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ESTIMATING THE SOCIAL COSTS OF NATIONAL
ECONOMIC POLICY: IMPLICATIONS FOR MENTAL
AND PHYSICAL HEALTH, AND
CRIMINAL AGGRESSION

A STUDY

PREPARED FOR THE USE OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES



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LETTER OF TRANSMITTAL

October 26, 1976

To the Members of the Joint Economic Committee:

Transmitted herewith for the use of the Members of the Joint Economic Committee and other Members of Congress is the study entitled, "Estimating the Social Costs of National Economic Policy: Implications for Mental and Physical Health, and Criminal Aggression" by Dr. M. Harvey Brenner of the Johns Hopkins University.

This study evaluates the long-term and aggregative impact on society of changes in income, prices, and employment. It will rank as a significant contribution to economic and public policy literature. The study is designed to fill a void, a large void, now confronting policy planners seeking to evaluate the social or human effects of economic policy decisions.

The Federal Government has become relatively adept since World War II at assessing the impact on income, prices, and employment of monetary and fiscal policy. But government policy planners have had essentially no success in shedding light on the next level--on the ensuing effects which changes in income, prices, and employment have on individuals and on society. In effect, they have focused on the technical linkages between fiscal or monetary policy and economic variables like unemployment; they have not evaluated the relationship of these economic variables with individual behavior. Yet, it is precisely the eventual impact of economic policy on individuals which should be the focus of Washington officials, rather than the impact of this policy on the intervening economic variables.

Policy planners know, for example, that contractionary economic policies generate unemployment. In turn, this unemployment will reduce incomes and output and enlarge Federal budget deficits as tax receipts fall and outlays rise for jobless benefits. They also know that unemployment creates stressful situations for laid-off workers and their families as well. And stress has long been recognized as a major contributor to a variety of physical and mental illnesses. Yet, no systematic evaluation of this straightforward relationship--the link between job loss and stress related illness--has occurred covering a long period of time or the entire country. Similarly, no evaluation has been made of the long-term links between unemployment, income or price changes, and social indices of criminal aggression such as homicides and imprisonment.

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An extensive body of literature does exist covering the relationship over short periods between various economic variables and one or two stress indicators. Failure to mount more comprehensive evaluations, however, in part reflects the relatively sanguine performance of our postwar economy. Until 1971, unemployment had exceeded 5.7 percent only twice since the 1940's and inflation exceeded 5.8 percent only once between the 1940's and 1969. A more important factor is the significant data collection and management problems. Many social indicators, for example, are discontinuous series, frequently revised and subject to severe credibility questions.

Data availability, in fact, limited the scope of this study to seven indicators of social stress, and to the post-depression period through the early 1970's. These seven indices are: total mortality, homicide, suicide, cardiovascular-renal disease mortality, cirrhosis of the liver mortality, total State imprisonment, and State mental hospital admissions. Each of these indicators of social stress was evaluated to determine its sensitivity to changes in real income, to changes in rates of inflation, and to changes in rates of unemployment.

The study revealed that all seven of these stress indicators are directly affected by changes in the three national economic variables. Changes in the unemployment rate have the most profound impact of the three variables.

Table 1 summarizes the level of sensitivity to fluctuation in unemployment rates which each of the stress indicators was discovered to have. For example, a sustained one-percent rise in unemployment will increase the suicide rate significantly over that year and the subsequent five years. The effect is cumulative. Furthermore, the increase in suicide is comparable to 4.1 percent of the suicides which occur in the fifth year following the sustained rise in unemployment. This conclusion is based on data over the 34-year period, 1940-1973.

That same one-percent rise in unemployment was found to increase the number of State mental hospitalizations for males as well. That increase was comparable to 4.3 percent of all such admissions occurring in the fifth year following the rise in unemployment. The analogous rate for females was found to be 2.3 percent.

These figures reflect the cumulative impact over just a five-year lag period. As a result, they understate the eventual total long-term impact of a one-percent rise in unemployment. This understatement is particularly significant for cardiovascular-renal (CVR) and cirrhosis diseases which typically require many years to be even diagnosed. Additionally, these figures understate the impact of unemployment, for they only include liver or CVR disease deaths--they do not include persons treated for these diseases when it did not result in death.

Table 1

IMPACT OF A SUSTAINED ONE-PERCENT CHANGE IN UNEMPLOYMENT

<u>Social Stress Indicator</u>	<u>Data Period</u>	<u>Change in the Stress Indicator 1/</u>
Suicide:	1940-1973	4.1%
State Mental Hospital Admissions:	1940-1971	3.4
Males--		4.3
Females--		2.3
State Prison Admissions:	1935-1973	4.0
Homicide:	1940-1973	5.7
Cirrhosis of the Liver Mortality:	1940-1973	1.9
Cardiovascular-Renal Disease Mortality:	1940-1973	1.9
Total Mortality:	1940-1974	1.9

1/ Measured as a proportion of the total indicator incidence occurring in the fifth year following the one-percent change in unemployment.

The low relative size of changes in these stress indicators due to unemployment fluctuations is not surprising. A bewildering variety of factors influence the mental and physical state of contemporary society--many of which are far more influential than jobless status alone.

At the same time, this study reveals that unemployment has a strikingly potent impact on society. Even a one-percent increase in unemployment, for example, creates a legacy of stress, of aggression, and of illness affecting society long into the future. In just the subsequent five years, this study reveals that it has a multiplier effect far exceeding the relative size of the unemployment rise.

This high elasticity between unemployment and indicators of stress has a more meaningful impact when translated to human terms.

For example, Table 1 indicates that a one-percent rise in unemployment will increase stroke, heart, and kidney disease deaths. How many people will actually be affected?

This and similar calculations for the other six evaluated stress indicators are presented in Table 2.

In 1970, unemployment rose 1.4 percent to 4.9 percent. This 1.4 percent increase has been sustained since that time. A one-percent sustained rise in unemployment increases CVR disease deaths by a total comparable to 1.9 percent of all such deaths in the fifth year thereafter. The 1.4 percent rise in unemployment during 1970 increased total CVR disease deaths through 1975 by 2.7 percent (1.9 percent times 1.4). There were 979,180 CVR disease deaths in 1975. Therefore, 2.7 percent, or 26,440 CVR deaths, are directly attributal to the rise in unemployment during 1970.

Table 2 shows, in fact, that the 1.4 percent rise in unemployment during 1970 is directly responsible for some 51,570 total deaths, including 1,740 additional homicides, for 1,540 additional suicides, and for 5,520 additional mental hospitalizations. These are not major portions of the total number of deaths, homicides, suicides, and mental hospitalizations which occurred during 1970 through 1975. But, unlike most other factors which contributed to these statistics, rising unemployment can be readily avoided.

It should be noted that the further increases in unemployment since 1970 are now having an additional impact on individuals and society--an impact which is not in any fashion included in statistics on Table 2. And this more recent rise in unemployment has been striking. From 1970 to 1976, almost four million additional men and women have been added to jobless rolls. This year, the unemployment rate has stagnated at close to eight percent. By the end of this decade, our current unemployment will result in deaths and institutional admissions almost three times larger than presented in Table 2.

We have yet to bear the full toll from our policy failures over the past five years.

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Table 2

CUMULATIVE IMPACT OF THE 1.4 PERCENT RISE IN UNEMPLOYMENT
DURING 1970

<u>Social Stress Indicator</u>	<u>Stress Incidence 1975</u>	<u>Change in Stress Indicator for a 1.4 Percent Rise in Unemployment</u>	<u>Increase in Stress Incidence Due to the Rise in Unemployment</u>
Suicide:	26,960	5.7%	1,540
State Mental Hospital Admission:	117,480 ^{1/}	4.7	5,520
State Prison Admission:	136,875 ^{2/}	5.6	7,660
Homicide:	21,730	8.0	1,740
Cirrhosis of the Liver Mortality:	32,080	2.7	870
Cardiovascular-Renal Disease Mortality:	979,180	2.7	26,440
Total Mortality:	1,910,000	2.7	51,570

^{1/} 1972 data, age 65 and under.

^{2/} 1974 data.

The human tragedy alone of unemployment revealed by this study is shocking--shocking enough to demand a persistent, priority effort by Washington policy planners to reduce unemployment and to keep it low, as well. At the same time, we can go further and attach specific monetary values to the human toll portrayed in Table 2.

In instances of CVR disease, cirrhosis, suicide, homicide, and total mortality, appropriate dollar values include foregone incomes, adjusted for age and sex characteristics. In effect, illness and deaths attributed to unemployment reduce our Nation's resources--our ability to produce goods and services. And, one good measure of this loss is the foregone income of deceased or ill workers. Direct medical costs for unemployment related care should be included as well.

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In instances of State prison and mental hospital admissions, a similar accounting is possible. This includes both lost or foregone income due to incarceration or hospitalization, plus direct outlays for prison/patient maintenance.

The human impact of the 1.4 percent rise in unemployment during 1970 was presented in Table 2. Table 3 is based on that data, but relies on cost data derived independently of this study. Dollar values are attached to the illness and institutional admissions which occurred from 1970 to 1975 as a result of the sustained 1970 increase in unemployment.

For example, this sustained unemployment resulted in some 5,520 additional mental hospital first admissions over the period 1970 through 1975, as shown in Table 2. Combining both foregone income and direct hospitalization outlays, the aggregate cost of these additional admissions was \$82 million in 1975 dollars. The lost or foregone income component of this cost, as well as this component of other income figures presented in Table 3, are discounted using present value calculations.

