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THE ECONOMIC IMPACT OF A MILITARY INSTALLATION  
CLOSURE ON THE SURROUNDING COMMUNITY: CLINTON  
COUNTY AIR FORCE BASE

AIR FORCE INSTITUTE OF TECHNOLOGY  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

SEPTEMBER 1976

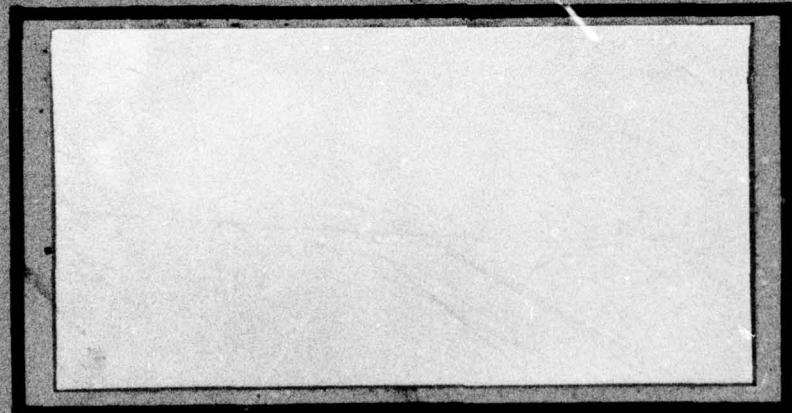
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THE ECONOMIC IMPACT OF A MILITARY  
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SURROUNDING COMMUNITY:  
CLINTON COUNTY AIR FORCE BASE

Robert J. Parsons, Captain, USAF

SLSR 5-76B

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In light of recent court actions, DOD has begun to develop a data base from which environmental impact assessments of military installation closures can be made. As a contribution to this effort, this research investigated the closure of Clinton County Air Force Base, Wilmington, Ohio, in an effort to establish what officially recorded data exist which could be used to assess the economic impact of the closure action on the surrounding community of Wilmington, Ohio. This research revealed that data exist at the state and county level which could be used to assess the economic impact of this closure. This research also discovered that data was not available relevant to the public sector of the community or the economic contribution to the community of the base. The researcher concluded that there was no significant economic impact on the community of Wilmington. The researcher recommended that correlational studies be accomplished to relate military installation economic data with corresponding community data to validate the data as economic impact predictors for future closure actions.

*Some conclusions are presented.*

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THE ECONOMIC IMPACT OF A MILITARY  
INSTALLATION CLOSURE ON THE  
SURROUNDING COMMUNITY:  
CLINTON COUNTY AIR  
FORCE BASE

A Thesis

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology  
Air University

In Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Logistics Management

By

Robert J. Parsons, BS  
Captain, USAF  
Class 76B

September 1976

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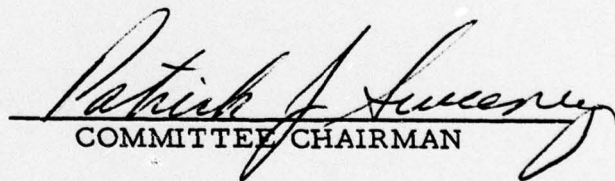
This thesis, written by

Captain Robert J. Parsons

has been accepted by the undersigned on behalf of the faculty of the  
School of Systems and Logistics in partial fulfillment of the require-  
ments for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

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## CHAPTER I

### INTRODUCTION

#### Statement of the Problem

The Department of Defense (DOD) has been unable to accurately predict the economic impact of the closure of military installations on surrounding communities. The recent court injunction against the relocation of the Air Force Communication Service from Richards-Gebaur AFB to Scott AFB, along with expected future closures and relocations of military installations, has directed attention to the need for a reliable method of determining the impact that bases have on their local communities.

#### Background

Efforts to provide more economical defense operations by eliminating non-essential bases and combining operations at remaining bases began with studies conducted in 1961 under the direction of Secretary of Defense Robert S. McNamara. The announcement of specific closures involving approximately 60 major defense installations came in March 1961 (10:6).

Many studies have been conducted since 1961 to assess the overall impact of defense installation closures. An in-depth research

effort was concluded in 1970 for the United States Arms Control and Disarmament Agency. This study, entitled "Economic Impact of Military Base Closings," examined nine specific closure actions and produced a synthesis of the principal findings. The synthesis was divided into two categories: community reaction to the announcement of closure, and long range reaction to the closure process. The economic factors examined were housing sales and construction, employment, and retail sales (5:2).

The report concluded that relatively few of the areas researched actually experienced "substantial" impact as a result of the base closures. The main problem in nearly all cases was the immediate reaction of the local community, which attempted to apply political pressure to postpone the closure date (5:27). As a result, valuable time may have been lost fighting the problem instead of accepting it and planning measures to minimize the resultant effects.

Housing. The first area to reflect the impact was housing--specifically new construction. "Often nearly complete work stoppage resulted from the initial reaction following the announcement [4:51]." The more the community depended upon the base, the greater was the impact upon their housing market. Unless the community expended efforts to entice an industry to relocate and utilize the abandoned base facilities, the ultimate result was many vacant house and increased foreclosures (4:52).

Employment. In terms of unemployment, each of the research efforts was notably conclusive, but differed in its conclusions. One researcher concluded that

. . . for all base civilian groups, lower-paid workers tended to retire or relocate in other areas; therefore, the local unemployment rate was relatively unaffected [7:34].

Another researcher concluded that "the impact of civilian personnel displacement was much greater than indicated by previous studies [4:213]." This same researcher equated the loss of one base-related civilian job to a loss of over two jobs in the supporting community; whereas, the loss of one base-related military job equaled only a similar loss in the community (4:xiv). A third researcher stated that loss of the military installation caused a larger proportional increase in unemployment than did the loss of a manufacturing installation (9:viii-9).

Retail Sales. Retail sales also proved to be an area where researchers differed; however, most researchers concluded that there was a lesser effect on sales due to a base closure than to closure of an industry of approximately the same size. For example, in "The Economic Impact of a Military Base," L. D. Turner concluded:

Unlike a military base, private firms generally sublet much of their work to local businessmen. They do not operate commissaries, BXs, and movies. Only occasionally do they build homes for employees. The result is that

a much larger part of a private firm's income and that of its employees is spent in the local area and helps to build the local economy [15:13].

This study also revealed that military personnel spend approximately 40% of their income on the base and approximately 25% more than 15 miles from the base; therefore, only about one-third of the base income was spent in the surrounding community (15:11).

Comparison of Base and Industrial Impacts. Lawrence E. Laben's research of Pease AFB near Portsmouth, New Hampshire, and IBM of Rochester, Minnesota revealed:

- The Air Force base did not cause any industrial growth; IBM did.
- Military personnel spent less of their income in the local community than personnel working for IBM.
- The Air Force base itself created no new jobs for workers in the area, while IBM created many new jobs by drawing nearly all of its workers from the community (9:9).

As a result, the closure of this military installation would create less of an economic impact upon Portsmouth than the closure of the IBM plant would to Rochester (9:9-10). Therefore, while it is recognized that a closure of any major type installation would definitely affect a local community, correlation between a military base closure and an industry closure cannot be assumed.

Time Series Analysis. The method employed to collect data by the authors of the literature reviewed was time series analysis-- data accumulated over a period of time. The immediate impact of the closure was considered in each case; however, it was only part of the picture and the time series analysis was useful because it allowed time for an impact to be observed (4:26).

Conclusions. The review of the existing literature has revealed that military installations definitely have an impact upon the economy of local communities near the installation (9:1-5). However, there is some difference of opinion among the various researchers as to the extent of the impact. Turner concluded that "military facilities are largely self-sufficient and their closing down leaves a much smaller impact on the surrounding communities [15:13]." Daicoff's summary of the Olmstead AFB, Pennsylvania, closure states that "it is clear that the impact was diffused to the extent that most measures of the area-wide economic activity do not show a reversal [5:171]." However, Daicoff's conclusions about Brookley AFB, Alabama, revealed a marked impact upon the local community (5:44).

Recent Department of Defense proposals to close more military installations and relocate various functions of other military installations has rekindled the interest of local communities whose economies benefit from the military presence. As a weekly news magazine points out:

Dozens of communities across the nation are sharing a traumatic experience--the closing of military installations that have poured millions of dollars into their economies. It is all part of the Pentagon's belt-tightening, following the Vietnam War, to get back to peacetime military strength. But the effect on some local communities has been harsh [18:72].

### Scope

This research contributed to the first of four phases of an ongoing project to establish a procedure for the prediction of the overall impact of military installation closures on surrounding communities.

Phase I of the project is the search for data. In order to facilitate the identification and collection of data, the overall impact of a base closure has been divided into economic, social, and physical impacts. This phase of the project will consist of individual case studies of various military installation closures in order to identify available data which may provide indicators of the overall impact of military installation closures on their surrounding communities (14).

Phase II, the consolidation phase, will examine and consolidate the findings which were determined to be significant in Phase I. The data will be arrayed by type of impact, size of installation, and size of community (14).

Phase III will be the validation phase. The consolidated data from Phase II will be examined for validity as estimators of the overall impact of military installation closures (14).

Phase IV, the incorporation phase, will utilize the validated data from Phase III in an attempt to develop a relatively simple procedure to enable DOD to predict the overall impact of military installation closures on local communities (14).

#### Factors Examined

This research was limited to examining the following economic factors:

1. population
2. total income and output
3. income distribution
4. employment
5. regional economic stability
6. private capital formation
7. public capital formation
8. land and property values
9. public sector revenues (6:548-562)

and identifying available data relevant to these factors which may provide accurate estimators of the economic impact of military installation closures on their surrounding communities (14).

These factors were chosen because they match the economic parameters to be utilized in a computer environmental impact model being developed by the Department of the Army. This computer model

will be available for DOD use. A detailed description of these economic factors is presented in Appendix A.

### Objective

The objective of the economic portion of Phase I of the project is to determine what officially recorded data are available to DOD which may be used to assess the current and probable economic impact of military installation closures on local communities.

The objective of this research was to determine what officially recorded data are available to DOD which may be used to assess the economic impact of the closure of Clinton County Air Force Base on the community of Wilmington, Ohio.

### Research Questions

The answer to the following research questions will provide the means to fulfill the research objective:

1. What officially recorded data are available to DOD which may be used to assess the economic impact of the closure of Clinton County Air Force Base on the community of Wilmington, Ohio.
2. What officially recorded data are available to DOD which may be used to assess the current and probable economic impact of military installation closures on local communities.

## CHAPTER II

### METHODOLOGY

#### Overview

This research effort used the case study approach to investigate a specific military installation closure and the resultant economic impact on the community surrounding that installation. Specifically, this research investigated the economic impact of the closure of a medium sized military installation surrounded by a small community. In order to facilitate data collection for the overall project, the size of military installations has been categorized by the number of personnel assigned as follows:

small--less than 1,000

medium--between 1,000 and 4,000

large--over 4,000.

Likewise, communities surrounding the base are categorized by population:

small--less than 25,000

medium--between 25,000 and 50,000

large--over 50,000 (14).

This research investigated the closure of Clinton County Air Force Base (AFB), closed in 1971, and the community of Wilmington, Ohio, located nearby (14).

Clinton County AFB. Clinton County AFB (CCAFB) is located 5 miles east of Wilmington, Ohio, 34 miles southeast of Dayton, 47 miles northwest of Cincinnati, and 50 miles southeast of Columbus. The mission of CCAFB included training active duty foreign national pilots under the Military Assistance Program as well as U.S. pilots in the operation of the C-119 Flying Boxcar aircraft. CCAFB was also the home of an Ohio Air National Guard unit, the 160th Air Refueling Group, with 10, KC-97 refueling aircraft. At the time of base closure there were 531 civilian, 50 active duty military, 1,888 Air Force Reserve, 166 Air National Guard, and 746 Air National Guard Reserve personnel assigned to the base (13:1).

Community of Wilmington. The city of Wilmington, Ohio with a population of over 9,000 people is the county seat of Clinton County, Ohio. Clinton County has a population of over 30,000 people and is located in Southwest Ohio. Metal working and machine tool industries dominate the economic base of Wilmington while nearly 90 percent of Clinton County land is held for agricultural use.

