.	Livingston	1	76	18	4
97.	Lyon	3	74	17	4
98.	McCracken	1	54	32	10
99.	Marshall	2	71	19	6
100.	Trigg	2	73	16	8
101.	Catoosa	2	61	31	5
102.	Dade	2	68	22	7
103.	Fannin	3	70	18	6
104.	Gilmer	3	77	15	4
105.	Lumpkin	6	70	12	10
106.	Rabun	2	65	21	9
107.	Towns	3	67	19	10
108.	Union	2	78	13	6
109.	Walker	3	64	25	7
110.	Whitfield	2	68	22	6
111.	Blount	2	69	22	4
112.	Colbert	3	52	35	9
113.	Cullman	2	66	25	4
114.	DeKalb	2	67	25	4
115.	Etowah	3	53	33	8
116.	Franklin	3	62	27	5
117.	Jackson	4	68	20	5
118.	Lauderdale	3	57	28	10
119.	Lawrence	3	71	19	4
120.	Limestone	5	63	24	6
121.	Madison	4	59	27	7

TABLE 81 (Continued)

County	No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
122. Marion	2	67	23	5
123. Marshall	3	64	26	5
124. Morgan	2	57	32	7
125. Winston	3	67	23	6

Note: Percentages will not necessarily add to 100 percent for 1950 due to the "School Years not Reported" category being omitted. Percentages in different categories obtained by tabulations from "Years of School Completed" category for males and females 25 years old and over.

Source: Census of Population, Vol. II, "Characteristics of the Population, 1950," U. S. Department of Commerce, Bureau of the Census (Washington: U. S. Government Printing Office, 1952).

APPENDIX O

TABLE 82

PERCENTAGE OF SCHOOL YEARS COMPLETED BY TOTAL POPULATION AT LEAST 25 YEARS OLD, BY COUNTY, FOR 1960

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
1.	Anderson	1	39	38	22
2.	Bedford	2	54	35	9
3.	Benton	2	67	23	8
4.	Bledsoe	2	72	20	6
5.	Blount	2	50	35	13
6.	Bradley	2	58	31	9
7.	Campbell	4	68	21	7
8.	Carroll	3	66	24	7
9.	Carter	3	59	28	10
10.	Chester	2	70	21	7
11.	Claiborne	4	72	17	7
12.	Cocke	4	68	22	6
13.	Coffee	2	50	34	14
14.	Cumberland	3	68	24	5
15.	Decatur	3	69	23	5
16.	Dickson	3	64	27	6
17.	Fentress	4	74	17	5
18.	Franklin	3	54	33	10
19.	Giles	3	58	31	8
20.	Grainger	3	77	16	4
21.	Greene	2	59	31	8
22.	Grundy	4	70	19	7
23.	Hamblen	1	56	31	12
24.	Hamilton	2	43	40	15
25.	Hancock	5	75	16	4
26.	Hardin	3	66	25	6
27.	Hawkins	3	67	23	7
28.	Henderson	4	68	23	5
29.	Henry	2	56	34	8
30.	Hickman	2	69	24	5
31.	Houston	3	64	26	7

TABLE 82 (Continued)

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
32.	Humphreys	2	62	29	7
33.	Jefferson	2	59	27	12
34.	Johnson	3	70	21	6
35.	Knox	1	43	40	16
36.	Lawrence	2	69	24	5
37.	Lewis	2	69	23	6
38.	Lincoln	3	56	33	8
39.	Loudon	3	59	31	7
40.	McMinn	2	61	28	9
41.	McNairy	2	66	26	6
42.	Marion	3	64	27	6
43.	Marshall	2	53	36	9
44.	Maury	2	52	36	10
45.	Meigs	3	69	23	5
46.	Monroe	4	67	21	8
47.	Moore	3	63	26	8
48.	Morgan	3	70	24	3
49.	Perry	4	66	25	5
50.	Polk	6	66	21	7
51.	Rhea	2	63	28	7
52.	Roane	2	57	32	9
53.	Rutherford	2	44	39	15
54.	Sequatchie	1	68	25	6
55.	Sevier	3	64	24	9
56.	Stewart	2	71	22	5
57.	Sullivan	2	48	36	14
58.	Unicoi	2	60	28	10
59.	Union	3	76	16	5
60.	Van Buren	3	77	16	4
61.	Washington	2	51	33	14
62.	Wayne	3	72	20	5
63.	Williamson	3	55	31	11
64.	Bland	3	62	28	7
65.	Dickenson	4	71	19	6
66.	Grayson	3	67	24	6
67.	Lee	4	70	20	6
68.	Russell	4	64	25	7
69.	Scott	4	64	26	6
70.	Smyth	3	56	30	11
71.	Tazewell	4	59	28	9
72.	Washington	4	56	29	11
73.	Wise	4	67	23	6

TABLE 82 (Continued)

County		No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
74.	Wythe	3	57	29	11
75.	Avery	2	59	30	9
76.	Buncombe	2	40	41	17
77.	Cherokee	3	63	26	8
78.	Clay	4	59	29	8
79.	Graham	4	68	23	5
80.	Haywood	2	48	38	12
81.	Henderson	2	44	39	15
82.	Jackson	3	55	30	12
83.	Macon	2	63	27	8
84.	Madison	4	64	24	8
85.	Mitchell	2	61	29	8
86.	Swain	3	59	29	9
87.	Transylvania	2	46	37	15
88.	Watauga	3	53	30	14
89.	Yancey	5	60	28	7
90.	Alcorn	3	54	34	9
91.	Itawamba	2	60	31	7
92.	Prentiss	2	57	32	9
93.	Tishomingo	2	62	29	7
94.	Calloway	2	55	30	13
95.	Graves	2	58	32	8
96.	Livingston	1	66	28	5
97.	Lyon	1	71	24	4
98.	McCracken	1	45	41	13
99.	Marshall	1	59	30	10
100.	Trigg	4	69	20	7
101.	Catoosa	1	50	42	7
102.	Dade	2	62	31	5
103.	Fannin	2	65	28	5
104.	Gilmer	4	69	21	6
105.	Lumpkin	3	61	21	15
106.	Rabun	3	55	33	9
107.	Towns	2	57	28	13
108.	Union	3	64	24	9
109.	Walker	2	55	35	8
110.	Whitfield	3	57	32	8
111.	Blount	2	57	35	6
112.	Colbert	2	42	44	12
113.	Cullman	2	59	33	6
114.	DeKalb	2	59	34	5

TABLE 82 (Continued)

County	No School	Grade School 1-8 Years	High School 1-4 Years	1 or More Years College
115. Etowah	2	46	43	9
116. Franklin	3	54	37	6
117. Jackson	3	59	32	6
118. Lauderdale	2	45	40	13
119. Lawrence	3	62	30	5
120. Limestone	3	55	33	9
121. Madison	2	38	40	20
122. Marion	2	58	33	7
123. Marshall	2	51	37	10
124. Morgan	2	44	42	12
125. Winston	2	61	31	6

Note: Percentages in different categories obtained by tabulations from "Years of School Completed" category for males and females 25 years old and over.

Data on the four educational categories for 1941-49 and 1951-59 generated by interpolation using figures in Table 80, page 239, Table 81, page 243, and Table 82.

Source: Census of Population, Vol. II, "Characteristics of the Population, 1960," U. S. Department of Commerce, Bureau of the Census (Washington: U. S. Government Printing Office, 1964).

VITA

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