Table 3
ECONOMIC LOSS RESULTING FROM THE SUSTAINED 1.4 PERCENT RISE
IN UNEMPLOYMENT DURING 1970

<u>Social Stress Indicator</u>	<u>Classification of Economic Cost</u>	<u>Economic Loss Due to the 1.4 Percent Rise in Unemployment Sustained from 1970-1975 (millions)</u>
Suicide:	Suicide	\$ 63
State Mental Hospital Admission:	Hospitalization for mental illness in State and County mental hospitals	82
State Prison Admission:	Imprisonment in State Institutions	210
Homicide:	Homicide	434
Cirrhosis of the Liver Mortality:	<u>1/</u>	<u>1/</u>
Cardiovascular-Renal Disease Mortality:	Diseases of the Circulatory System	1,372
Total Mortality:	Total Illness	\$6,615

1/ Costs not available.

The 1.4 percent rise in unemployment during 1970 has cost our society nearly \$7 billion in lost income due to illness, mortality, and in added State prison and mental hospital outlays. To this must be added public outlays of some \$2.8 billion annually over the 1970-1975 period for jobless and welfare payments associated with the sustained 1.4 percent rise in unemployment. Additional outlays not included here are the costs of care in Federal institutions. Even excluding these latter outlays, the cost of the sustained 1.4 percent rise in unemployment during 1970 is at least \$21 billion. And as noted earlier, this entirely excludes the impact of the further increases in unemployment since 1970 as well.

These dollars represent resources lost or diverted from productive use. They represent wealth never to be realized, lost forever to our economy and society. They, in part, measure the human tragedy of unemployment. But most significantly, their loss could have been avoided.

I said earlier that the Federal Government knows how to minimize unemployment. It knows how to reduce it using monetary and fiscal policy and to keep it down. This study, for the first time, offers our government the capability to accurately and fully measure the impact of these economic policies. Economic policy planners can and will now know the full and tragic cost of unemployment if they fail to hold it at a minimum.

They are obligated to use this new wisdom.

The study was prepared by Dr. M. Harvey Brenner of Johns Hopkins University with extensive assistance from Mr. William H. Robinson, Chief of the Education and Public Welfare Division of the the Congressional Research Service, and Douglas Bendt, Flora Dean, Jack Ebeler, Warren Farb, Janet Pernice, Miriam Saxon, and Nancy Sharbel of the CRS staff.

The study was prepared under the general supervision of Mr. George R. Tyler of the Committee staff with the assistance of Ms. Deborah DuBrule and Mr. Larry Yuspeh.

The views expressed in this study are those of the author and do not necessarily represent the views of the Joint Economic Committee or any of its individual Members.

Senator Hubert H. Humphrey,
Chairman

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October 26, 1976

The Honorable Hubert H. Humphrey
Chairman, Joint Economic Committee
U.S. Congress
Washington, D.C.

Dear Mr. Humphrey:

I am pleased to submit the accompanying study entitled, "Estimating the Social Cost of National Economic Policy", which was conducted in response to your request of December 12, 1975. This report was prepared by Dr. M. Harvey Brenner of The Johns Hopkins University, under a contract with the Congressional Research Service. The conclusions which the author reaches are, of course, his own and should not be taken to represent the views of the Congressional Research Service.

This report analyzes the effects of the economy on social problems. Dr. Brenner examined the relationships of three economic indicators (national income, inflation, and especially unemployment) on six indices of social pathology -- cardiovascular-renal disease, cirrhosis of the liver, suicide, mental illness, homicides, and the rate of imprisonment. He found that there is a significant statistical relationship between unemployment and the incidence of these forms of social pathology.

Dr. Brenner's work goes beyond traditional analyses of the relationship between economic factors and social costs in that he has been able to link several economic measures and a broad range of pathological social factors, using comparable methods and years. In addition to bringing several comparisons together in one study, Dr. Brenner also has provided a detailed analysis of other programmatic research in this area, which may suggest possible avenues for exploring causal linkages between unemployment and these various social ailments. However, at this stage of our knowledge, we cannot assert a causal relationship between unemployment and various forms of social pathology.

We hope you find this report helpful.

Sincerely,

A handwritten signature in dark ink, appearing to read "Norman Beckman".

Norman Beckman
Acting Director

ESTIMATING THE SOCIAL COSTS OF
NATIONAL ECONOMIC POLICY: IMPLICATIONS
FOR MENTAL AND PHYSICAL HEALTH, AND
CRIMINAL AGGRESSION

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Acknowledgements:

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EXECUTIVE SUMMARY

Purpose of the Study

The purpose of this study is to translate research findings on the pathological effects of unemployment and other forms of economic distress into a form that would be useful for national economic policy decisions. Economic indices considered by themselves are questionable because such data permit no inferences as to quantitative social implications. Thus, while we universally abhor high rates of unemployment and inflation and low rates of productivity and declines in real income, these data themselves tell us little about the impact of economic policy on societal well-being.

Specific social indices can be extremely useful in the assessment of economic policy where it can be demonstrated that national economic indices are clearly and closely associated with changes in specific social indices. Here, in fact, scientific hypotheses, relating the behavior of the national economy to that of the population as individuals, come to be of great importance.

Data Used in the Study

There are three outstanding and obvious areas of social cost that scientific investigators have associated with patterns of national economic changes:

- mental health,
- physical health, and
- criminal aggression.

In all three areas, it should be possible to estimate costs either in terms of the national economic impact on these social pathologies themselves, or in terms of the economic costs usually incurred in dealing with these problems.

In the present report, we have brought together several of the scientific findings on the impact of economic distress in a policy relevant framework which would ultimately permit quantitative estimates of that impact on social pathology. Some success has been achieved in formulating models to explain how the various sources of national economic distress may be associated with pathology.

Specifically, the basic models include three critical indices of national economic behavior which presumably influence social distress. These are:

- per capita income,
- the rate of unemployment, and
- the rate of inflation.

The selected series of pathological indices include:

- age and sex-specific mortality rates,
- cardiovascular-renal disease mortality rates,
- suicide mortality rates,
- homicide mortality rates,
- mental hospital admission rates, and
- imprisonment rates.

Methods

Statistical examination of the relationships between the economic and social indices was performed in a manner which is both standard and has been traditionally used in applications to national economic policy. It should be stressed, however, that analyses using these regression techniques do not demonstrate causation. They only establish that certain factors vary in similar fashion and appear to be statistically linked.

The sources of information used, covering the areas of physical health, mental health, and criminal aggression, were selected so that the material would be relatively easy to extract from single sources. This assures reliability of data collection over time and maximizes replicability and updating for purposes of future policy and scientific analysis. A second criterion for selection of sources was that they began with material that was collected soon after the end of the Depression era of the 1930's. The rationale was that while we wanted to maximize the time span in order to strengthen the statistical ground of the analysis, we also wanted to represent a period which came closest to current experience for purposes of potential application to public policy. For these reasons, the majority of the analyses covered the period 1940-1973.

Identical procedures of analysis, with the same economic variables, were utilized for several of the pathological indices for the United States as a whole (in which case, all pathological indices were used), for the states of California, Massachusetts, and New York (general mortality, suicide, homicide, and cirrhosis of liver mortality), and for England and Wales, and Sweden (general mortality). Replications of our analyses were conducted at several levels

to verify the basic structure of the relationships. Replications were made among geographic and political regions, and by age and sex for each of the pathological indices.

Findings

The overall hypothesis was that the combined effects of real per capita income, unemployment, and inflation would be related to the incidence of the various types of social pathology within a five-year lag period.

The most consistent pattern of relationship between national economic changes and each of the measures of social cost was demonstrated with the unemployment rate. Unemployment plays a statistically significant role in relation to social trauma for each of the indices of social cost and for virtually all ages, both sexes, and for whites and non-whites in the United States, and each of the three test states. Even in a comparative examination of the mortality rates by age and sex for England and Wales, and Sweden, one finds a consistent relationship to the unemployment rate. These findings are remarkable both from the stand-point of the serious problems of measuring unemployment as a concept, and the difficulty of comparing unemployment statistics, demographically, regionally, and internationally.

The relationships between the rate of inflation and the pathological indices were frequently strong, but lacking in consistency from one index of pathology to another and from country to country. These data leave the strong impression that even though statistically significant relationships between the rate of inflation and various indices of pathology exist, one can have little confidence in the measures of the importance of

those relationships. Furthermore, the inconsistencies in the relationships among pathological indices and among countries suggest that social and political factors, probably indirectly associated with inflation, are more closely connected to the indices of pathology.

In the case of real per capita income, we find generally consistent and significant relationships to the mortality rates by age and sex, in the United States, England and Wales, and Sweden. This conforms with the overall hypothesis of important beneficial implications for life span associated with increases in per capita income. The long-term downward trend in cardiovascular mortality is also inversely related to the trend in per capita income. Positive relationships between per capita income and several of the measures of pathology (e.g., suicide, homicide, and imprisonment) were less easy to understand. At the present time, there is statistical reason to believe that only the relationship between per capita income and overall mortality rates (including cardiovascular mortality) is appropriate for policy consideration.

The findings on the relationship of unemployment, as an index of "cyclic" changes in the economy to the various pathological indices, were translated into tentative numerical estimates. Thus a one percent increase in the unemployment rate sustained over a period of six years has been associated (during the past three decades) with increases of approximately:

- 36,887 total deaths, including 20,240 cardiovascular deaths,
- 920 suicides,
- 648 homicides,
- 495 deaths from cirrhosis of the liver,

- 4,227 state mental hospital admissions,
and
- 3,340 state prison admissions.

All of the above are based on the population in 1970. These estimates include lagged associations of increases in pathology with changes in unemployment rates distributed over a five-year period following those changes. (Similar numerical estimates were not given for per capita income and inflation due either to lack of consistency in findings or difficulty in interpretation of several of the relationships.)