### Limitations of Research

Due to time and manpower limitations, a census of potential economic data sources could not be accomplished. Therefore, data collection efforts were concentrated on those sources which the researcher judged to have the greatest potential for supply of reliable data relevant to the nine economic factors under consideration. Specifically, research efforts were concentrated on state, county, and city governmental agencies as previous research identified these sources as the most fruitful (3:25).

A second limitation of this research was the assumption made by the researcher that economic data relevant to Clinton County in non-agrarian categories could be related to Wilmington. This assumption appeared to be valid in light of the fact that approximately 55% of all manufacturers and 64% of all persons employed in manufacturing for Clinton County are located in Wilmington.<sup>1</sup>

A final limitation of this research was the result of the historical nature of this research and the time which had elapsed since the installation closure (five years). Valuable data may well have been lost or destroyed, particularly at the local level, due to the lack of requirements to maintain them beyond three or four years.

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<sup>1</sup>See Appendix B for breakdown of manufacturers in Clinton County.

### Data Collection Plan

Data collection efforts were concentrated at Wilmington, the county seat and Columbus, the state capitol due to time and manpower limitations. Initial efforts were concerned with determining what economic data were available without regard to categorizing the data within a specific economic factor.

As mentioned in Chapter I, nine economic factors were examined and provide the data base for analysis. A detailed description of each factor is presented in Appendix A. The factors are repeated here for clarity of discussion. They are:

1. population
2. total income and output
3. income distribution
4. employment
5. regional economic stability
6. private capital formation
7. public capital formation
8. land and property values
9. public sector revenues

Preliminary contact with potential data sources was made with a letter of request for information.<sup>2</sup> Follow-on efforts consisted

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<sup>2</sup> A sample letter is contained in Appendix C, along with a listing of civilian data sources.

of visits to the cities of Wilmington and Columbus to conduct interviews and collect data.

### Subjective Analysis

Data received were subjectively evaluated as candidates for potential estimators of economic impact. These evaluations were based on the following criteria:

1. the data must be relevant to one of the nine economic factors previously mentioned
2. the data must be amenable to time series analysis
3. corresponding community (city or county) and state data must be available for comparison.

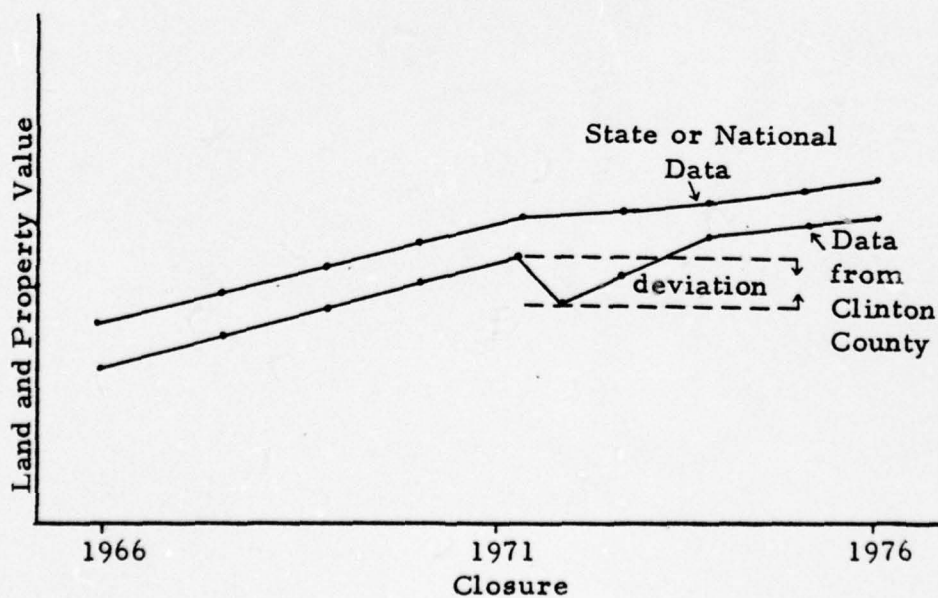
Data which did not satisfy all of the above criteria were not further considered as candidates for potential estimators of economic impact. Candidates selected in this manner were then subjected to time series analysis.

### Time Series Analysis

The economic impact of military installation closures was investigated through the use of time series analysis covering a period from five years prior to closing to the present. Time series analysis allowed the immediate effect of the installation closure to be studied as well as a study of the long range impact (4:26).

State economic data relative to the nine economic factors above were compared with like data from the affected community. Deviations between changes in the community data and changes in the state data for each economic factor were considered significant if the deviation was greater than three percent. This figure, the criterion most commonly used in previous similar studies, was chosen because no standard has been officially established (4:12). Economic factors exhibiting significant deviations will be classified as "impacted factors" (14).

Data relative to each economic factor listed was evaluated with respect to time. The following graph presents a graphical comparison between local and state or national data for a particular economic factor. The data presented is illustrative of time-series analysis.



The evaluation of the economic impact of the closure of CCAFB on the community of Wilmington using time series analysis provided a measure of validity to the subjective evaluation of the data received as potential indicators of economic impact.

## CHAPTER III

### PRESENTATION OF RESEARCH FINDINGS

#### Introduction

This research was partially successful in producing data relevant to the closure of CCAFB and its impact on the community of Wilmington, Ohio. The successful retrieval of data was limited by the time and manpower restrictions previously mentioned, and the fact that private businesses and local governmental agencies normally maintain financial records for a limited period of time (3 to 4 years).

#### Presentation of Findings

This research was primarily concerned with two time frames, the period from 1965 to 1975 for long range impact, and the period from 1971 to 1972 for the study of the immediate impact of the base closure. In many cases, data relevant to a particular economic factor was either estimated or reported on an infrequent basis (3 to 5 years). In these cases, the validity of conclusions reached by the researcher were weighed accordingly.

For the purpose of graphical comparison of state and local data, scaling factors were used which would permit a "side by side"

comparison of the data. For example, Clinton County contains approximately 0.3 percent of the population of the state of Ohio. On the graph comparing state and county populations, a scaling factor of 0.003 is used to allow equal percentage changes to appear equal on the graph.

In those cases where data relevant to a particular economic factor could not be found, no conclusion about impact was made.

Population. Population data for the state of Ohio and Clinton County was obtained from the Ohio Department of Economic and Community Development, Bureau of Business Research, Columbus, Ohio, in the form of actual (1970) and estimated (1967-1969 and 1971-1974) statistics.<sup>1</sup>

State and county population statistics are presented in Figure 1. The changes in population for Clinton County follow the same pattern as the statewide population with a deviation of much less than one percent for any time period. In light of these data, it would appear that the closure of CCAFB had little or no effect on the population of Clinton County.

The successful conversion of CCAFB property to an industrial park and educational facility appears to have compensated for the loss of base associated personnel.<sup>2</sup> The generation of many new jobs as

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<sup>1</sup>These data are presented in Appendix D.

<sup>2</sup>Development actions with new jobs generated are presented in Appendix K.

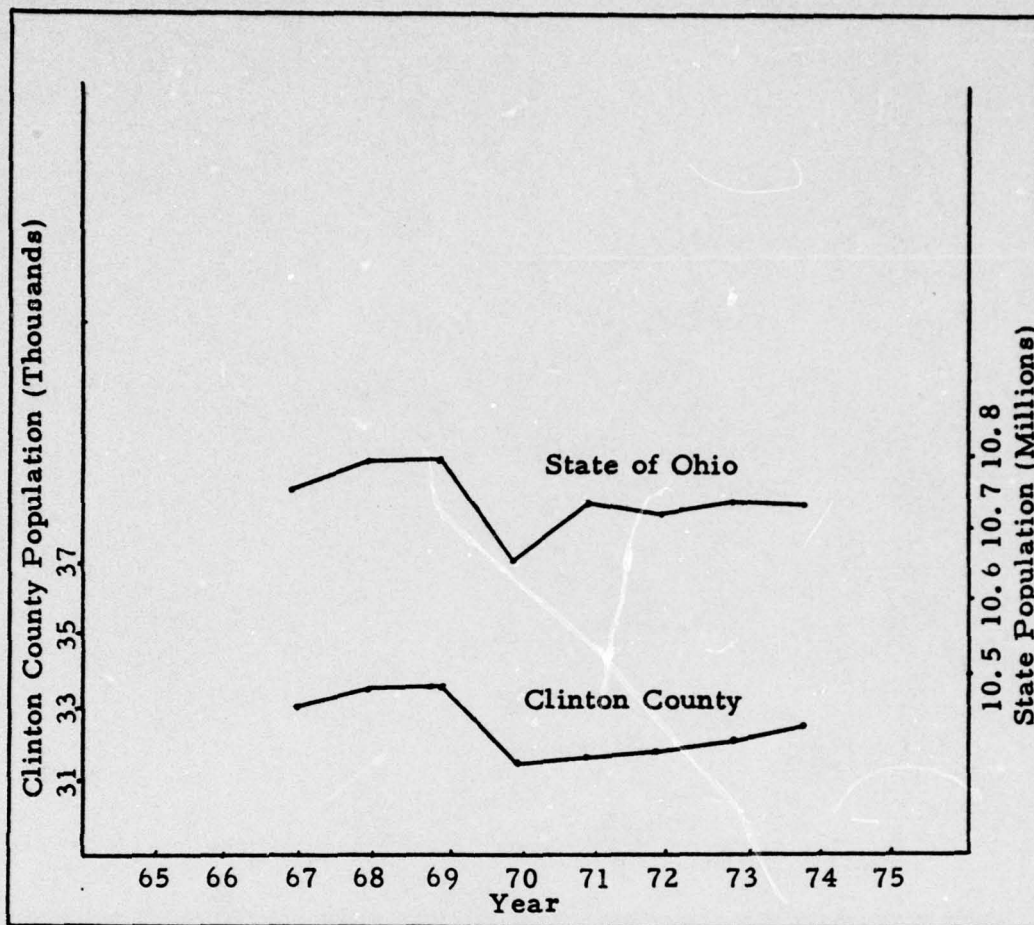


Figure 1

State and County Population

Source:

Ohio Department of Economic and Community Development,  
Bureau of Business Research, Columbus, Ohio.

well as the influx of students attending training at the converted base property have provided the impetus for increased area growth (2).

Total Income and Output. Income data for the state of Ohio and Clinton County were obtained from the Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio. These data consisted of payroll statistics for those individuals covered by the Ohio Unemployment Compensation Law working in selected industries.

State and county payroll statistics for all industries are presented in Figure 3. Payroll statistics for the selected industries are presented in Figures 3 through 8. The state and county local industry payroll statistics of Figure 2 parallel each other very closely with the difference in rate of change never exceeding one percent. In Figures 4 through 9, the only industry which shows a significant deviation is construction (Figure 4). Construction payrolls between 1970 and 1971 decreased by 21 percent in Clinton County while decreasing only 2.5 percent in the state. However, in the following year, construction payrolls increased 23 percent and continued to rise at a greater percentage rate than the state construction payrolls through 1974. Due to this evidence, the researcher concluded that, although the construction industry was impacted during the time period of the base closure, recovery was complete and rapid.

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<sup>3</sup>These data are presented in Appendix E.