The numerical estimates of extreme pathology associated with economic changes should be used with caution in making projections to even the near future, since such projections assume that the future will replicate the conditions of the time period on which these estimates are based. That such replication of conditions is open to doubt is indicated, for example, by evidence that the relationship between the overall mortality rate and the unemployment rate may be increasing in strength for the majority of age groups, while that between the mortality rate and real per capita income has declined. Moreover, there appear to have been important non-economic trends which influenced the relations between the major economic variables and the major pathologies (especially cardiovascular mortality, mortality within the age group 15-34, suicide, homicide, and imprisonment).

The significance of the non-economic phenomena in the relationships reported here may also be subject to considerable change. Keeping these cautionary statements in mind, it is nevertheless the case that the most accurate projections of future situations are derived from analagous situations in the recent past. Thus, it would not

be inappropriate to use the estimates derived from this study as overall indications that serious, if not vital, national concerns tend to be associated with economic processes.

Conclusions

Overall, it is evident that significant relationships exist between economic policy and measures of national well-being. This study indicates that actions which influence national economic activity -- especially the unemployment rate -- have a substantial bearing on physical health, mental health, and criminal aggression.

In any event, it would be imprudent to disregard the implications of substantial social costs associated with factors that stem from economic policy. Even in the nation's current value system, the social costs associated with national economic decisions may be equivalent to -- or even outweigh -- those concerned primarily with money income. Indeed, it is relative freedom from serious problems of ill health and aggression and profound mental discomfort that one hopes to secure through economic security and advancement.

To the extent, therefore, that economic policy has acted to influence economic activity, it has always been related to the nation's social health. It would appear that on a day-to-day basis, nearly all political and deliberate economic policy decisions which affect the national, regional, and local economic situations also are associated with many aspects of the nation's well-being. Indeed, significant amelioration of many of our basic social problems may depend, in part, on national economic policy considerations.

More specific policy applications will require extensive research efforts that focus more precisely on the causal mechanisms involved. The worth of such future research is indicated by the fact that important results have been shown in this study despite (1) substantial problems in measurement of economic trauma and pathology on the national level, (2) use of relatively insensitive indices of rather extreme behavior (i.e., institutionalization and mortality), and (3) analyses based on the national level rather than specifically on those individuals directly affected by economic trauma. Statistically significant results in the face of these difficulties indicate the potential for more refined and specifically targeted research in this area. The suggested research includes macroscopic approaches as used in this study as well as detailed epidemiological analyses. It is recommended that a high priority in such studies be given to examination of those areas (especially urban) and population groups which have been affected by economic loss well beyond the national averages.

Moreover, it is through these studies that we can begin to evaluate the extent to which ameliorative procedures in the general health, mental health, and criminal justice areas affect pathologies associated with national economic changes.

I. INTRODUCTION AND BACKGROUND

The purpose of this study is to translate research findings on the pathological effects of unemployment and other forms of economic distress into a form that would be useful for national economic policy decisions. To do so, it is necessary to understand the quantitative impact of economic factors whose effects one would like to either encourage or suppress.

Some success has been achieved in formulating the outlines of such models. Specifically, the basic models relate three major indices of national economic behavior to several measures of social distress.

The economic indices selected to represent national measures of economic distress were:

- a. the rate of employment,
- b. relative lack of growth or actual decline in per capita income, and
- c. the rate of inflation.

The pathological indices included:

- a. the mortality rate (age-, sex-, and race-specific),
- b. the cardiovascular disease mortality rate,
- c. the cirrhosis of the liver mortality rate,
- d. the suicide rate,
- e. the homicide rate,
- f. the rate of first admissions to mental hospitals, and
- g. the rate of imprisonment.

Economic indices were selected with specific reference to economic policy. At the same time, economic indices were chosen which would make sense theoretically in describing how economic factors might influence pathological phenomena. Thus, the group of indices included one which focuses on a long-term trend of the economy (economic growth), but which was related to the material well-being of individuals, namely, per capita income. Secondly, a measure was selected to portray the capacity of the economy to provide employment to those who seek it. This index (measured inversely) is the unemployment rate and is a classic estimator of "cyclical" changes in the national economy. The rate of inflation is similarly an indicator of the macroscopic state of the nation's economic health, and it is as well an additional index of social stress on the individuals subject to it.

The pathological indices were also chosen for their policy significance. They are measures of the fundamental values on which human happiness and well-being are based. Thus, trends in the overall mortality rate are measures of changing life span; cardiovascular disease and cirrhosis of liver mortality are indices of the physical health of the population; suicide and mental hospitalization are negative indices of mental health; and imprisonment and homicide are indices of illegal activity, and the most acute form of human aggression.

In each of the topic areas in which social indices have been selected -- physical health, mental health, illegal activity and aggression -- key policy issues are involved. There is now a substantial literature which indicates that for each of these areas the direct or indirect relationship to national economic policies cannot be

ignored. In many instances, the linkages to national economic changes maybe among the most important sources of the social problems that society has tried to remedy through a variety of public programs.

Background

In this study we hypothesize that the social costs of economic distress originating at the national level can be described in quantitative terms. We include in this conception: the general material level of living of the population, the per capita purchasing power of the population, the employment status of the population, and the physical and emotional demands of work.

The overall material level of living includes the degree to which the society has been able to provide essential goods and services, such as nutrition, public health and medical technology, and education. Also strongly correlated with material level of living is the structure and character of available occupations. This is an outcome of the changing structure of industry in an economy characterized by long-term growth. Two implications of secular economic growth in societies are a continual increase in the social status of occupations and decreasing physical stress and job hazards. With economic development as it has occurred among modern industrialized societies, we observe continual decline in the physical strain and dangerousness of work. Also, there is a substantial decline in the types of work which have traditionally been considered as "low status", namely, those which are unskilled and extremely low paid (1).

Also associated with long-term growth in industrialized societies is the increasingly greater investment in public goods and services, particularly those connected with income maintenance for those unable to work (i.e., "welfare" services). Overall, then, economic growth has tended to produce higher levels of goods and services available to the society as a whole, an increased ability on the part of individuals to partake of what is valued in the society, ranging from the necessities of life to items that provide emotional gratification, and a decrease in the physical and emotional strain of work life.

Somewhat independent of the long-term benefits of the secular increase in economic well-being is the issue of economic stability -- in particular that of job stability. In this category, we include the issue of unemployment as well as that of "sub-employment," or employment at a lower level of skill or income than is possessed by an individual. Involved in this problem of employment status and security is the fundamental issue of the identity of the individual as a function of his or her work role. Identity is conferred on an individual by society through the work role, since this role is understood both by the person and the larger society as representing his contribution. In a word, the value of the person to society is too often understood in terms of the function that individual performs. In part then, the person is understood to "be" what he does as a category of productive work.

To the extent that the work is performed well and employment is secure, the individual sense of contribution and sense of self-value is secure. Thus, a basic anxiety is inherent

in unemployment or fear of it. Work role, in addition, is often the basic means by which social relationships are formed. It is a fundamental link between the individual and his family to society through the economic system. There is no doubt that concomitant with economic growth in modern industrial societies, job security has been substantially advanced. Nevertheless, even in the mature, economically developed society, unemployment, and economic instability in general, continue to be a major threat to security and livelihood.

To summarize, then, economic distress originating from disturbances at the national level is a primary source of trauma which affects nearly all major types of individual stress. These sources of societal stress are inherent in life, (e.g., 15, 17) and the sociologically oriented sciences (e.g., 18, 23). Perhaps the best known of these formulations involves the relationship between serious aggression and conditions of frustration (16). This conception, formulated originally within the disciplines of psychology and psychiatry, has in recent years been elaborated with the aid of additional research to include the causal factors of loss, attack, and social stress in general (17).

In all of the sources of aggression thus far identified and scientifically supported, the connection with economic distress can be seen. Put directly, the fear, or actuality, of loss of income or employment is a profound source of frustration and a potential source of major loss. Moreover, it is not difficult to imagine that the unexpected mental trauma due to losses of income, employment or social position would be regarded as an unjust attack by the society upon many of the individuals subject to it.

Perhaps more specific to the United States' situation in the last few years, however, is a relative decline in the urban quality of life. This has meant that the material level of living of a substantial majority of city residents has actually fallen, or at the very least, has not kept up with the general trend of national prosperity. We must, therefore, be acutely aware of a potentially "negative effect" of national economic growth during the last two decades, meaning that it may not apply to a substantial proportion of inner city residents. This problem of recent urban decline has been particularly serious for younger persons and for ethnic minorities who, during a period of comparative decline within urban areas, have been especially prone to suffer either from problems of unemployment and "sub-employment" (i.e., employment at levels of skill below their capacity or training) or comparatively low income.

The second major frame of reference in the study of criminal aggression explains such deviance as the gap between the demands of the society as represented in its fundamental social values and the ability of individuals to contend with those demands. In the well-known formulation of Merton, for example, it is primarily the lack of fit between the social values of achievement and the capacity of specific minorities to meet the usual social norms of such achievement which is the source of much criminal activity, among other deviant reactions (18). In line with this argument are the works of other sociologists who have pointed to the importance of lack of economic opportunity as a major factor in juvenile delinquency (19). Similarly, there has been a substantial emphasis on the learned aspects of criminal deviance in youthful subcultures which may themselves develop as a reaction to insufficient opportunities for individuals of lower

socio-economic status to achieve such levels of income and significance as to attain dignity in the society (20, 21).

At the same time, it should be pointed out that there is an important tradition in social science thinking which links long-term societal economic development, particularly as related to urbanization and industrialization, to a generalized decline in the integration of society (e.g., 22). Such a decline in social cohesion is often represented by long-term increases in the rate of divorce, the decline of family functions in general, greater geographic mobility among working class people leading to fewer long-term friendships and community ties, segregation and institutionalization of the elderly, increased imprisonment and bureaucratization in the work setting, among many others (23). It has been thought that such a decline in the integrating networks of society has led to real secular increases in the willingness of individuals to injure others in order to satisfy desires that are material or symbolic. This view should be sharply distinguished from that associated with shorter term economic instabilities, such as those involving various types of loss discussed above. The short-term groups of stresses are very frequently thought to lead to increases in the incidence of criminal behavior, as well as other types of aggression.

Up to this point, we have been discussing both the empirical evidence and the well-established theoretical positions linking economic stress to pathological behaviors on the individual level. We now turn to a number of research literatures which deal with the problem of economic stress on two different levels of analysis.

Two main types of studies are involved here. The first of these deals with what is perhaps the most prominent theme in the study of the distribution of pathological behavior in society, namely, the inverse relationship between socio-economic status and measures of pathology. The second is the study of change in measures of the aggregate economic status of populations in relation to changes in pathological indices.

The Use of Indices to Reflect the Impact of Economic Change in Societal Stress

It is obvious that we cannot at this point successfully estimate the quantitative impact of the state of the economy on the whole of societal distress. Indeed, we cannot even offer overall estimates as to the impact of economic changes on the general pathology areas of mental health, physical health, or aggression. To do this, it would be necessary to take into consideration the extent of total morbidity (in the cases of mental and physical health) and the total incidence of aggression in society as both react to economic changes. Data have never been available on generalized illness incidence which could be appropriately used for these analyses. Nor have we had any but the barest and most questionably reliable data on estimates of criminal behavior. Therefore, we are in the position of the scientist who is unable to measure the totality of the phenomena he wishes to investigate directly, but rather must estimate the incidence from a variety of indirect data which are quantitative and conform to minimal norms of validity and reliability. These indications of the presence or change in the phenomena we wish to measure are, perhaps, the most extreme behavior for which the society tends to keep a continuous record.

(a) Mental Health Indices

One example of the use of data on extreme behavior is our utilization of admissions to mental hospitals over time to indicate changes in the overall mental health level of the population. Such a procedure has the disadvantage of being somewhat confounded by administrative problems related to the hospitalization of the mentally ill. It has the advantage, on the other hand, of representing a relatively severe indication of change in the manifestation of pathology, as well as in the relative tolerance by the population of serious mental disturbance.

It is often useful to utilize additional measures. In this study, for example, mental hospital admissions are supplemented by data on suicide mortality rates and on mortality related to alcohol abuse, namely, cirrhosis of the liver. We may assume that if the relationship between mental hospital admissions and changes in the economy do reflect accurately the effects of the economy on societal stress, then we should obtain similar findings for suicide and cirrhosis of the liver mortality. The mental hospital admission rate may be more generally reflective of the overall level of societal mental distress, however, since suicide and cirrhosis of the liver mortality are comparatively infrequent as compared with mental hospital admissions.

At the same time, use of the mortality rates provides the advantages of not having to deal with potential problems of mental hospital administration as it might affect rates of hospitalization and as, in turn, we wish it to reflect rates of the manifestation of mental pathology or societal intolerance of it. Moreover, the data

on suicide and cirrhosis mortality are comparatively reliable insofar as they describe mortality and reflect mental distress in the population. There are, however, problems inherent in the use of data that are specific to the cause of death due to the less than perfect classification of cause of mortality at time of death.

The overall estimate, then, is more properly based on a number of different indices of mental distress, each of which may have its own problems of validity and reliability. But it is hoped that given consistency of findings among the various indices in relation to changes in the economy, a more nearly accurate picture of the general relation may be obtained.

In using these three indices (mental hospital admission rates, suicide rates, and cirrhosis of liver mortality rates) to reflect changes in the overall mental health of the population, we are not measuring directly the "mental health level." Rather we are assuming that the combined estimates obtained through the use of these three indices allow us to infer changes in the overall mental health status of the population.

The rationale for our assumption is that the indices are indicative of changes in a variety of types of symptoms of mental distress, both intellectual and affective. In the cases of mental hospitalization, particularly among youthful and middle-aged groups, we observe that the majority of diagnosed causes of hospitalization refer to functional psychoses, particularly schizophrenia. Thus, for the age groups involved, we may find

both that increased symptoms of intellectual disturbance are being precipitated and that the community is more likely to define severely disturbed behavior as being disruptive and requiring hospitalization. The case of suicide is indicative of probable clinical depression, thus providing a general estimate of changes in mood. A higher suicide rate points to an increase in the perception of profound unhappiness and hopelessness. Finally, fluctuations in the incidence of cirrhosis of the liver mortality would indicate changes in the extent of very serious alcohol abuse. The understanding, further, would be that such abuse of alcohol to the extent of serious morbidity (and, in fact mortality) would be indicative of the general tendency to utilize anesthetizing and tranquilizing psychotropic drugs to ease the sense of anxiety, tension, and depression.

Among the mental health indices, therefore, we have selected those which represent intellectual disturbance, affective disturbance, inability on the part of family and community to deal with mental disorders outside of an institutional setting, and the use of psychotropic substances to alleviate mental trauma. These are indices which cover, conceptually, a number of broad mental health problems and which, taken together, generally reflect the overall mental health status of the population.

(b) General Health Indices

The problem is even more complicated where we wish to measure changes in the nation's health status. There appear to be no uniformly gathered estimates of health status over sufficiently long periods of time to permit comparisons with indices of change in the state of the economy.

Moreover, those estimates which do exist have extraordinarily serious problems of compatibility with medical diagnostic criteria of ill health. We are, therefore, limited in our estimates to the most severe indication of ill health, namely, mortality.

Perhaps the major disadvantage of using mortality as a national health index over time is that it is for the long-term trend somewhat inverse to the state of population morbidity. Thus, over the last several decades, mortality rates have continually fallen in the United States; this has resulted in an increased life span with a concomitantly greater probability of morbidity due to chronic diseases (24).

However, the advantages of using mortality as an index substantially outweigh the disadvantages. Mortality data have been collected for the various states within the United States which have registered deaths since 1900, and quite reliable estimates are available over time of the rate of death in those states. In fact, mortality data are among the "hardest" demographic data available for use in the biological and social sciences. Furthermore, these data can be cross-classified according to specific components of age, sex, and race, thereby providing a panoramic view of the comparative subgroup reactions to environmental changes.

Finally, the data on causes of death are reasonably reliable for the very large categories of mortality such as cardiovascular-renal disease, or infectious disease as an entire group. In addition, these data are not only available across a great many different countries but are also available among the states of the United States for purposes of comparison with estimates provided on the national level.

In summary, we appear to be limited by the nature of the available data to utilizing mortality statistics as indices of national health levels. While this, no doubt, minimizes our estimate of disease morbidity (especially chronic disease), it may not greatly disturb our estimates of change in the prevalence of serious morbidity. This is even true for the cardiovascular-renal disease diagnostic categories. If there are observed short- to medium-term (i.e., under ten year) changes in the mortality rate due to cardiovascular-renal diseases, then we can assume that there have been somewhat similar proportional changes in the rate of severe morbidity due to cardiovascular-renal problems.

(c) Indices of Criminal Aggression

The problem of estimating changes in the incidence of criminal aggression is at least as difficult as obtaining comprehensive indices for mental and physical health. In this report, we have chosen not to deal with these problems directly because existing estimates of the incidence of criminal behavior have been subject to extraordinarily severe, negative criticism in the academic and professional communities. Rather, we begin with an issue that is perhaps more fundamental to life in a major industrial democracy. We ask under what conditions does it become necessary for the aggressive power of the state, as represented by imprisonment, to be used against some of its citizens.

The use of imprisonment, then, as an index of internal societal aggression leads again to focus on a rather extreme measure. Imprisonment occurs for the most serious crimes in the society -- those which are not necessarily representative

of the vast majority of criminally aggressive behavior that ordinarily occurs. It is furthermore, an indication of behavior so extreme as to warrant incarceration by the state for the protection of the public through the use of a procedure which includes the deprivation of freedom and the almost certain alteration of the future economic and social career of the individual imprisoned. While this is a relatively indirect measure of the aggression within the society it is nevertheless a fairly reliable measure.

Homicide is used as a supplementary measure of aggression. It is drawn from vital statistics rather than criminal justice sources and, therefore, does not depend on the actions of the criminal justice system. As suicide and cirrhosis mortality rates lend reliability and validity to mental hospitalization estimates of mental ill health, we use homicide rates as a supplementary measure to imprisonment as an indication of change in the extent of aggression in American society. Further, as in the case of the mental health indices, the two indices of aggression show relatively similar patterns in relation to disturbances in the social environment.

Hypotheses

In general, we hypothesize that pathological reactions will follow increased unemployment, increased inflation, and decreased per capita income. The economic indices are considered independent variables, and the measures of social distress are treated as dependent variables.

Operationalization of this overall hypothesis requires a single equation with several variables in which each of the three economic indices are observed to be simultaneously related to each of the pathological indices. In the cases of each of these three economic sources of distress, we expect what is referred to as a "distributed lag" relationship. This means that the relationships to economic stress are dispersed over time so that during each of several years, a certain proportion of the economic stress initiated during the first year takes its toll.

We hypothesize that increases in the unemployment rate, regardless of the causal basis, will be followed by increases in the various pathology indices estimated in this report. The hypotheses pertaining to the stressful impact of inflation are somewhat similar to those pertaining to unemployment. The impact of upward trends in per capita income is extraordinarily varied, and we hypothesize that trends represent phenomena which tend to reduce the level of stress in society. However, we must also be aware of a substantial tradition within the social and environmental sciences which points to many of the potentially and actually deleterious effects of unregulated economic growth.