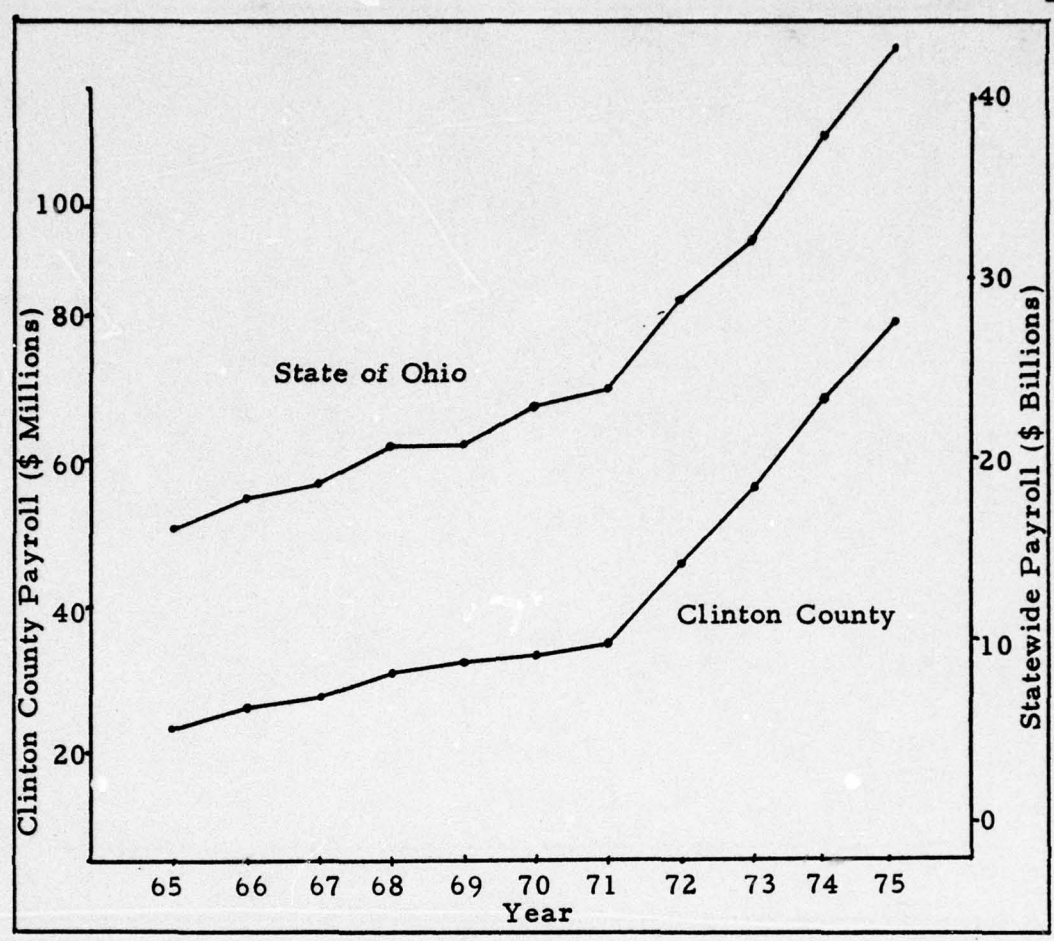


Figure 2

Total Payrolls for All Industries,  
Statewide and Clinton County

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

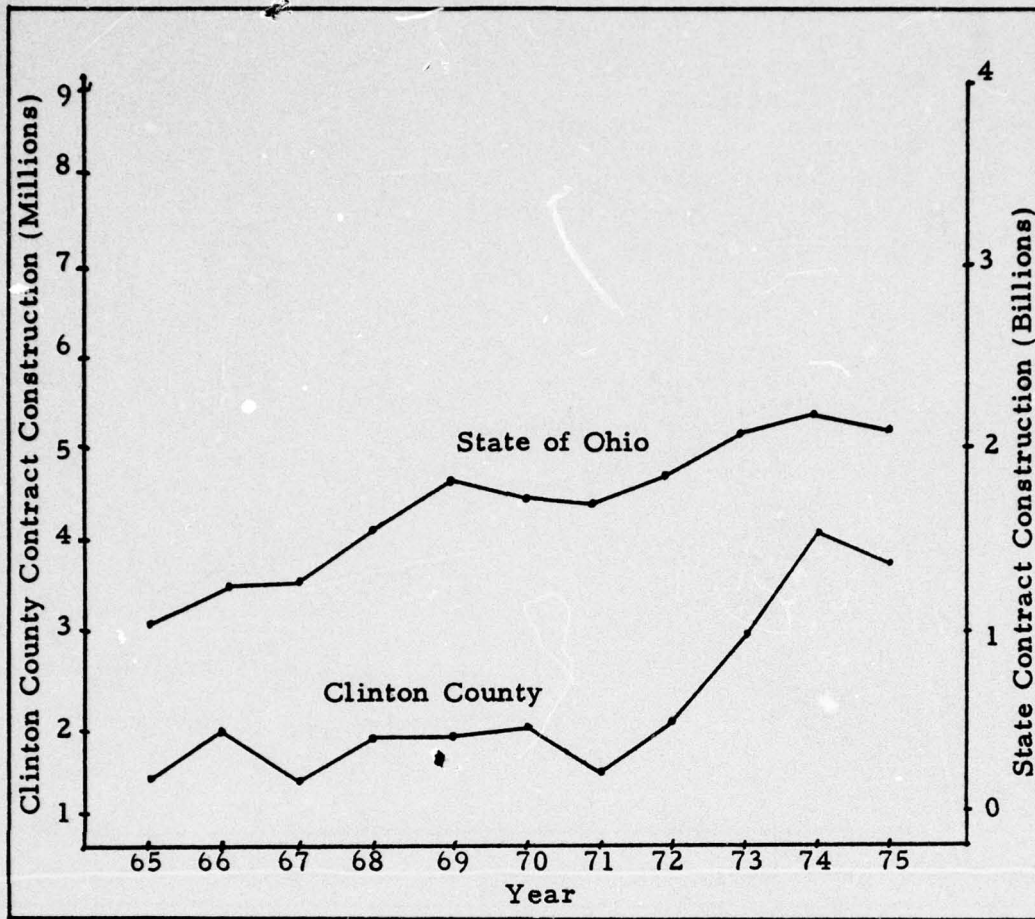


Figure 3

## State and County Construction Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

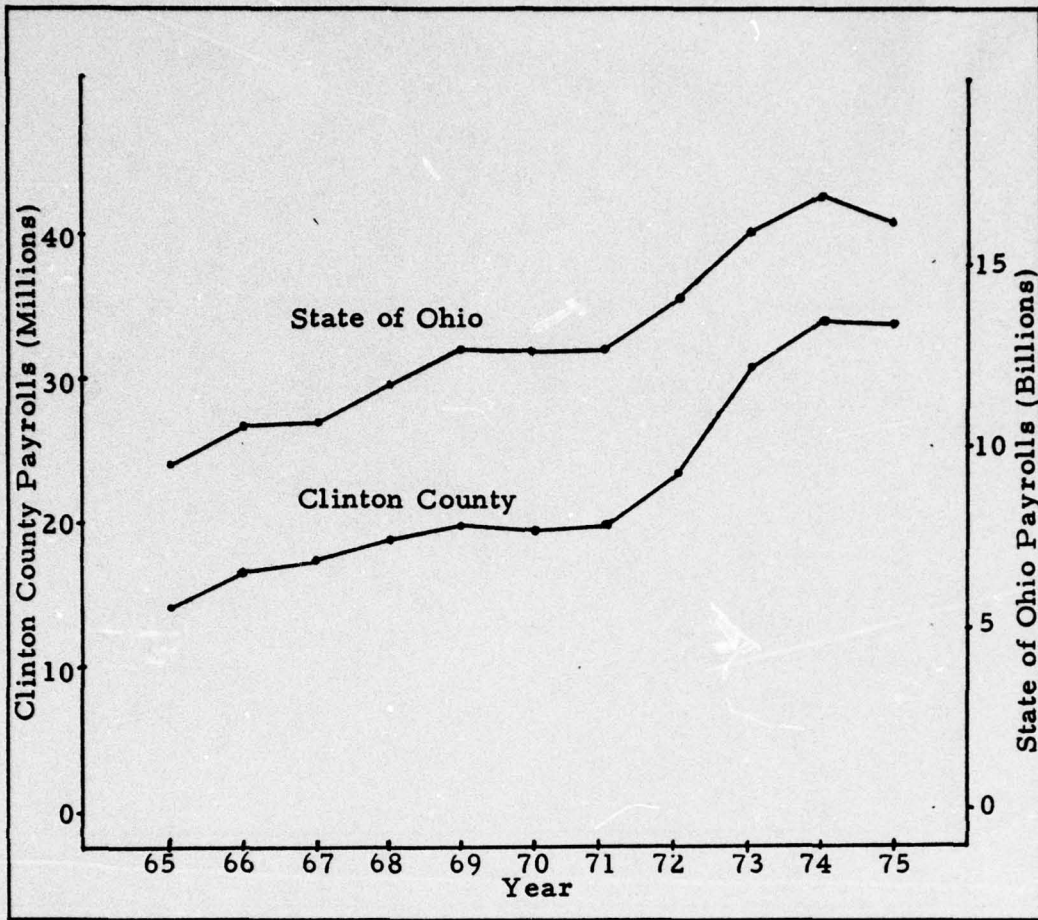


Figure 4

State and County Manufacturing Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

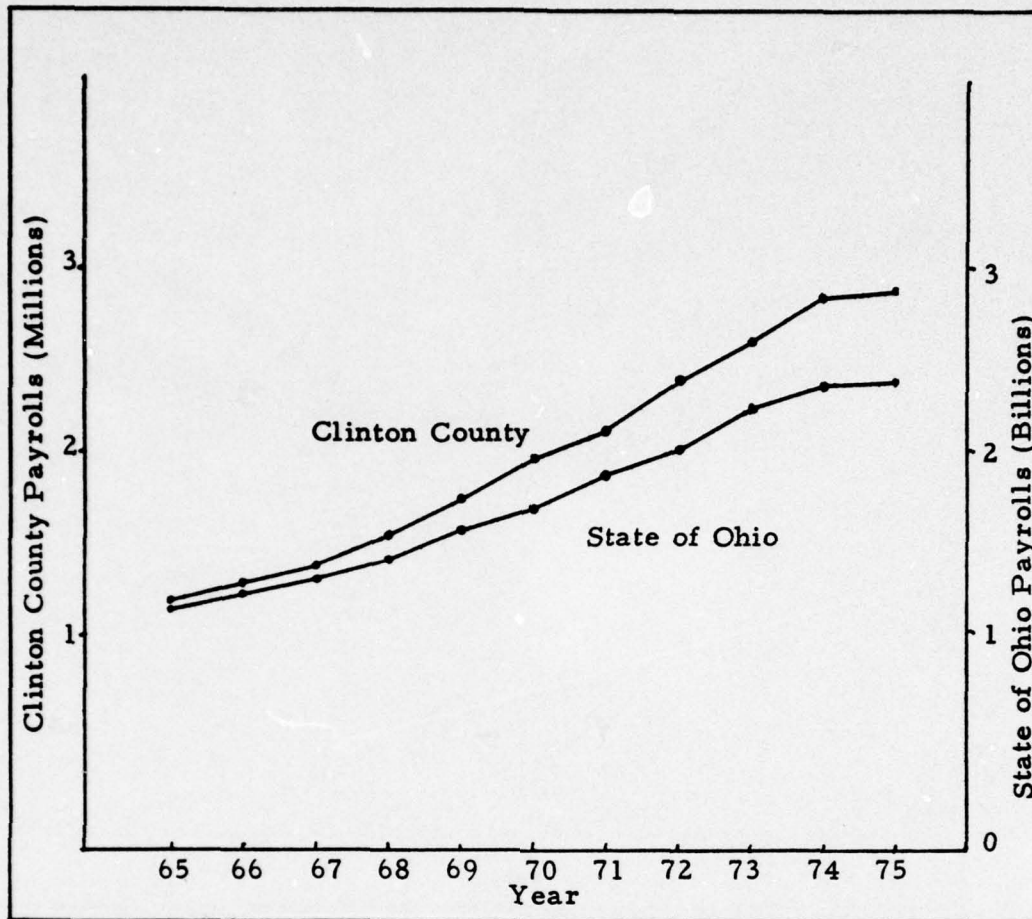


Figure 5

State and County Transportation and  
Utility Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