Overall, we expect that over the long term, increases in per capita income should have acted to decrease our indices of pathology, except where those indices pertain to specific sub-population groups which have been victimized by the indirect "effects" of the prosperity. In the latter case, where victimization has occurred in the face of economic growth, we should then expect increases in our pathological measures.

II. REVIEW OF THE LITERATURE

The research in this area can be traced back to the 1930's in the United States. Until very recently, the vast bulk of this research has been concerned with establishing the inverse relationship between socio-economic status and mental and physical disorders. In other words, a considerably higher prevalence of many types of physical and mental pathology has been found among lower socio-economic groups. While these studies began as attempts to define the ecological profile of urban populations, they subsequently concentrated on the specific measurement of socio-economic status and the prevalence of a substantial number of illnesses in the population.

Social researchers' community surveys of the distribution of illnesses appear to have moved in three directions. The first involves the field of clinical epidemiology, concentrating on highly specific and well-defined diagnostic categories of illness, including infectious, acute, and chronic diseases, and employing advanced biostatistical procedures of sampling and multivariate analysis. A second direction was the establishment of a semiperiodic interview of the health status of the population by the National Center for Health Statistics. The third direction was in the area of utilization of health services. Here again, the National Center for Health Statistics has been very active and has produced a continuing series of monographs on the utilization of different types of health care according to various socio-demographic characteristics of the population. In addition, academic researchers working in schools of public health and departments of sociology have developed rather an extensive literature on socio-economic factors and the utilization of health care facilities.

The research on this subject has shown higher rates of morbidity and mortality due to physical disorders, and a shorter life expectancy, among lower socio-economic groups (23-39). For the mental disorders, there is a similarly consistent inverse relationship between prevalence rates and socio-economic status (40-56). For both physical and mental disorders, in general, there is a considerably lower rate of utilization by lower socio-economic groups of health care facilities, controlling for age and levels of severity of illness (67-118).

This research has led to the question of the probable dynamics, over time, of the inverse relationship between socio-economic status and health status. The generally accepted hypothesis among specialists in this field is that three factors were largely responsible for this inverse relationship:

- (1) comparatively low levels of nutrition among low socio-economic status groups, especially significant in the acute and chronic infectious diseases;
- (2) higher levels of social-psychological stress in lower socio-economic groups, particularly relevant to mental disorders, alcoholism, psychosomatic disorders, cardiovascular-renal diseases involving hypertension, and suicide, homicide, and accidents;
- (3) lower utilization of health services among lower socio-economic groups, especially important in maternal and child illnesses, accidents, and cancer and malignant tumors, especially those of the female reproductive system.

With these three general factors as background, a series of studies was developed over the last twelve years to determine the effects of adverse changes in the national economy on health status. Given the consistent findings of the substantial literature on the subject, there was reason to believe that declines in employment and income, and increased inflation, would decrease the actual socio-economic status of significant minorities of the general population. Those decreases in socio-economic status, in turn, would lead to lowered nutrition levels, a substantially greater prevalence of social-psychological stress and decreased financial ability to utilize medical care facilities. These three factors, originating in national economic instabilities, would then have a substantial negative impact on the health of the population.

The empirical evidence strongly supports these hypotheses for both developing and industrialized countries. For developing countries where the major sources of mortality are the infectious diseases, and in industrialized countries for both infectious diseases and infant and maternal illnesses, strong inverse relationships have been observed between national economic indicators and mortality rates (136). Mortality due to the chronic diseases has also been found to have a strong inverse relationship to national economic indicators in industrialized countries (133-5). These chronic diseases include heart, cerebrovascular, and renal diseases which comprise the great majority of sources of mortality in these countries. Finally, hospitalization for mental disorders has been shown to be strongly inversely related to adverse national economic fluctuations, as have mortality due to alcoholism (cirrhosis of the liver), automobile accidents, and suicide and homicide (130, 140, 144).

Influence of Socio-Economic Status on Health and Utilization of Health Care

Epidemiological studies in the United States began in urban settings with the work of the "ecological school" in Chicago in the 1920's. According to one ecological theory, the characteristic spatial pattern of cities is a series of concentric circles, with each circle having certain distinctive characteristics (1, 2). The ecological pattern of the city in terms of concentric zones leading out from the first circle are: Zone I, the central business district; Zone II, an area known variously as the slums, zone in transition, or interstitial area; Zone III, an area of two or three-family flats or dwellings; Zone IV, an area of single family dwellings; and Zone V, the suburban or commutation area.

The epidemiological spot-mapping by place of residence showed that certain types of social deviation are concentrated in specific areas. For example, conventional crime, delinquency, mental illness in general, (and schizophrenia in particular), suicide, prostitution, vagrancy, dependency, illegitimacy, infant mortality, as well as associated problems such as high death and disease rates, have been found to vary with the areas of the city (3-9). The highest rates are in Zones I and II, and become successively lower as one moves out from these areas. The evidence on alcoholism and the manic depressive psychoses does not show this pronounced pattern. Although there are probably higher rates in Zones I and II, the differences are not as marked from one part of the city to another. White collar crime, on the other hand, is greater in Zones IV and V of the city.

The spot-mapping research of the ecological school was based at first on published sources of data, and subsequently, involved participant observation techniques. It was not until the advent of community studies, however, that survey research procedures were widely used. The first group of community studies, exemplified by the work of the Lynds (10, 11) and Warner et al. (12, 14), was prominently concerned with the issue of social status and its measurement. The community studies of Warner, and later of Hollingshead (15, 16), provided two of the most frequently used measures of socio-economic position. This tradition of sampled community studies (17-19) influenced the development of major epidemiological studies of the prevalence of mental and physical disorders, and other social pathologies, within socio-economic strata of the population.

With the use of specific socio-economic measures, it was found that indicators of pathology in society correlated more closely with gradients of socio-economic position than with ecological areas of residence. The conclusion was that socio-economic status, per se, rather than residential area or ecological niche, was the crucial variable in social deviance, in general, and in physical and mental pathology specifically.

The following discussion draws on American and British epidemiological studies, although similar findings have been obtained in Northern and Western European countries.

Throughout each of the population age groups, mortality among the lower socio-economic groups was greater for epidemic, acute and chronic infectious diseases, for diseases of early infancy and childhood and for rheumatic

heart disease, ulcers and cancer of the stomach, among others (23-28).

With the introduction of the Welfare State in Britain after the Second World War there has been some equalization of income distribution as well as greater availability of free social and medical services. Nevertheless, substantial differences in disease patterns continue even among the socio-economic groups in that country.

Indeed, overall mortality has continued to be higher for the lower socio-economic groups, both in Britain and the United States (29). In the United States, moreover, the infant mortality rate and the communicable disease death rate for white infants have declined, far more sharply than those for non-whites (30) which seems to be due in part to income and educational differences.

In the United States the comparatively poor position of lower socio-economic groups and non-whites has been sharpest for chronic conditions as reported in the National Health Survey (31). Hypertension (32), and cancer of the lung, cervix, stomach, and esophagus (33) are among the principal chronic diseases inversely related to socio-economic status.

Poorer health-care and related practices appear to be closely connected with morbidity and mortality patterns. There has been a lower rate of utilization by lower socio-economic groups in Britain of a great variety of services to improve health, including hospitals (34), prevention and immunization facilities, maternal and child health services and dietary supplements (35). Similar findings of disadvantage to lower socio-economic strata continue to be observed for the United States. In the United

States, in addition, the problem of discrimination by the services against low-income persons appears to have a more serious impact on access to health care both because of the absolute costs and the organization of medical services (36-7).

The higher morbidity and mortality experience of individuals in lower socio-economic strata can even be observed among the elderly. Among the lower social classes there is a greater number and severity of disabilities for older persons and, largely for these reasons, fewer of them continue to work after the age of retirement. The insufficiency and relatively poor preparation of food among the lower class elderly has been documented as has their inadequate housing, housekeeping services and nursing care (38-9).

Major differences among socio-economic groups are also found in the case of mental disorders. Despite the many unsolved problems of selecting reliable and valid indices for measuring mental disorders, every measure shows that lower socio-economic status tends to be highly correlated with poor mental health (40). A small number of studies among a great many on this subject do not show a greater prevalence of mental disorders in the lowest socio-economic groups (41-2). The inverse relationship between mental disorder and socio-economic status holds whether the studies used surveys of subjective reports of happiness, standard psychiatric inventories, psychiatric examinations or interviews by psychiatrists (43-7). In addition, these findings continue to occur where the studies involve the incidence of all types of psychiatric care (48) or first admissions to mental hospitals (49).

The incidence of schizophrenia, especially in larger cities, shows greatest occurrence in the lower socio-economic groups. Similarly, the incidence of the psychoneuroses and personality disorders becomes increasingly higher in relation to low socio-economic level. The distribution of the depressive disorders, however, may be unrelated to social class grouping (50-6).

Seriously compounding the problem of higher rates of severe illness and mortality among lower socio-economic groups, is that of considerably greater delay in seeking medical care among these groups. A large number of studies show that people with low incomes more often seek physicians' services in hospital emergency rooms and clinics, presumably because the illness has reached emergency conditions or because they have had no regular source of primary physician care (69, 79, 85, 88-9, 94-5, 98, 101, 105, 107-9). People with the lowest incomes have the lowest rates of surgery (68-9, 73-4). High-income groups are more likely to use preventive services, especially children from high income families (67-8, 73, 76, 78, 84, 86, 89, 90, 101-2, 105, 108, 110-14). In addition, high income persons use more specialist services (69, 82, 94, 96, 99, 94-5, 101, 108), and seek more preventive services from dentists than do low income persons (88, 101, 103, 115).