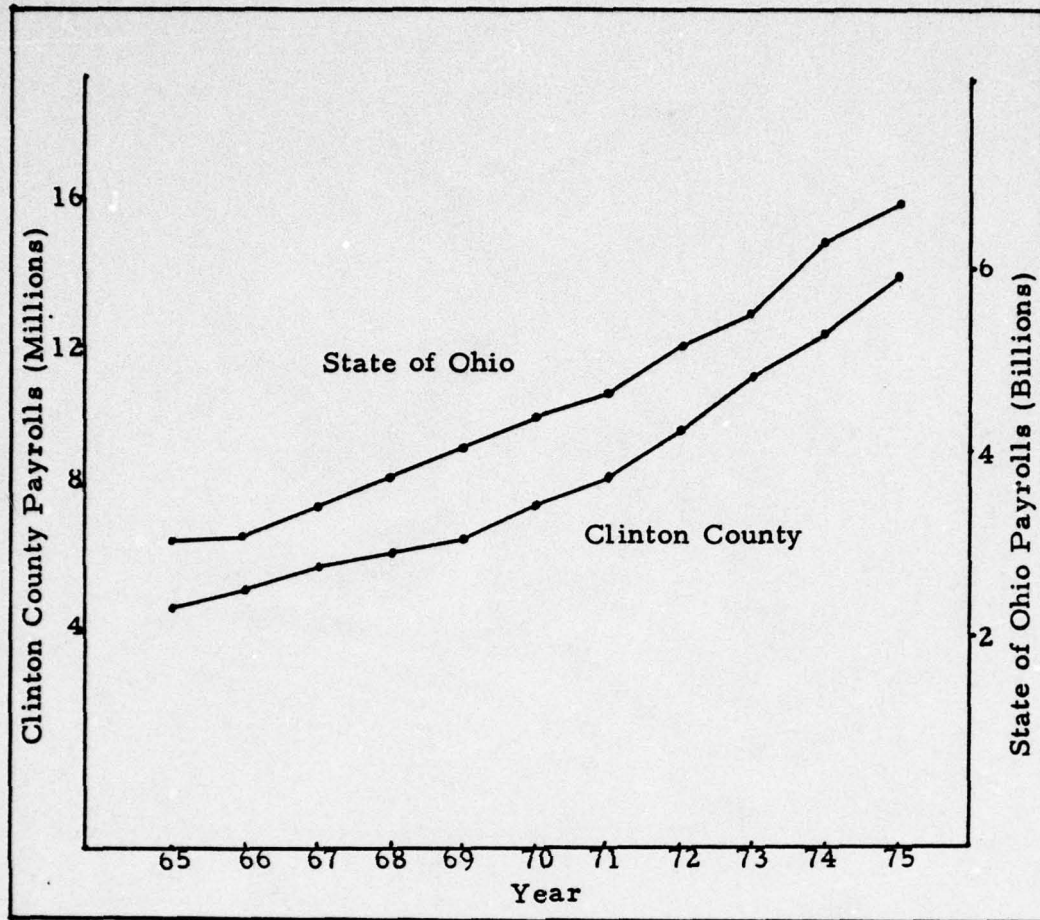


Figure 6

State and County Wholesale and  
Retail Trade Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

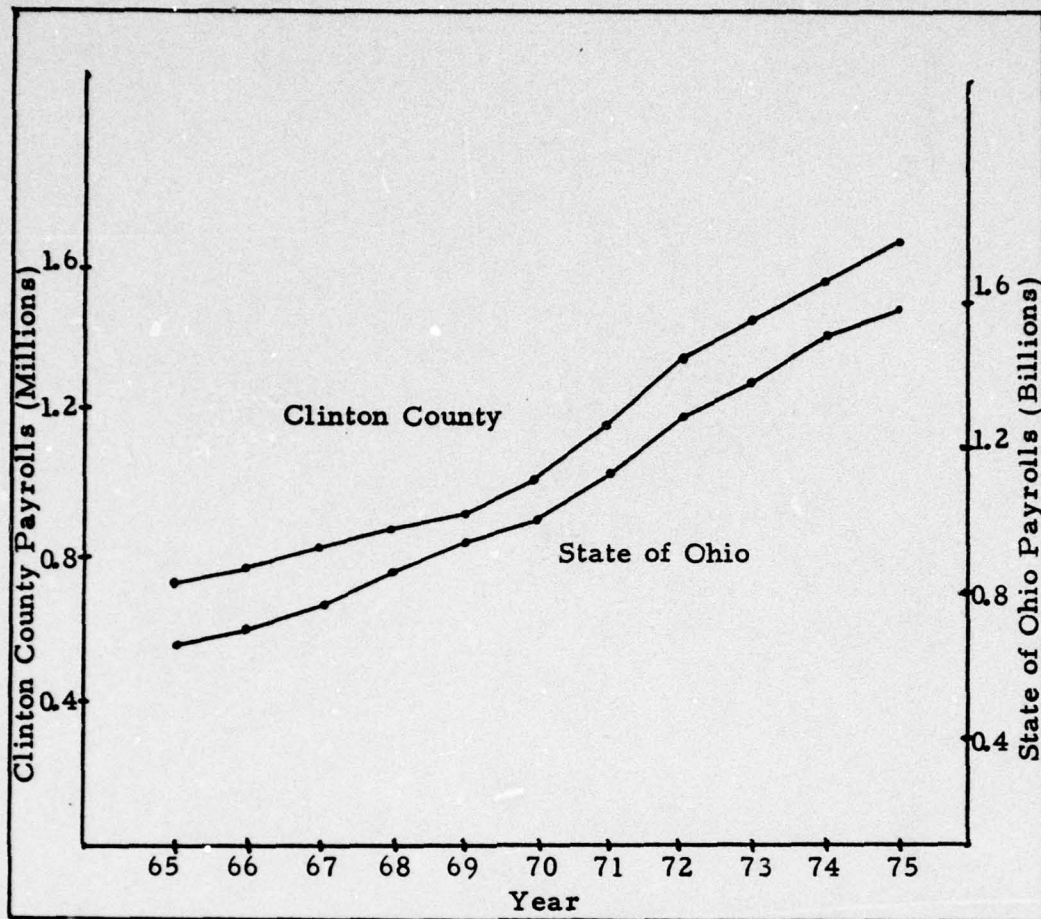


Figure 7

State and County Finance, Insurance and  
Real Estate Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

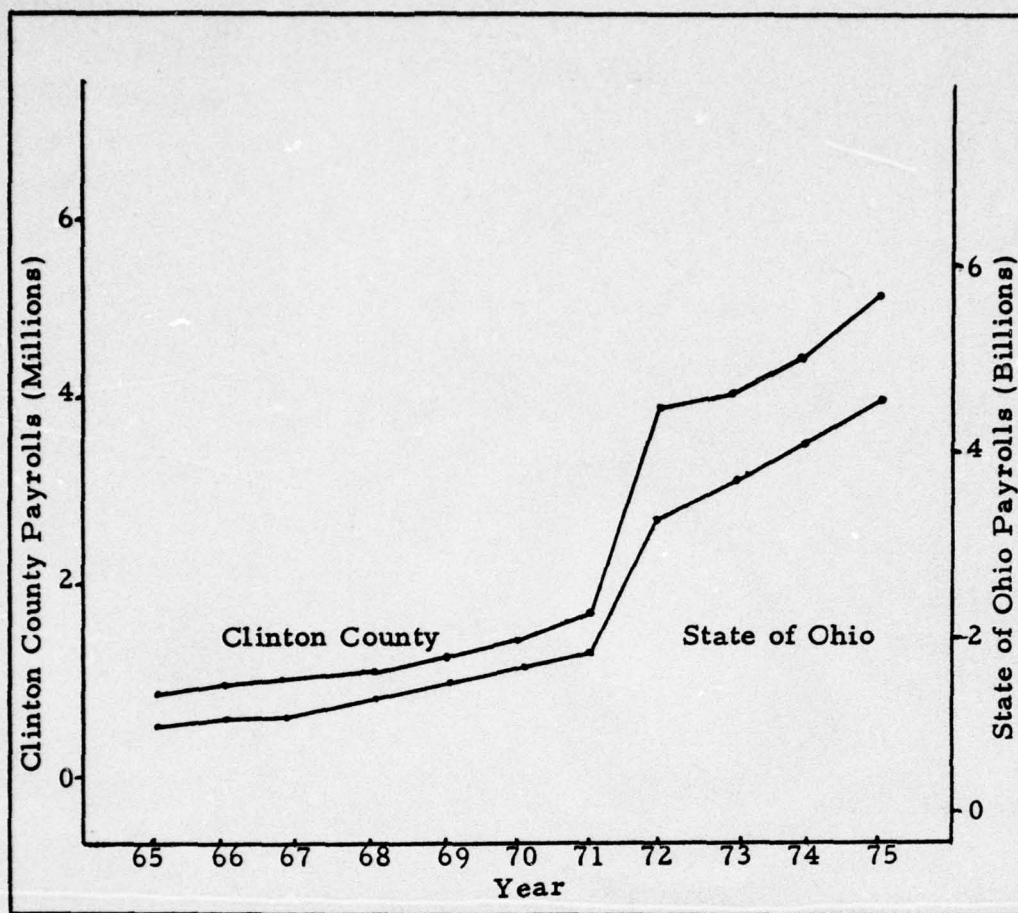


Figure 8

State and County Services Payrolls

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

The data obtained by the researcher indicated that the closure of CCAFB had no significant impact on the community in the area of total income.

The output of the community is defined as the value of goods and services produced. The only data obtained by the researcher which could be related to the output of the community were statistics on the "value added by manufacture" for the years 1967 and 1972.<sup>4</sup> These statistics show a statewide increase of 31.69 percent in "value added by manufacture" and a 23.13 percent increase for Clinton County. Due to the large variance in percentages for different counties (a low of minus 5 percent to a high of 527 percent) along with the researcher's uncertainty about the relationship between "value added by manufacture" and output, no conclusion was made concerning the impact of the closure of CCAFB on the output of the community of Wilmington.

Income Distribution. Data related to income distribution was obtained in the form of percent of households by estimated effective buying income group for the state of Ohio and Clinton County. These data were obtained from the Ohio Department of Economic and Community Development, Bureau of Business Research, Columbus, Ohio. Households in the state and the county were categorized into 5 income

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<sup>4</sup>These statistics are presented in Appendix F.

groups ranging from \$0--\$2,999 for group 1 to \$10,000 and over for group 5. The percent of households in each group was then plotted over several years, including the period when CCAFB was closed (12). The researcher was unable to obtain written permission to reproduce this copyrighted material in time to include the actual data in this research, however, the data show no significant deviations between state and community percentages in any buying income group. The researcher therefore concluded that income distribution could not be classified an "impacted factor" for the closure of CCAFB.

Private Capital Formation. Data related to private capital formation was obtained from the United States Department of Commerce, Bureau of the Census in the form of statistics of the number, ranking in Ohio by county, and percentage change of manufacturing establishments for each county in Ohio.<sup>5</sup> Since these statistics are collected only once each five years, they were not considered amenable to time series analysis. The researcher was unable to locate other data related to this economic factor and, therefore, attempted to make a limited analysis of this economic factor based on the data received.

During the period from 1967 to 1972, the state of Ohio showed an average increase of 5.1 percent. Clinton County showed an

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<sup>5</sup>These data are presented in Appendix G.

increase of 14.29 percent during this period while increasing its state ranking from 62nd to 56th in number of manufacturing establishments among the 88 counties in the state. In light of this evidence, the researcher concluded that private capital formation could not be classified as an "impacted factor." It should be noted, however, that the researcher considers this conclusion to be of questionable validity due to the lack of sufficient statistics.

Employment. Employment data for the state of Ohio and for Clinton County, in the form of estimated total employment statistics, were obtained from the Ohio Bureau of Employment Services, Division of Research and Statistics, Columbus, Ohio.<sup>6</sup>

These statistics for state and county employment are presented in graphical form in Figure 9. These graphs parallel each other very closely until 1969. In that year, the state of Ohio experienced a five percent drop in total employment while the employment in Clinton County increased by over two percent. During the 1971 to 1972 time period, following the closure of CCAFB, the state of Ohio employment increased by 3 percent while Clinton County employment increased by 1.5 percent. The deviation between the state and county employment rates for the period of interest (1971-1972) was 1.5 percent and is not considered significant. The general trend of

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<sup>6</sup>These estimates are presented in Appendix H.

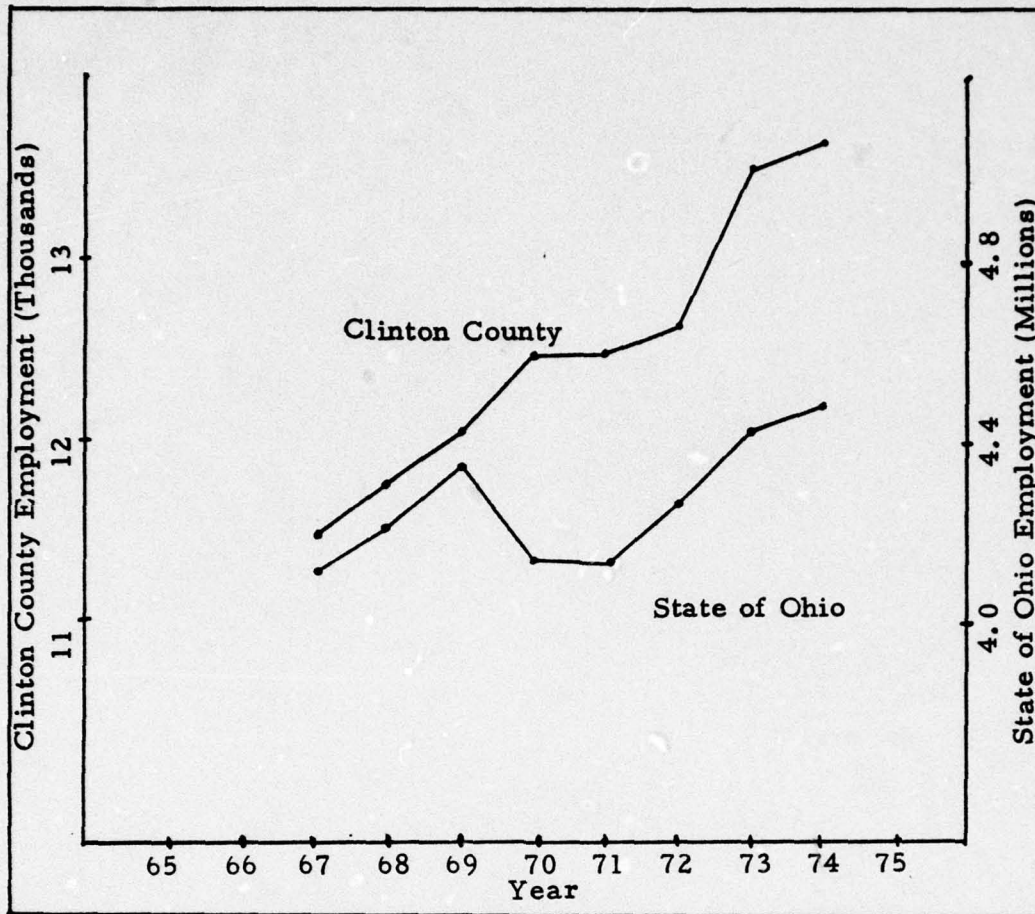


Figure 9

## State and County Total Employment

Source:

Ohio Bureau of Employment Services, Division of Research and Statistics, Columbus, Ohio.

employment in Clinton County, as reflected in Figure 9, shows a very healthy growth as compared to the state employment rates. This healthy growth rate led the researcher to conclude that employment could not be classified an "impacted factor," especially for the period of interest (1971-1972), and the large variance of percentage changes by all counties. The range of percentage change went from a low of minus 28 percent to a high of plus 58 percent.

Public Capital Formation. Public capital consists of all land, structures, and equipment owned by agencies and used for the supply of public services. The researcher was unable to obtain any quantitative data concerning changes in the formation of these assets at either the state or local level. Therefore, this economic factor could not be classified as either "impacted" or "not impacted" based on the criteria used in this research.

Land and Property Values. A limited amount of data was obtained relative to land and property values. These data are in the form of real property assessed value statistics for the state of Ohio and Clinton County for the years 1955, 1960, and 1974.<sup>7</sup> These data were obtained from the State of Ohio Real Estate Equalization Section, Board of Tax Appeals, and are presented as graphs in Figure 10.

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<sup>7</sup> These data are tabulated in Appendix I.

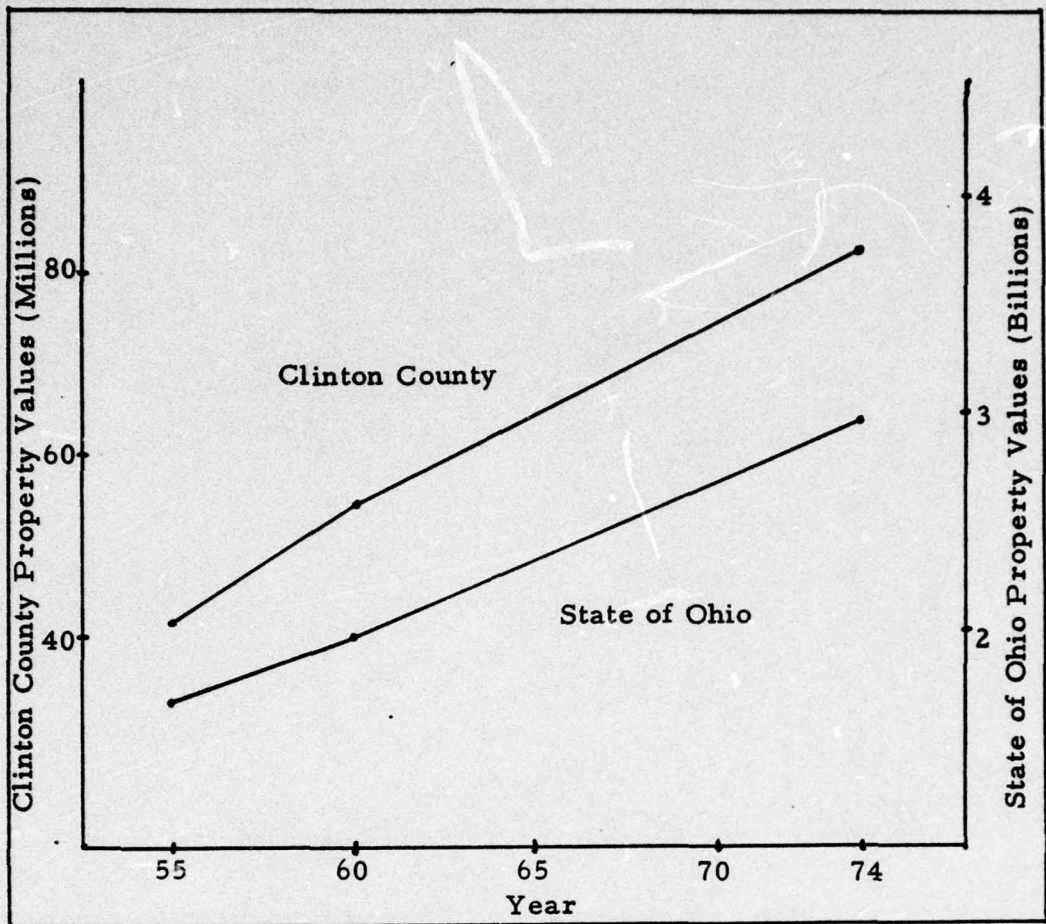


Figure 10

State and County Property Values

Source:

State of Ohio Real Estate Equalization Section, Board of Tax Appeals.

From the limited amount of data available, it is not possible to assess the immediate impact of the base closure on community land and property values but the long range impact appears to be negligible since the values for Clinton County are rising at a faster rate than the statewide values. This information led the researcher to the conclusion that land and property values could not be classified as an "impacted factor." Once again, it should be noted that this conclusion is based on a limited amount of data and should be weighed accordingly.

Public Sector Revenues. Public sector revenues are primarily in the form of taxes and federal and/or state aid. The researcher found an abundance of data at the state level relevant to public sector revenues in the form of state sales tax receipts. Local revenue data for Clinton County and Wilmington was maintained for a very short period (3 years). The lack of data at the community level prohibited any meaningful comparison with state level data and forced the researcher to decide that no conclusion could be reached as to the amount of impact on public sector revenues caused by the closure of CCAFB.

Regional Economic Stability. Regional Economic Stability, as defined in Appendix A, includes the diversity of a region's economy as well as the region's ability to withstand severe "shocks" to its economic base. This economic factor proved to be most difficult to

quantify as a separate, measurable factor. The diversity of a region can perhaps be measured by the change in private capital formation,<sup>8</sup> while the ability to withstand shocks can be measured only by analyzing all of the previously considered economic factors and reaching a conclusion based on the amount of impact present in those factors. It would appear that, based on the above definitions and logic, the amount of regional economic stability possessed by a community is inversely proportional to the amount of economic impact on that community produced by a "shock" such as the closure of a nearby military installation such as CCAFB. Since the closure of CCAFB produced no significant impacted factors in the community, the researcher concluded that this community possesses a high degree of economic stability. The validity of this conclusion might be questioned in light of the lack of data concerning the public sector, however, in the opinion of the researcher, the weight of the seven economic factors which were analyzed along with the views expressed by personnel involved with the base closure and industrial park development actions (2; 8; 11) appears to support a finding of no significant impact on the economic factor of regional economic stability.

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<sup>8</sup>See Appendix G for a tabulation of indicators of private capital formation.

## CHAPTER IV

### CONCLUSIONS AND RECOMMENDATIONS

#### Economic Impact on Wilmington

The overall economic impact on the community of Wilmington caused by the closure of CCAFB appears to be negligible based on the analysis of data obtained relevant to the economic factors previously discussed. Personal interviews with members of the community who were involved in the base closure and redevelopment actions support this view ( 2; 11; 12).

The community members interviewed indicated that the conversion of the installation to an educational/industrial park has broadened the economic base of the area by bringing in new industries and residents.

#### Availability of Data

The objective of this research was to determine what officially recorded data exist which would enable DOD to assess the current and probable economic impact of an installation closure on the community surrounding that installation. This research attempted to fulfill that objective by determining what officially recorded data exist

which could be used to assess the economic impact of the closure of Clinton County Air Force Base on the community of Wilmington, Ohio. This effort revealed that data were available relevant to population, total income and output, income distribution, employment, private capital formation, and land and property values. Data were not obtained relevant to public capital formation or public sector revenues at the local level.

The economic factor, regional economic stability as defined in Appendix A, is an economic indicator of sufficient ambiguity to warrant the inclusion of all economic data relevant to all other economic factors. The researcher concluded that inclusion of this factor would add no insight into the economic analysis of an installation closure action.

It should be noted that all of the community data obtained was at the county level with no data peculiar to Wilmington, Ohio. Wilmington is the economic heart of Clinton County with over 50 percent of the county industry and over 30 percent of the population. The researcher concluded that any economic factor which was impacted in Wilmington would be indicated in Clinton County data. The researcher felt that economic data from the community would have added validity to the conclusions reached in this research effort. The fact that local government agencies maintain records for only 3 to 4 years precluded the use of time series analysis of data peculiar to Wilmington. This

fact was the primary reason for the lack of economic data relevant to the public sector.

There appears to be sufficient data available to assess the economic impact of the closure of Clinton County Air Force Base on the community of Wilmington, Ohio. Whether or not this data could have been used to predict the economic impact of this closure action must be addressed in order to fulfill the objective of this research.

The historical nature of data collected and used for time series analysis is relevant and useful in the assessment of economic actions which have taken place in the past, but there appears to be no means of measuring the contribution of the installation to any of the economic factors used in this research and in the environmental impact computer model from which the factors were drawn. The data collected appears to have been generated from an economically stable community which took positive action to insure that the community did not suffer from the base closure action. An analysis of the usefulness of these data as predictive tools for the forecast of economic impact related to future installation closure actions must be deferred until the later phases of this ongoing study are completed. Later phases of this study will compare the data generated by this research effort with like data from other similar research efforts in order to establish trend analysis factors which can be used to predict the economic impact of closure actions. The conclusion of the researcher concerning the

existence of data which may be used to predict the current and future economic impact of installation closures on communities surrounding those installations is that data exist and are available relevant to population, total income and output, income distribution, employment, private capital formation, and land and property values. The validity of these data as estimators of economic impact will be determined in phase III of the overall research project as outlined in Chapter I.

#### Recommendations

The collection and investigation of data presently being accomplished in phase I of this project will be invaluable to this and other environmental impact studies. For this reason, the researcher recommends that the data and results of this research and other similar efforts be collected and maintained at a central DOD agency.

One major shortcoming of this research effort as it is presently structured, as perceived by this researcher, is the lack of correlational studies between the economic activities of active military installations and the economic base of the communities surrounding those installations. The Air Force is currently undergoing an extensive effort to collect and analyze data relevant to the "economic interrelationship between the base and community [17:2]." This effort is required by the Air Force Comprehensive Plan, Tab A-1, "Environmental Narrative." The researcher recommends that correlational

analysis be conducted between data collected for Tab A-1 relevant to the base economy and similar data relevant to the community surrounding that base. One means of accomplishing this analysis would be to use the Spearman rank correlation test.<sup>1</sup> For example, correlation could be tested between base employment (civilian and military) and community employment or between on-base housing availability and land and property values. In the opinion of the researcher, these correlational studies would provide the best means of testing the validity of conclusions made in phase III of this project via time series analysis.