Traditionally, research has indicated that lower income groups generally showed lower utilization of physicians' services and had lower hospital admission rates than the high income groups. However, these relationships are being reversed because of the growth of health insurance and financing programs for the poor (67-106). Low income persons still have longer average lengths of hospital stay than the high income groups, probably indicating greater rates of severe illness (68-9, 71-4, 79-83, 86, 88 91, 93-4, 96, 99, 100, 103, 105-6, 116), but both high and low income groups seek physicians' services for serious illness at similar rates (68-9, 84, 108-9, 117-8).

The relationships between socio-economic status and crime and delinquency, family disorganization, and alcoholism have been worked out less satisfactorily. This is perhaps primarily due to the lack of precise measures in these areas of social pathology. Nevertheless, as was discussed above, they tend to predominate in low socio-economic areas of residence. In addition, many studies indicate that lower class individuals run greater risks of being defined as criminal or delinquent (57-9). Again, a great variety of studies indicates an inverse relationship between socio-economic status and divorce rates (60-2), desertion (62-4), and illegitimacy (65). Finally, there is substantial evidence of increases in heavy drinking of alcohol, and debilitating problems related to such drinking, with decreases in socio-economic position (66).

Influence of Changes in the National Economy on Health Status

The literature described above details the inverse relationship between economic status and (1) morbidity and mortality and (2) utilization of health services. In an effort to understand the dynamic relationship between economic levels and health, further advances were required in research design. Specifically, it was necessary to demonstrate beyond a statistical doubt that with a change in the economic status of a person or population, there would follow a change in health status. There are no extant cohort studies of living populations in which both the economic and health statuses of individuals were measured and correlated through time. The only studies which have attempted to probe these relationships in depth are based on mortality or hospital utilization data.

The earliest studies of the effects of economic adversity on mortality rates come out of the traditions of demographic and economic history. These studies began with the observation that since the eighteenth century in northern Europe, the mortality rate had declined sharply (119). Furthermore, the decline in mortality rates had been measurable long before the introduction of the public health technologies including sanitation, large-scale quarantine methods (involving immigrant groups), and the medical technologies which included inoculation and chemical therapeutics (especially the sulfonamides). It is now accepted that the extraordinary increase in life expectancy that occurred during the eighteenth century in northern Europe was largely a function of the control over agricultural productivity (120-1).

Major technological advances in agriculture, generally attributed first to Britain, were observed to diminish the amplitudes of the cycles of abundance and famine which were known to be closely related to the virulence of major epidemic diseases and plague (120-1). Indeed, the nineteenth century in northern Europe saw a decline in mortality which resulted in a virtual doubling of the life span and an extremely sharp decrease in mortality rates due to infectious diseases. The process of "industrialization" of agriculture continued into the twentieth century. In the industrialized countries, after the first two and half decades, the infectious diseases ceased to be a significant cause of mortality at any age.

So significant is the influence of economic development, per se, on mortality and morbidity levels, that on an international basis, the most significant source of life expectancy differentials is clearly related to level of economic development. In developing countries, mortality rates are comparatively high, especially infant mortality rates; acute and chronic infectious diseases account for the vast proportion of morbidity and mortality. In contrast, in industrialized countries, the major sources of mortality are chronic diseases and "external causes" (accidents, homicide, suicide) in the younger age groups. These major changes in life expectancy and patterns of disease incidence reflect very long-term or secular changes in the productivity of the economy due to industrialization in both agriculture and manufacturing (122).

The outstanding implication of these long-term studies of the economic effects on health is that advances in the economic system have historically been the most important sources of improved health status both on international and

national levels. Further, declines in the state of the economy might produce adverse effects in health status. This was, in fact, observed by Fredericksen (123) for several developing countries where the major causes of death were associated with infectious disease processes.

For industrialized countries, however, relating trends in economic indicators to health status is far more complex. In the first place, the effects of long-term trends in national productivity and income must be distinguished from those of cyclical changes in the economies of countries where production and consumption patterns are not planned, i.e., non-socialist countries. The importance of the distinction between long-term and cyclical effects of economic change must be kept clearly in mind. The long-term effects influence the overall population life span and prevalence of chronic versus acute infectious illnesses. The cyclic effects of the economy influence short- and medium-term departures from those long-term mortality and morbidity patterns.

A second major problem in analyzing the effects of economic change on morbidity and mortality in industrialized societies is that of a probable lag in the decline in health status behind the decline in the national economic indicator. For example, in the case of chronic disease morbidity, one might expect the more acute manifestations of illness to occur after a lengthy and severe series of disturbances.

A third problem also involves the issue of lags, and the precise mechanisms whereby adverse changes in the economy might increase the population morbidity level. In the case of cardiovascular, cerebrovascular, and renal diseases, it is assumed that the primary source of deleterious influence of economic adversity would be through

the mechanisms of social-psychological stress acting to elevate levels of hypertension and perhaps blood serum cholesterol levels. One would assume that the effects of stress on hypertension or serum cholesterol levels must be prolonged and extensive (perhaps two to seven years) in order to result in severe morbidity or mortality.

On the other hand, the effects of adverse economic changes on fetal and infant mortality probably would require a relatively short lag (probably under two years). The mechanisms might involve nutrition levels and maternal and child care, both prenatal and postnatal.

Social Pathologies Associated with Economic Change

The studies that have been conducted over the past fifteen years on the relationship of economic change to morbidity and mortality in industrialized countries deal with two distinct epidemiological traditions -- those in the mental and those in the physical disorders. The first of these areas to be examined in detail in relation to economic change was the mental health theory. This included studies of suicide, mental hospitalization, and homicide. Suicide is perhaps the first indicator of mental pathology found to increase consistently with adverse changes in the economy (124-5). A number of researchers have replicated these findings, and they attest to the rather severe sources of stress that are brought about by economic recession.

Mental Hospital Admissions

Since the 1930's a number of researchers have attempted to demonstrate an inverse relationship between economic changes and mental hospital admissions. The last three attempts demonstrated beyond any statistical question that the relationship can be measured in consistent and stable ways through time (126-128). The first of these studies dealt with Massachusetts during the 1930's, the second with the whole United States during the Great Depression, and the third with New York State for the period, 1841-1967. It was demonstrated that during each of the recessions since 1841, there occurred substantial increases in both first admissions and readmissions to mental hospitals. Cyclical changes in the economy were the single most important factor in trends of admission to mental hospitals. The New York State study was replicated for the entire United States and for each state for the period, 1928-1969, with nearly identical results (128-9).

Alcohol Abuse

The findings on alcohol abuse are consistent with the hypothesis of increased mental disorder precipitated by social-psychological stress during economic recession. It was initially observed that increases in mortality rates due to cirrhosis of the liver were positively related, over time, to consumption of alcohol (130). It was subsequently estimated that there is a lag between the increase in per capita alcohol consumption and cirrhosis mortality rates (130). In addition, it was shown that consumption of distilled spirits (rather than wine or beer) was the significant factor in cirrhosis mortality, and that this consumption was inversely related to

the state of the national economy on a cyclical basis. Finally, it was observed that cirrhosis mortality itself showed substantial increases one to two years following national economic recessions (130). It is clear from the long period of time apparently necessary to acquire (chronic) cirrhosis of the liver, that the short-term economic trauma did not initiate the cirrhotic condition, but once present tended to hasten mortality.

Additional findings continued to reflect the importance of the inverse relationship between consumption of distilled spirits and the state of the national economy. Thus, admissions to mental hospitals, in New York State and the United States as a whole, with a diagnosis of psychosis related to alcoholism or with any alcohol-related mental disorder, showed substantial and stable increases during economic recessions for the period, 1921-1968 (128, 130). Similarly, arrests for "drunkenness" in Massachusetts were found to be inversely related to the national economy during 1915-1968, with the arrests lagging two years behind fluctuations in the economy (130). Finally, the arrest rates for driving while intoxicated in the United States as a whole, and the number of persons brought to trial and found guilty of driving while intoxicated in the city of Philadelphia, were found to increase substantially during national economic recessions (130).

Auto Accidents

In keeping with the findings on the relation of economic recession to arrests for driving while intoxicated are more general findings on the relation of economic recession and mortality due to automobile accidents in the United States (131). These findings hold across all ages, both

sexes, and whites and non-whites, and may or may not be related to alcohol abuse. At least some of this relationship may be due to the effects of stress on intellectual functioning, which may, in turn, result in mistakes while driving or handling other machinery. It has also been suggested that automobile accidents represent a form of highly aggressive and violent behavior related to decreased impulse control under stressful conditions. This latter hypothesis is consistent with findings that the homicide rates are strongly influenced by economic recession, particularly for white males in the United States, and in Canada, England and Wales, and Scotland as well (132-3).

Heart Disease

An increasing amount of empirical research has been devoted to factors in the incidence of, and mortality from, heart disease. The first studies clearly demonstrated that fluctuations in heart disease mortality rates for New York State were inversely related to the employment rate in New York State for 1915-1967. They also showed that mortality from diseases of coronary arteries was positively related to fluctuations in the unemployment rate for the United States as a whole during 1930-1960 (134). Both the relationships for New York State and the United States showed the peak of increased mortality lagging at least two to three years behind economic recessions.