This research resulted in the conclusion that potentially useful data relevant to base-community economic interrelationships was not being maintained prior to the Tab A-1 requirements of 1975 with the result that conclusions reached in this research were almost totally based on data collected by the state and the county under investigation. There is some question in the mind of the researcher as to the sensitivity of state and county data to economic changes at the community level. For this reason, the researcher finally recommends that special emphasis be placed on the Tab A-1 efforts to insure that potentially useful data is collected in a thorough and diligent manner at all bases and forwarded to a central agency for maintenance and distribution.

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<sup>1</sup>An explanation of the Spearman rank correlation test along with sample computations is contained in Appendix J.

APPENDIX A  
ECONOMIC FACTORS

## APPENDIX A

### ECONOMIC FACTORS

Total Income and Output. Income in a region is defined here to mean the income of the population or consumers while output is defined as the retail value of goods and services produced in the region.

Income of the population may be earned from wages and salary income or from other sources. Wages and salary income is defined as money earned for work performed as an employee, including wages, salary, Armed Forces pay, commissions, tips, piece-work payments, and cash bonuses. Other sources include self-employed income, social security payments, retirement income, public assistance income, welfare payments, and property income such as interest, dividends, and rental income.

Different terms are used to measure the output of a region, but the dimension of all terms is dollars. For example, the output of manufacturers is generally measured as value of shipments, for the trade industry, output is measured in terms of sales, and for the services industry output is measured in terms of gross receipts.

The levels of income and output of a region vary as a result of:

1. Changes in the amount of labor performed or products sold
2. Changes in the wage rate or in other income (e. g. dividend rate)

3. Changes in the valuation of output
4. Changes in the demand for products or services
5. Changes in the demand for labor
6. Changes in DOD's direct and indirect pattern of purchases or in its direct or indirect payroll expenditures

Changes in income and output will also tend to affect all other economic factors, either directly or indirectly.

Income Distribution. This variable indicates what "sectors" in an economy receive what incomes. DOD activities directly (payroll changes) or indirectly (mission changes) leading to changes in income, employment or production may change income distribution. Payroll changes result in a variance of the regional earning pattern. This pattern change may intensify or reduce regional income disparities. For example, if reduced military expenditures in a region cause a loss of income to the locally wealthy only, the income distribution in the area will change.

Employment. This variable includes all full-time and part-time employees in the region who worked for or received pay from an organization in the region during a specified period. Persons on paid sick-leave, paid holidays, and paid vacations during the period are included as are officers of corporations. Members of the Armed Forces, proprietors and partners of companies are excluded as are pensioners carried on active rolls but not working during the period.

Generally, the level of employment varies directly with the

level of economic activity in a region. That is, an increased level of output generally requires more employees. However, improved productivity may modify demands for employment, usually requiring fewer employees to produce the same output level.

Changes in employment affect both the labor force and regional population growth in areas where the relationship between employment and population is given by labor participation rates. This is particularly true if unemployment levels are low and the change is of long duration.

Regional Economic Stability. This factor is defined as the ability of the regional economy to withstand "severe fluctuations," or the ease with which an economy returns to an equilibrium state after receiving a "shock." Another definition is the degree of diversity of a region's economy. The more closely related a region's economic activity is to the "growth areas" of the national economy, the more likely the region's economy is to be stable.

DOD activities, such as purchases and payrolls, resulting in input or output relationships with regional businesses or individuals affect regional economic stability. Variance of stability is directly proportional to the degree of dependence of the regional economy on businesses affected by DOD activities. If a few industries or businesses dominate the regional economy (as measured by their share of the gross regional product or by percentage of total regional employment), that region is highly sensitive to changes in those industries or

businesses. DOD activities that decrease the diversity of a region also decrease the stability of the region.

Private Capital Formation. This factor is defined as the assets used in manufacturing. That is, the plants or factories using power driven machinery and materials-handling equipment to transform raw materials into products.

Changes in the usage or in the availability of manufacturing assets will affect the value of private sector assets. An example of a DOD activity resulting in changes of the use of manufacturing assets is a change in the demand for goods produced by a civilian manufacturer and consumed by a military activity. If a military installation were to increase or decrease its activities, a change could be expected in the value of the manufacturing assets which supply inputs to that installation. An example of a change in availability of manufacturing assets within a region would be the case where a military installation closes, and the land and buildings on the installation become available for private or public use. In this case, new quantities of manufacturing assets (land, buildings, equipment) become available for use by the manufacturing establishment in the region.

Changes in military activities that utilize production from Regional Manufacturing assets will change the value of those assets. Changes in either the quantity or value of manufacturing assets will affect production, income, and employment.

Public Capital Formation. Public capital consists of all assets owned by public agencies and used for the supply of public services. These assets include land, structures and equipment. State highways, public schools, water supply and sewage treatment facilities, and hospitals are included in this category.

Public capital formation is affected by any activities which change the rate of construction of public assets or which change the rate of removal from active use. Examples of these activities are construction and property acquisition.

Changes in the usage of public facilities will affect their value. Military use of public roads may require increased public maintenance expenditures.

Changes in available assets for public construction may affect employment, production, and income.

Land and Property Values. Changes in land and property values are measured by market price. All land and property, including residential, industrial, commercial, and agricultural land should be considered.

Military activities that affect existing land use patterns will also affect land and property values. These changes in land use patterns may be either in type of use or intensity of present use.

Land and property values provide an excellent measure of the economic impact on the capitol structure of the local area.

Changes in land and property value may affect income, economic

activity, or fiscal activity.

Public Sector Revenues. This factor represents the annual per capita revenues of local governments and associated agencies in the area under study. Changes in this factor provide a measure of changes in the "economic well-being" of the community.

Changes in the economic conditions of the area due to DOD activities may result in changes in public sector revenues primarily through changes in military and civilian base payrolls and the release of real estate by DOD.

Changes in personal income directly affect local tax revenues. A loss of payments to local governments by the federal government, especially in aid to education, due to base closure or a reduction in the level of base activities, will affect public sector revenues. Changes in property values, business volume, and consumption of goods in the local community will also affect revenue collection.

**APPENDIX B**  
**CLINTON COUNTY MANUFACTURERS**

APPENDIX B

CLINTON COUNTY MANUFACTURERS

<u>Principal Industrial Category</u>	<u>Location</u>	<u>Number of Employees</u>	<u>Total</u>
Apparel and other finished products made from fabrics			3
Sabina Tool Kit Co.	Sabina, Oh	3	
Lumber and Wool Products, except furniture			138
Katter Lumber and Supply Co.	Wilmington, Oh	7	
Volcan Corp.	Blanchester, Oh	131	
Printing, Publishing, and Allied Industries			215
News Journal Co.	Wilmington, Oh	37	
Mareton Printing Co.	Wilmington, Oh	2	
Sabina News Record	Sabina, Oh	4	
Wilmington Publishing Co.	Wilmington, Oh	136	
Curless Printing Co.	Blanchester, Oh	36	
Chemicals and Allied Products			3
Custom Farm Services, Inc.	Wilmington, Oh	3	
Petroleum Refining and Related Industries			37
Clinton Asphalt Paving Co.	Wilmington, Oh	33	
Melvin Asphalt Products Corp.	Wilmington, Oh	4	

<u>Principal Industrial Category</u>	<u>Location</u>	<u>Number of Employees</u>	<u>Total</u>
<b>Rubber and Miscellaneous Plastics Products</b>			122
Buckeye Molding Co.	New Vienna, Oh	122	
<b>Stone, Clay, Glass, and Concrete Products</b>			66
Allen Co.	Blanchester, Oh	42	
Clinton Construction Co.	Wilmington, Oh	24	
<b>Primary Metal Industries</b>			199
Blanchester Foundry Co.	Blanchester, Oh	45	
Wilmington Casting Co.	Wilmington, Oh	139	
Aluminum Metal Products Co.	Wilmington, Oh	11	
Hand H Aluminum Casting Co.	Wilmington, Oh	4	
<b>Fabricated Metal Products, except Ordnance, Machinery, and Transportation Equipment</b>			1,134
Auger Bit Co.	Wilmington, Oh	340	
Tools, Inc.	Sabina, Oh	211	
R. W. Tool Co.	Wilmington, Oh	12	
Stanton Bridge Co.	Wilmington, Oh	31	
Farquhar Co.	Wilmington, Oh	8	
Consolidated Ceramic Products, Inc.	Blanchester, Oh	57	
Textron Inc., Randall Div.	Wilmington, Oh	372	
Clinton Chrome Service	Sabina, Oh	3	
Beckett Harcum Co.	Wilmington, Oh	45	
Fulflo Specialties Co., Inc.	Blanchester, Oh	25	
Valley Steel Products, Co.	Clarksville, Oh	30	
<b>Machinery, Except Electrical</b>			148
Hills Machine Shop	Blanchester, Oh	8	
Cincinnati Lathe and Tool Co.	Wilmington, Oh	0	
Bennett Metal Products Co.	Wilmington, Oh	52	
Carter Tool and Die Co.	New Vienna, Oh	19	
Wilmington Pattern Works, Inc.	Wilmington, Oh	6	

<u>Principal Industrial Category</u>	<u>Location</u>	<u>Number of Employees</u>	<u>Total</u>
National Gear Corp.	Wilmington, Oh	50	
Hale, C. M. Welding Shop	Wilmington, Oh	6	
Compton Metal Products	Wilmington, Oh	3	
Southern Ohio Tool and Die	New Vienna, Oh	4	
<b>Electrical Machinery, Equipment, and Supplies</b>			<b>65</b>
Ledex, Inc. Wilmington Controls Div.	Wilmington, Oh	65	
<b>Miscellaneous Manufacturing Industries</b>			<b>49</b>
Wells Mfg. Co., Inc.	New Vienna, Oh	49	
			<hr/>
			11,157

Source:

Ohio Department of Economic and Community Development,  
Bureau of Business Research, Columbus, Ohio.

APPENDIX C  
CIVILIAN DATA SOURCES

## APPENDIX C

### CIVILIAN DATA SOURCES

#### DATA

#### SOURCE

1. Total income and output.

U. S. Dept of Commerce Social  
and Economic Statistics Admin,  
Bureau of Economic Analysis  
2400 M. Street S. W.  
Washington, D. C. 20304

Ohio Dept of Taxation  
Income Tax Division  
1030 Freeway Dr. N  
Columbus, Ohio 43229

Wilmington Chamber of Commerce  
Wilmington, Ohio 45177

2. Employment.

U. S. Dept of Commerce  
Social and Economic Statistics  
Admin  
Bureau of Economic Analysis

Ohio Bureau of Employment  
Services  
550 W. Broad  
Columbus, Ohio 43215

Ohio Civil Service Employees  
Association  
1960 W. Broad  
Columbus, Ohio 43223

Wilmington Chamber of Commerce

**3. Land and Property Values.**

U.S. Dept of Commerce  
Social and Economic Statistics  
Admin

Bureau of Census  
Suitland, Maryland

Dept of Housing and Urban  
Development  
60 E. Main  
Columbus, Ohio 43215

Veterans Administration  
360 S. Third  
Columbus, Ohio 43215

Ohio Dept of Commerce  
Division of Real Estate  
Ohio Real Estate Commission  
180 E. Broad  
Columbus, Ohio 43215

Wilmington Chamber of Commerce

**4. Regional Economic  
Stability.**

U.S. Dept of Commerce  
Social and Economics Statistics  
Administration

Bureau of Census

Ohio Dept of Taxation  
Property Tax Division  
30 E. Broad  
Columbus, Ohio 43215

Wilmington Chamber of Commerce

**5. Public Sector Revenues.**

U.S. Dept of Commerce  
Social and Economic  
Statistics Admin

Bureau of Census

Ohio Administrative Services Dept  
Dept of Education  
30 E. Broad  
Columbus, Ohio 43215

5. Public Sector Revenues  
(continued)
- Ohio State Education Dept  
Federal Assistance Div  
933 High  
Columbus, Ohio 43085
- Wilmington Chamber of Commerce
6. Public Capital Formation.
- Ohio Public Utility Commission  
111 N. High  
Columbus, Ohio 43215
- Ohio Water Development  
Authority  
50 W. Broad  
Columbus, Ohio 43215
- Wilmington Chamber of Commerce
7. Income Distribution.
- U.S. Dept of Commerce  
Social and Economic Statistics  
Administration
- Bureau of Census
- Ohio Dept of Taxation  
Sales and Excise Tax Division  
30 E. Broad  
Columbus, Ohio 43215
- Wilmington Chamber of Commerce
8. Private Capital Formation.
- U.S. Dept of Commerce  
Social and Economic Statistics  
Administration
- Bureau of Census
- Ohio Dept of Taxation  
Income Tax Division
- Ohio Dept of Taxation  
Property Tax Division
- Ohio Dept of Taxation  
Sales and Excise Tax Division
- Wilmington Chamber of Commerce

## 9. General.

Office of Economic Adjustment  
Washington, D. C. 20304

Ohio State Manpower Planning  
Council  
8 E. Long  
Columbus, Ohio 43215

Ohio Dept of Economic and  
Community Development  
30 E. Broad  
Columbus, Ohio 43215

Wilmington Chamber of Commerce

Ohio Department of Economic  
and Community Development  
Bureau of Business Research  
Columbus, Ohio

NOTE: Following is a sample of the type letter being used to request information.

Wilmington Area Chamber of Commerce  
Wilmington, Ohio 45177

Gentlemen

I am currently serving as advisor for a number of research teams studying the economic impact of military installation closures on local communities. Your community experienced such an action in 1971 with the closure of Clinton County Air Force Base and is therefore of particular interest to us. In our attempt to determine the extent of the economic impact of this closure on Wilmington, the research teams will analyze local economic data for the period 1966-1976. We would appreciate any assistance you might be able to provide in obtaining or locating the following types of information pertaining to Wilmington during the period in question:

- a. Population statistics
- b. Employment statistics
- c. Personal income levels
- d. Tax revenue
- e. Utility utilization
- f. Retail sales
- g. Housing market (sales and rentals)
- h. Changes in property values
- i. Construction permits
- j. School enrollments

If you desire more information concerning this research effort, please contact me by phone or letter. My office phone is (513) 257-3016/2679.

Thank you for your time and consideration.

Sincerely

PATRICK J. SWEENEY, Lt Col, USAF  
Assistant Professor of Facilities Management  
School of Systems and Logistics

APPENDIX D  
POPULATION DATA

APPENDIX D

POPULATION DATA<sup>1</sup>

<u>Year</u>	<u>Clinton County</u>	<u>State of Ohio</u>
1967	33,078	10,749,221
1968	33,428	10,784,388
1969	33,634	10,790,424
1970	31,464	10,652,017
1971	31,600	10,739,000
1972	31,700	10,722,000
1973	32,000	10,743,000
1974	32,300	10,737,000

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<sup>1</sup>Actual, 1970; estimated 1976-1969 and 1971-1974

Source:

Ohio Department of Economic and Community Development,  
Bureau of Business Research.

APPENDIX E  
INCOME DATA

APPENDIX E

INCOME DATA

Payroll Summaries--State of Ohio

Year	Total All Industries <sup>1</sup>	Contract Construction	Manufacturing
1965	16,186,244,665	1,031,742,184	9,413,166,305
1966	17,797,174,377	1,210,513,185	10,388,851,612
1967	18,507,075,933	1,261,482,778	10,586,514,884
1968	20,439,770,640	1,524,981,543	11,604,169,525
1969	22,557,171,517	1,795,361,246	12,621,903,928
1970	22,033,030,125	1,700,031,663	12,511,853,493
1971	23,764,978,365	1,658,993,780	12,607,384,568
1972	27,600,424,421	1,809,932,372	13,309,215,747
1973	30,927,822,324	2,032,470,477	15,651,755,848
1974	33,427,527,247	2,139,732,155	16,617,363,580
1975	35,780,085,974	2,128,004,129	16,098,750,673

<sup>1</sup>This figure includes mining and quarrying.

Year	Transportation and Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate	Services
1965	1,091,533,818	2,947,703,811	658,709,673	892,343,942
1966	1,183,627,793	3,164,743,383	702,213,480	993,782,524
1967	1,244,700,929	3,389,001,453	767,219,333	1,089,075,523
1968	1,384,569,586	3,692,195,408	852,214,919	1,200,713,041
1969	1,533,241,048	4,090,892,202	940,903,207	1,370,133,820
1970	1,649,816,685	4,359,164,864	1,031,740,492	1,549,632,121
1971	1,811,283,131	4,604,854,079	1,135,626,325	1,700,228,441
1972	1,991,166,636	5,172,390,623	1,286,455,171	3,236,451,211
1973	2,215,619,244	5,690,697,518	1,396,279,884	3,616,461,605
1974	2,366,224,526	6,314,961,475	1,505,493,594	4,112,737,705
1975	2,366,163,827	6,691,132,968	1,575,192,569	4,520,793,808

Payroll Summaries--Clinton County

Year	Total All Industries	Contract Construction	Manufacturing
1965	22,863,663	1,437,853	13,768,026
1966	26,516,577	1,908,197	16,162,423
1967	27,760,843	1,407,322	17,094,103
1968	30,295,272	1,799,690	18,454,632
1969	32,201,150	1,813,830	19,442,515
1970	33,616,093	1,978,159	19,344,659
1971	34,906,035	1,561,684	19,698,867
1972	42,561,173	2,036,167	23,207,147
1973	52,671,945	2,983,882	30,347,786
1974	58,572,042	3,843,821	33,510,943
1975	60,659,439	3,753,919	33,319,576

Year	Transportation and Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate	Services
1965	1, 138, 739	4, 581, 651 .	715, 686	817, 925
1966	1, 220, 958	5, 088, 012	753, 223	976, 400
1967	1, 316, 831	5, 669, 859	803, 171	1, 063, 853
1968	1, 516, 062	6, 067, 663	860, 699	1, 166, 081
1969	1, 712, 539	6, 619, 635	914, 626	1, 271, 456
1970	1, 959, 987	7, 434, 485	1, 043, 260	1, 431, 137
1971	2, 105, 878	8, 260, 785	1, 163, 144	1, 703, 608
1972	2, 380, 214	9, 579, 173	1, 350, 359	4, 008, 113
1973	2, 591, 917	11, 031, 284	1, 461, 105	4, 255, 971
1974	2, 821, 308	12, 276, 938	1, 540, 020	4, 579, 012
1975	2, 838, 936	13, 804, 793	1, 674, 835	5, 267, 380

Source:

Division of Research and Statistics, Ohio Bureau of Employment Services, Columbus, Ohio.

APPENDIX F  
OUTPUT DATA

APPENDIX F

OUTPUT DATA

Amount, Rank, and Percentage Change of Value  
 Added By Manufacture, By County, Ohio,  
 1967 and 1972  
 (Ranked in decreasing order of Value Added by Manufacture.)

	1972		1967		Percentage Change 1967-1972
	Amount (in millions of dollars)	Rank	Amount (in millions of dollars)	Rank	
OHIO TOTAL	\$26,910.6	--	\$20,435.4	--	31.69% <sup>1</sup>
<u>County</u>					
Adams	11.1	83	2.7	83	311.11
Allen	385.1	14	244.6	14	57.44
Ashland	121.3	39	70.1	43	73.03
Ashtabula	207.3	22	174.5	19	18.79
Athens	38.9	72	26.6	66	46.24
Auglaize	100.4	44	72.7	41	38.10
Belmont	69.8	56	46.2	58	51.08
Brown	11.5	82	5.5	80	109.09
Butler	587.9	11	436.1	11	34.81
Carroll	20.6	77	12.7	76	62.20
Champaign	71.6	54	50.6	55	41.50
Clark	316.2	15	233.7	15	35.30
Clermont	54.6	62	8.7	78	527.59
Clinton	54.3	63	44.1	61	23.13
Columbiana	137.5	34	121.0	28	13.64
Coshocton	117.1	41	69.7	44	68.01
Crawford	189.2	24	141.3	24	33.90
Cuyahoga	4,465.0	1	3,911.7	1	14.14
Darke	59.7	61	34.1	64	75.07
Defiance	154.4	31	107.2	31	44.03
Delaware	95.0	46	58.9	49	61.29
Erie	161.4	29	160.7	21	0.44

<sup>1</sup>Weighted arithmetic mean.

	1972		1967		Percentage Change 1967-1972
	Amount (in millions of dollars)	Rank	Amount (in millions of dollars)	Rank	
Fairfield	156.4	30	115.4	30	35.53
Fayette	39.8	70	38.6	62	3.11
Franklin	1,582.0	4	1,032.8	5	53.18
Fulton	94.2	47	55.6	52	69.42
Gallia	13.1	80	3.2	81	309.38
Geauga	69.6	57	50.2	56	38.65
Greene	62.9	58	44.4	59	41.67
Guernsey	70.0	55	50.8	54	37.80
Hamilton	3,156.5	2	2,445.1	2	29.09
Hancock	173.6	27	70.4	48	146.59
Hardin	62.8	59	58.8	50	6.80
Harrison	10.0	84	6.1	79	63.93
Henry	123.5	37	83.7	37	47.55
Highland	40.6	69	17.3	71	134.68
Hocking	42.8	67	30.2	65	41.72
Holmes	40.9	68	13.0	75	214.62
Huron	130.0	36	90.6	34	43.49
Jackson	31.3	74	26.3	67	19.01
Jefferson	261.0	17	182.5	17	43.01
Knox	74.1	53	74.4	40	-0.40
Lake	403.2	13	273.0	13	47.69
Lawrence	74.9	52	75.7	38	-1.06
Licking	202.5	23	197.2	16	2.69
Logan	52.4	64	34.8	63	50.57
Lorain	1,022.7	9	533.8	9	91.59
Lucas	1,319.7	6	942.0	6	40.10
Madison	23.6	76	15.8	74	49.37
Mahoning	658.9	10	520.7	10	26.54
Marion	243.1	18	169.1	20	43.76
Medina	117.0	42	62.1	46	88.41
Meigs	3.6	85	2.9	82	24.14
Mercer	89.3	49	61.7	47	44.73
Miami	212.1	21	177.9	18	19.22
Monroe	--	--	--	--	--
Montgomery	1,879.6	3	1,688.9	3	11.29
Morgan	--	--	--	--	--
Morrow	26.0	75	16.2	73	60.50
Muskingum	148.2	32	90.5	35	63.76
Noble	11.7	81	--	--	--
Ottawa	43.1	66	44.2	60	-2.49
Paulding	18.5	78	18.3	70	1.09
Perry	17.1	79	9.3	77	83.87

	1972		1967		Percentage Change 1967- 1972
	Amount (in millions of dollars)	Rank	Amount (in millions of dollars)	Rank	
Pickaway	119.8	40	70.5	42	69.93
Pike	62.7	60	--	--	--
Portage	184.0	25	119.0	29	54.62
Preble	31.6	73	17.2	72	83.72
Putnam	79.9	51	57.0	51	40.18
Richland	503.7	12	385.6	12	30.63
Ross	100.7	43	106.0	32	-5.00
Sandusky	230.8	19	136.8	27	68.71
Scioto	95.7	45	75.3	39	27.09
Seneca	175.4	26	159.3	22	10.11
Shelby	121.4	38	90.1	36	34.74
Stark	1,142.8	7	896.6	7	27.46
Summit	1,494.8	5	1,281.8	4	16.62
Trumbull	1,052.8	8	739.8	8	42.31
Tuscarawas	170.2	28	138.6	25	22.80
Union	90.1	48	46.7	57	92.93
Van Wert	87.4	50	53.1	53	64.60
Vinton	5.4	86	2.0	84	170.00
Warren	43.3	65	23.3	68	85.84
Washington	136.1	35	104.5	33	30.24
Wayne	222.0	20	154.8	23	43.41
Williams	137.7	33	64.9	45	112.17
Wood	303.0	16	137.7	26	119.88
Wyandot	39.5	71	21.1	69	87.20

Source:

Ohio Department of Economic and Community Development,  
Economic Development Division, Bureau of Business Research,  
Columbus, Ohio.