The work on heart disease was followed by extensive studies of the relation between national economic indicators and cardiovascular-renal diseases in general (135). The hypothesis was that these illnesses include significant psycho-physiological factors involving hypertension, as well as serum cholesterol levels. The

total category of cardiovascular-renal diseases and major subcategories, including circulatory system diseases and chronic nephritis, were examined. Since these cardiovascular-renal diseases account for approximately 60 percent of all sources of mortality in many industrialized nations, the data were examined in ten-year age groups, by race and sex, for the United States during 1914-1968. A consistent inverse relationship was found between national economic fluctuations, measured by per capita income or employment rates, and cardiovascular-renal diseases in general, as well as their major subcategories (135). For cardiovascular-renal diseases in general, the peak lag behind economic recessions ranged from three to six years, depending on age, while the peak lags for chronic nephritis ranged from zero to two years. For cerebrovascular diseases, the lag ranged from as much as six to nine years.

Infant Mortality

Moving from those types of illnesses in which social-psychological stress is an important precipitating factor to those for which nutrition and medical care are outstanding factors, the relationship between the economy and infant, fetal, and maternal mortality has received extensive examination. Indeed, the infant mortality rate has long been regarded as one of the most sensitive indicators of the general socio-economic level of the nation. In all industrialized countries for which data are available, the secular trend of industrial growth has seemed to be inversely related to the long-term trend in infant mortality rates (136). For industrialized societies, however, the problem of adapting to economic change is less concerned with the level of economic growth than with whether that growth is relatively smooth or chaotic.

In investigating the relationship between economic instability and mortality under one year of age, the following hypotheses were raised: (1) There is a short- to intermediate-range relationship of approximately three to eleven years between economic trends or fluctuations and trends in infant mortality rates. This relationship has historically been an important component of the inverse relationship between socio-economic status and infant mortality. (2) This three-to-eleven-year relationship has become more important in influencing infant mortality trends since 1950. This may have occurred as a result of the relative decline in the beneficial impact of secular economic growth in an economy that is already highly developed. To test the applicability of the hypotheses to the full age-range of infant and fetal mortality, the following categories were examined: infant mortality under one day, under 28 days, from 28 days through one year, and fetal mortality. All data were examined by race. All cases of fetal and infant mortality increased sharply in relation to economic recession with a peak lag of from zero, to two years (136).

Crime Indices, Imprisonment, and Homicide

The trend in unemployment appears to be the most intensively studied economic factor in relation to crime. Thus, property crime (137) and delinquency (138-9), as indicated by reported crimes on the national level, are significantly related to unemployment. Admissions to prisons and the homicide rate also vary with unemployment according to several studies. For the period, 1926-1962, admissions to state prisons and the homicide rate for the entire United States and for New York State were positively correlated with the unemployment rate (140). In the state

of Georgia, the prison population was similarly observed to change with fluctuations in the unemployment rate during 1967-1974 (141). The size of the federal prison population was shown to be related to the unemployment index of 15 months earlier for the period, 1952-1974 (142). Again, for the period, 1960-1972, strong relationships were found between the unemployment rate and both federal and state imprisonment for the United States as a whole (143).

A cross-national comparison of the United States (specifically, California, Massachusetts, and New York), Canada, England and Wales and Scotland, over the years, 1920-1940 and 1947-1973, also substantiated the positive relationship between criminal activity and unemployment (144). For all four countries, the homicide rate was examined, as were crimes known to the police, arrests and trials, and conviction and imprisonment. For the three states within the United States, imprisonment was examined. Significant relationships with the unemployment rate were found within each country, for every measure of criminal activity, and for both personal and property crimes (145). Finally, several studies have indicated that unemployment directly influences parole, mandatory release violations, and recidivism (146-7).

Summary

The recent investigation of the relationships between economic recession and morbidity and mortality was preceded by a lengthy history of research covering the inverse relationships, at single points in time, of socio-economic status to morbidity, mortality, and medical care utilization. The inverse relationships were consistently found in epidemiological studies

and health care utilization studies, and for both physical and mental disorders. Attempts were recently made to measure the association between national economic recession and national "health status."

The hypothesized inverse relationship was in fact found between adverse economic changes and health status. Specifically suicide, mental hospitalization, indicators of alcohol abuse, cirrhosis mortality, homicide, automobile accident mortality, and infant, fetal, and maternal mortality all showed inverse relations to national economic indicators within a lag period of two years behind adverse economic conditions. Similar inverse relationships between adverse economic conditions and health status were found for the cardiovascular-renal diseases, except that for these illnesses mortality lagged from under two years up to nine years.

The increase in morbidity in the population following economic recession may be seriously compounded by a decline in utilization of health services during economic recession due to a decreased purchasing power. This is an extremely serious potential problem for maternal and child health (prenatal and postnatal) and for illnesses in which rapid diagnosis and treatment are essential.

It should also be noted that the effects of economic recession on health status vary greatly for different subgroups of the population. This is particularly true of individuals of comparatively low socio-economic status, including a significant proportion of the non-white population.

Finally, a number of studies since the 1960's have found strong relationships between

crime indices and lack of employment. Property crimes known to the police, admissions to state prisons on the state and national levels and admissions to federal prisons have been correlated with changes in the unemployment rate. For homicide and other personal crimes, significant positive relations were found with changes in unemployment rates.

The limitations of presently available data samples, gaps in our theoretical knowledge, and problems inherent in the methods of correlation themselves, have restricted causal interpretation of several of the findings discussed above. For these reasons, there has not been complete consensus among specialists as to the full causal linkages in a number of the cases reviewed in this chapter. Nevertheless, the hypotheses on which the present report is based are consistent with the basic findings contained in the literature reviewed.

III. METHODOLOGY

Analytic Techniques

This chapter is devoted to technical considerations. Readers who are not conversant with advanced statistical analysis may wish to move directly to Chapter IV.

The findings reported in this paper are based on a uniform analytic procedure in which trends in each of the pathological or "social cost" indices are examined for the presence of a statistical relationship to per capita income, unemployment, and inflation rates. The statistical analyses were performed by computer utilizing the Harvard University (1) version of the Time Series Processor computer programs. These programs were developed over the period, 1966-75, for the purpose of examining statistical relationships over time among economic indices (e.g., 2, 3). Standard statistical procedures for analyzing multiple variables were used.

Data Sources

Having selected the major categories of data for the social indices (including types of pathology and demographic and regional cross-classifications), it was necessary to locate appropriate data sources and the over-all span of time for which the analyses would be performed.

The chief criterion for selection of data sources was that the information would be relatively easy to extract from single references. This would assure the maximum in efficiency and reliability of data collection over time, a crucial matter since we are dealing entirely with

time series. Also, it would make possible replication and further analysis of the findings by other researchers. Lastly, it would facilitate updating for purposes of future policy and scientific analyses.

A second criterion for selection of sources was that they include material beginning as early as possible since the end of the depression era of the 1930's (i.e., after approximately 1936). The rationale was that while we wanted to maximize the time span in order to strengthen the statistical ground of the analysis, we also wanted the data to represent a period which came closest to current experience for purposes of potential application to public policy. Thus, it was felt that the post-Great Depression behavior of the national economy was historically unusual in its relatively shallow business cycle amplitudes and lack of predictable relation between unemployment and inflation rates (especially since 1940).

Tests of Validity

For each geographic region, mortality as a whole was examined for all ages and by sex. Racial differences (white and non-white) were also analyzed for the United States, and each of the three test states. In the United States as a whole, each category of pathology was examined at least by age group. The purpose of the replications of the analysis by categories of pathology, demographic group and geographic and political region was to validate our findings on the basic relationships. To the extent that consistency of findings was observed among the many replications for each of the principal economic indices, additional confidence was obtained in the validity of the findings associated with each of the indices.

Two other factors made it necessary to examine the relationships between the economic and social indices by demographic classification of the population. The relationships between the two sets of indices do indeed vary by age, sex and race. Thus, representation of the relationships by the totals of the pathological indices can be seriously biased by the influence of the relations in a minority of subgroups which have an inordinate influence on the totals (e.g., the age groups over 85 in the case of total mortality, or the group over 65 in mental hospital admissions). The second factor that would cause bias is that changes in the economic indices are often associated with changes in the demographic structure of the population. Disaggregation of the pathological indices in age-specific components was used to deal with this problem. Technically, then, disaggregation of the pathological data by demographic breakdown (age, sex, race) was used to obtain more accurate estimates of the coefficients of pathology associated with the economic indices (and subsequent translation of those coefficients into numerical estimates of pathology).

The following data, with accompanying time spans, were utilized.