APPENDIX G  
PRIVATE CAPITAL FORMATION DATA

APPENDIX G

PRIVATE CAPITAL FORMATION DATA

Number, Rank, and Percentage Change of Manufacturing Establishments, By County, Ohio, 1967 and 1972

	1972		1967		Percentage Change 1967-1972
	Number	Rank	Number	Rank	
<b>OHIO TOTAL</b>	16,215	--	15,428	--	5.10% <sup>1</sup>
<u>County</u>					
Adams	24	79	22	80	9.09
Allen	168	17	153	19	9.80
Ashland	74	41	66	44	12.12
Ashtabula	159	19	158	17	.63
Athens	37	69	38	66	-2.63
Auglaize	60	49	63	46	-4.76
Belmont	74	41	74	41	0.00
Brown	21	83	23	77.5	-8.70
Butler	205	12	198	13.5	3.54
Carroll	28	74.5	23	77.5	21.74
Champaign	42	65	44	57.5	-4.55
Clark	201	14	203	12	-.99
Clermont	70	43.5	54	52	29.63
Clinton	48	56	42	62.5	14.29
Columbiana	202	13	198	13.5	2.02
Coshocton	70	43.5	62	47	12.90
Crawford	96	30.5	95	27	1.05
Cuyahoga	3,674	1	3,658	1	.44
Darke	68	46	65	45	4.62
Defiance	45	62.5	43	60	4.65
Delaware	63	48	53	53.5	18.87
Erie	125	24	123	22	1.63

<sup>1</sup>Weighted arithmetic mean.

	1972		1967		Percentage Change 1967-1972
	Number	Rank	Number	Rank	
Fairfield	98	29	83	34	18.07
Fayette	36	71.5	32	72	12.50
Franklin	968	3	870	3	11.26
Fulton	95	32	90	31.5	5.56
Gallia	23	80.5	22	80	4.55
Geauga	114	25	76	38.5	50.00
Greene	84	35	75	40	12.00
Guernsey	55	52.5	53	53.5	3.77
Hamilton	1,657	2	1,597	2	3.76
Hancock	83	36	76	38.5	9.21
Hardin	51	55	45	56	13.33
Harrison	22	82	20	84.5	10.00
Henry	52	54	59	49	-11.86
Highland	46	60	41	64	12.20
Hocking	28	74.5	35	67	-20.00
Holmes	58	51	42	62.5	38.10
Huron	96	30.5	92	30	4.35
Jackson	46	60	48	55	-4.17
Jefferson	60	50	73	42	-17.81
Knox	47	57.5	44	57.5	6.82
Lake	387	8	310	9	24.84
Lawrence	39	67	33	70	18.18
Licking	106	27	93	29	13.98
Logan	40	66	43	60	-6.98
Lorain	304	10	271	10	12.18
Lucas	759	6	738	5	2.85
Madison	25	77.5	27	73.5	-7.41
Mahoning	326	9	425	8	.62
Marion	86	34	82	35	4.88
Medina	154	20	124	21	24.19
Meigs	17	85	14	87	21.43
Mercer	55	52.5	61	48	-9.84
Miami	141	22	122	23.5	15.57
Monroe	--	--	22	80	--
Montgomery	858	4	810	4	5.93
Morgan	--	--	21	82.5	--
Morrow	23	80.5	19	86	21.05
Muskingum	105	28	112	25	-6.25
Noble	10	86	11	88	-9.09
Ottawa	69	45	71	43	-2.82
Paulding	26	76	27	73.5	-3.70
Perry	37	69.5	33	70	-6.06

	1972		1967		Percentage Change 1967-1972
	Number	Rank	Number	Rank	
Pickaway	30	73	24	75.5	25.00
Pike	25	77.5	21	82.5	19.05
Portage	194	16	154	18	25.97
Preble	46	60	34	68	35.29
Putnam	36	71.5	33	70	9.09
Richland	198	15	189	15	4.76
Ross	47	57.5	55	51	-14.55
Sandusky	107	26	111	26	-3.60
Scioto	65	47	90	31.5	-27.78
Seneca	74	41	84	33	-11.90
Shelby	80	37	79	36	1.27
Stark	549	7	514	7	6.81
Summit	774	5	723	6	7.05
Trumbull	267	11	243	11	9.88
Tuscarawas	165	18	161	16	2.48
Union	38	68	24	75.5	58.33
Van Wert	45	62.5	43	60	4.65
Vinton	18	84	20	84.5	-10.00
Warren	79	38	58	50	36.21
Washington	76	39	77	37	-1.30
Wayne	147	21	137	20	7.30
Williams	94	33	94	28	--
Wood	135	23	122	23.5	10.66
Wyandot	44	64	39	65	12.82

Source:

Ohio Department of Economic and Community Development,  
Economic Development Division, Bureau of Business Research,  
Columbus, Ohio.

APPENDIX H  
EMPLOYMENT DATA

APPENDIX H

EMPLOYMENT DATA

<u>Year</u>	<u>State of Ohio</u>	<u>Clinton County</u>
1967	4, 102, 100	11, 450
1968	4, 222, 900	11, 750
1969	4, 350, 500	12, 025
1970	4, 143, 000	12, 487
1971	4, 142, 000	12, 446
1972	4, 273, 000	13, 631
1973	4, 416, 000	13, 487
1974	4, 479, 000	13, 625

Source:

Ohio Bureau of Employment Services, Division of Research  
and Statistics, Columbus, Ohio.

APPENDIX I  
LAND AND PROPERTY VALUE DATA

APPENDIX I

LAND AND PROPERTY VALUE DATA

<u>Year</u>	<u>State of Ohio</u>	<u>Clinton County</u>
1955	\$14,141,453,880	\$40,271,220
1960	17,950,144,477	53,961,730
1974	29,958,272,043	82,603,280

Source:

Ohio Real Estate Equalization Section, Board of Tax Appeals,  
Columbus, Ohio.

APPENDIX J

SPEARMAN RANK CORRELATION TEST

## APPENDIX J

### SPEARMAN RANK CORRELATION TEST

1. The purpose of the Spearman Rank Correlation coefficient is to test for correlation between two attributes or characteristics of a population when parametric correlation such as Pearson's product moment method would be inappropriate due either to the scale of measurement of either characteristic being less than interval or to the assumption of normality being tenuous. The basic situation being analyzed is precisely the same as that for which ordinary correlation is used, except for the scale of measurement and normality assumptions.

2. Characteristics:

Scale of measurement: ordinal or better

Sample size criteria: (a) small sample--use attached table

(b) large sample ( $n \geq 31$ ) can use t statistic,  
where

$$t = \frac{r_s \sqrt{n-2}}{\sqrt{1-r_s^2}} \quad df = n - 2$$

Special rules: average tied ranks

3. Test statistic:

$$r_s = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$$

where  $d_i = r_{x_i} - r_{y_i}$

$r_{x_i}$  = the rank assigned to an observation on the basis of  $x_i$ , one of the two characteristics.

$r_{y_i}$  = the rank assigned according the other characteristic,  $y_i$ .

$n$  = sample size = number of pairs

4. Test Procedure:

a. Assign ranks to each observation separately according to each characteristic.

b. Find  $d_i$

c. Compute  $r_s = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$  and then, if necessary

$$t = r_s \sqrt{n - 2} / \sqrt{1 - r_s^2} \quad df = n - 2$$

d. Find the critical value of  $r_s$  or find critical value of  $t$ .

5. Example: See if there is any correlation between number of personnel employed, on base, and percentage of local employment.

Let  $x$  be a Random Variable, the number of personnel employed on base.

Let  $y$  be a Random Variable, the percentage of local employment.

$H_0 : \rho_{xy} = 0$  [implies no association or relationship]

$H_1 : \rho_{xy} \neq 0$  [implies statistical dependence and that a relation does exist]

$$n = 5$$

$$\alpha = .20$$

$$\alpha/2 = .10$$

Data

$i$	$x$	$R(x)$	$y$	$R(y)$	$d$	$d_i^2$	$r_s = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$
1	512	3	99	1	2	4	$r_s = 1 - \frac{6(19.5)}{5(24)}$
2	514	5	96	4.5	.5	.25	$r_s = 1 - .975$
3	511	1.5	97	3	-1.5	2.25	$r_s = 0.025$
4	511	1.5	96	4.5	-3	9	
5	513	4	98	2	2	4	

Crit Value = .700 (from Table, page 81)

Conclusion: Cannot reject  $H_0$ , therefore no relationship exists.

Source:

Sidney Siegel, Nonparametric Statistics. New York, McGraw-Hill Book Company, 1956, pp. 213-214.

## Quantiles of the Spearman Test Statistic

n	$\rho = .900$	.950	.975	.990	.995	.999
4	.8000	.8000				
5	.7000	.8000	.9000	.9000		
6	.6000	.7714	.8286	.8857	.9429	
7	.5357	.6786	.7450	.8571	.8929	.9643
8	.5000	.6190	.7143	.8095	.8571	.9286
9	.4667	.5833	.6833	.7667	.8167	.9000
10	.4424	.5515	.6364	.7333	.7818	.8667
11	.4182	.5273	.6091	.7000	.7455	.8364
12	.3986	.4965	.5804	.6713	.7273	.8182
13	.3791	.4780	.5549	.6429	.6978	.7912
14	.3626	.4593	.5341	.6220	.6747	.7670
15	.3500	.4429	.5179	.6000	.6536	.7464
16	.3382	.4265	.5000	.5824	.6324	.7265
17	.3260	.4118	.4853	.5637	.6152	.7083
18	.3148	.3994	.4716	.5480	.5975	.6904
19	.3070	.3895	.4579	.5333	.5825	.6737
20	.2977	.3789	.4451	.5203	.5684	.6586
21	.2909	.3688	.4351	.5078	.5545	.6455
22	.2829	.3597	.4241	.4963	.5426	.6318
23	.2767	.3518	.4150	.4852	.5306	.6186
24	.2704	.3435	.4061	.4748	.5200	.6070
25	.2646	.3362	.3977	.4654	.5100	.5962
26	.2588	.3299	.3894	.4564	.5002	.5856
27	.2540	.3236	.3822	.4481	.4915	.5757
28	.2490	.3175	.3749	.4401	.4828	.5660
29	.2443	.3113	.3685	.4320	.4744	.5567
30	.2400	.3059	.3620	.4251	.4665	.5479

Source:

Sidney Siegel, Nonparametric Statistics. New York, McGraw-Hill Book Company, 1956, p. 27.

APPENDIX K  
DEVELOPMENT ACTIONS

APPENDIX K

DEVELOPMENT ACTIONS

Clinton County Air Force Base

As of July 1972

<u>Education</u>	<u>Enrollment</u> <u>Sept. 1972</u>	<u>Faculty/Staff</u> <u>Sept. 1972</u>
(Service Area 12 Counties)		
Area Vocational High School (Grades 11-12)	625	108
Technical Institute (Grades 13-14)	250	20
Adult Education (Night)	<u>400</u>	<u>20</u>
Totals	1,275	148

<u>Training</u>	<u>Annual Students</u>	<u>Staff</u>
(Service Area 10 Counties)		
Police Training	400	30
Fire Training	8,500	150
Industrial Plant Protection Personnel	2,500	---
Heavy Equipment Training	<u>500</u>	<u>10</u>
Totals	11,900	190

<u>Current Industry and Business on Base</u>	<u>Type of Activity</u>	<u>Employment</u>	<u>Projected Employment by July 1973</u>
Hospital Equipment	Manufacturing	200	250
Automotive Trim	Warehouse	10	10
Oil (industrial/heating)	Service	15	35
Aircraft Modification	Manufacturing	25	25
Operation Mainstream	Service	<u>55</u>	<u>55</u>
	Totals	305	315

#### Development Outlook

The local Citizens Committee with the assistance of the IAEAC is currently working with five additional industrial prospects. These firms vary from transportation oriented activities such as an air freight carrier, and trucking company, to light industries such as a machine tool manufacturer. It is expected that several of these firms will eventually locate at the Base. These new activities when combined with the above cited firms will raise the number of jobs generated aboard the Base from 641 to 1,000 by January 1973 (less than eight months after the base closure!).

In addition, expansion of vocational educational programs within the next five years should result in a student enrollment of 5,000 as compared to the 1,000 projected for September 1972. This program, which is under the auspices of the Great Oaks Joint Vocational School District in Cincinnati, may be augmented by a program sponsored by Miami University (Oxford, Ohio) which would provide vocational education programs from Grade 11 through Grade 16 (an educational continuum from high school through college). This program will be unique to all of Ohio and the Midwest!

#### Source:

William J. Sheehan, Director of Economic Adjustment, OASD (I&L), Attachment A to Memorandum, 1 May 1972.

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AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHO--ETC F/G 5/3  
THE ECONOMIC IMPACT OF A MILITARY INSTALLATION CLOSURE ON THE S--ETC(U)  
SEP 76 R J PARSONS

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## SELECTED BIBLIOGRAPHY

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