Dependent Variables

<u>United States</u>	<u>Date</u>	<u>Source Key</u>
Total Mortality Rates by Age, Sex, Race	1937-1974	1, 2
Homicide Mortality Rates by Age Total	1940-1973	1, 2
Suicide Mortality Rates by Age Total	1940-1973	1, 2
Cardiovascular - Renal Disease Mortality Rates by Age Total	1940-1973	3
Cirrhosis of Liver Mortality Rates by Age Total	1940-1973	1, 2
Mental Hospital First Admissions Rates by Age, Sex	1940-1971	5, 6, 10
Total Imprisonment in State Prisons Rate	1935-1973	7, 8, 9, 10
<u>States (California, Massachusetts, New York)</u>		
Total Mortality Rates by Age, Sex, Race	1937-1970	2, 4, 10
Homicide Mortality Rates by Age Total	1937-1970	2, 4, 10
Suicide Mortality Rates by Age Total	1937-1970	2, 4, 10
Homicide Mortality Rates by Age Total	1937-1970	2, 4, 10
Cirrhosis of Liver Mortality Rates by Age Total	1937-1970	2, 4, 10
Total Imprisonment in State Prisons Rate by State & by Region	1935-1973	7, 8, 9, 10
New York State First Admissions to Mental Hospital by Age & Sex	1936-1970	10, 11
<u>Countries (England and Wales, and Sweden)</u>		
Total Mortality Rates by Age & Sex (England & Wales)	1936-1972	12, 13
Total Mortality Rates by Age & Sex (Sweden)	1940-1973	14
<u>Independent Variables</u>		
<u>United States</u>		
Gross National Product Per Capita (Real Dollars)	1930-1974	16, 9, 10
Total Unemployment Rate for Ages 16+	1930-1974	17, 9
Consumer Price Index (% Change)	1930-1974	15, 9
Food Energy	1940-1974	9
<u>States</u>		
Personal Income Per Capita (Real Dollars)	1930-1970	16, 9
Consumer Price Index for Boston, New York City & San Francisco	1930-1970	15, 9
<u>Countries</u>		
<u>England and Wales</u>		
Gross National Product Per Capita (Real Dollars)	1930-1939 1946-1972	1-21
Total Unemployment Rate	1930-1972	18, 13
Cost of Living Index (% Change)	1930-1972	18, 13
<u>Sweden</u>		
Gross Domestic Product Per Capita (Real Kroner)	1934-1973	19, 21
Total Unemployment Rate	1934-1974	19, 20
Cost of Living Index (% Change)	1934-1974	19, 20

An additional issue pertaining to the time spans was whether to include the period of the Second World War (1942-45). For the sake of maximizing the time span, it was decided to use the War years in the sample except where either: (1) the statistical significance of the economic indices (in their relations with the pathological indices) suffers substantially, or (2) bias may be involved in the magnitude and statistical significance of the economic indices or the full explanatory equation (by virtue of autocorrelation in regression residuals as indicated by the Durbin-Watson statistic). Where either of these problems occurred, the War years were subsequently omitted from the analysis.

On the basis of the time spans selected for the social indices, analogous spans were used (where possible) for national, state and foreign economic indices. Thus, for example, state-specific data on per capita income were available for the period, 1937-70, as were consumer price indices for principal cities in the states under study. However, since data on unemployment by state were unavailable until 1947, the national unemployment rates (which are highly correlated with the state rates over time) were used in the state-level analyses beginning in 1937.

For the purpose of this study, it was decided not to utilize age- and sex-specific unemployment rates (or median income) in the analysis of the pathological indices which were classified by these demographic breakdowns. The most important fact in this decision was that the correlation between fluctuations over time in the national unemployment rate and those in the age- and sex-specific rates is extremely high (in most instances in the range of $.90 \pm .07$). This means

that, over time, subgroup-specific fluctuations in unemployment rates are virtually indistinguishable from those in the national rates, although the size of the coefficients would probably differ. Equally important is that data for subgroup-specific unemployment rates did not become available until 1947, which considerably narrows the span of time available for analysis.

From the standpoint of the substantive relations between economic fluctuations and pathological indices, the use of subgroup-specific unemployment rates may actually be quite misleading. Not only is there a lack of independence among the subgroups over time in fluctuations in their unemployment rates, but there is a lack of independence among different age and sex groups in their social and economic status because they are bound together in family and other social units. Thus, the economic implications of unemployment or income loss of a breadwinner may be quite substantial for the entire family whose members are of diverse age and sex. From the standpoint of income loss, a more realistic index of psychological stress would then be a measure of deterioration in family socio-economic status (for which data are as yet unavailable).

Apart from the economic inter-dependency of people of different ages and sex is the problem of diffusion of psychological stress generated by economic trauma among different members of a family, though mediated frequently through only one member's relationship to the economy. In this case, we have a situation of "social dependency." For example, to a working wife the emotional stress of unemployment may bring about severe agitation, depression, or deterioration in physical health status. Such conditions might have serious pathological implications for her relationships with family members or with friends,

neighbors, or other associates. In this example, the husband and children might well become agitated and eventually show adverse patterns of reaction similar to the wife who initially encountered the economic trauma.

Thus, although the initial mental stress appears to have been encountered by one individual, what results is stress to the entire family or even the larger community. In situations where an entire family is undergoing stress ("initiated" by the actions of one of its members), it is often difficult to predict which of the members will actually show the most serious pathological reaction. The probability of pathological response will depend, at least in part, on the previous mental and physical condition of the individuals involved. To take this problem of diffusion one step further, it may be found that high anxiety levels are generated among workers who are themselves not unemployed, but who observe a high incidence of job loss around them, and then become fearful for their own employment and income.

The Problem of Causal Relations

The research techniques utilized in this study are essentially based on statistical correlation and regression analysis. As in all research based on correlation or regression, it is important to state the caveat that one cannot establish causation with these procedures. At most, one can test specific hypotheses which are ideally grounded on sound theoretical considerations and earlier research findings. In these tests, the hypotheses are either supported or unsupported by the statistical evidence. Even when they are supported on the basis of statistically significant relations, they are not proven since

the statistical tests only indicate whether or not the findings may result from "chance" factors at specific levels of probability.

In addition to the problem of a lack of causal certainty in our results, there is also the issue of possible spuriousness even for the relations found to be statistically significant. Regardless of stringent controls, outside influences may have unobservable effects on the relationships. The possibility remains that we have not taken all relevant factors into account, especially since the state of our knowledge in the fields involved is incomplete. Thus, it is possible that some unknown factor may be influencing both the economic trends and those of the pathological indices.

Finally, it is entirely possible that the techniques of measurement in constructing the economic or social indices under study are not without some error. To the extent that such measurement error might exist, our results can be biased.

Having stated the caution on causal interpretation, we should nevertheless point out that the statistical techniques used in this study are standard for the problems encountered, and do not necessarily involve greater error or bias than would be true in other research based on correlation or regression techniques.

Lagged Relations Between Economic and Social Indices over 0-5 Years

In all cases, it was hypothesized that increases in pathological indices would occur within five years after the onset of economic trauma (i.e., declines in per capita income or increases

in unemployment or inflation rates). These hypotheses were either confirmed or rendered false by an examination of the sum of the regression coefficients pertaining to each of the synchronous and lagged (i.e., over a period of 0-5 years) relations between each of the economic and social indices. If the sum of coefficients (over 0-5 years) for per capita income, unemployment or inflation rates showed a statistically significant relation to a pathological index, the principal hypothesis was supported.

The rationales for specification of a 0-5 year period in which to observe the pathological effects of economic trauma involve considerations of theory, previous empirical research, and measurement issues.

From a theoretical standpoint, it is reasonable to assume that for the chronic diseases, a considerable period of time may elapse before the human organism responds with physical illness to economic trauma. The problem of lag becomes even more serious since several of our measures in this study involve mortality. It can be assumed that it would require a longer lag period for mortality, rather than only serious morbidity, to respond in a measurable way to economic changes. On the other hand, it may be that much of the adverse reaction to economic trauma is precisely in terms of mortality rather than morbidity. This would be the case where a long period of chronic morbidity (say, based on lifestyle) is required before mortality could occur as a response to short-term trauma. Examples would be cirrhosis of the liver and certain categories of cardiovascular-renal disease.

Even apparently "discrete" reactions to stress, such as suicide and homicide may involve a considerable period of lag. This is because

it may require a lengthy period of mental depression, anxiety or agitation before a person is emotionally capable of taking his own life or that of another. The problem is further compounded when we consider mental hospitalization or imprisonment as a "discrete" reaction. It is necessary, first of all, for the experience of economic trauma to precipitate psychiatric reactions, criminal aggression or other specific illegal acts. This "precipitation" may occur over an extended period as the individual becomes sufficiently distressed to respond in such ways. In the second place, both of these types of institutionalization are preceded by often lengthy procedures involving several different institutions. In the case of mental hospitalization, it might involve the family, general physician, psychiatric ward of a general hospital, and admissions officer of the state mental hospital. Imprisonment, in turn, must follow the sequence of criminal act, arrest, trial and conviction.

From previous empirical research, data are available on peak reaction times of various pathological indices to fluctuations in unemployment rates. For suicide, the peak reaction time has been calculated at a one-year lag (for certain age groups, it is between 2 and 3 years, however) (4). For heart disease mortality, it is approximately 3 years (but is closer to 2 years for the population under 45 and over 75) (5), for cirrhosis approximately 2 years (6), for infant mortality between 0-2 years (depending on the cause of death) (7), for mental hospitalization 1 to 2 years (8), and for imprisonment 0-1 years (9). Given peak reactions of 1-3 years, it is reasonable to assume that the tail end of the reaction pattern may occur within an additional year or two but probably not very much longer.

A third reason for the selection of a five year maximal lag involved the measurement of the lagged reactions. Perhaps the key economic variable in this study, the unemployment rate, tends to show a pattern of fluctuation over time that is somewhat cyclic. Economic researchers have estimated that the span of the business cycle, along which unemployment rates fluctuate, is approximately 3-5 years (10). It would be technically difficult to obtain accurate measures of lagged pathological reactions beyond the span of a full "business cycle" (maximally, 5 years).

Finally, it is entirely possible that factors only indirectly related to economic trauma serve as major influences on the probability of pathological outcome. For example, unemployment of the male "family head" may result in long-term loss of income for the family, changes in the authority structure in the home, serious losses of community social status for husband, wife and children, and a lengthy pattern of decreased social contact especially where many of the social relationships were job-related. The probability of pathological reaction is further increased where loss of job or income on the part of neighbors, relatives including family members, or other associates has contributed to an atmosphere of substantial tension and anxiety. The most realistic statement of the stress of unemployment would then involve a lengthy and cumulative chain of traumatic events including disturbances to family, community and friendship patterns -- perhaps over several years.

After examining the economic indices for the presence of relations to the pathological indices within a five year period following economic trauma, an effort was made to narrow the estimated lag period to a more precise

estimate within the period. This narrowing procedure was accomplished by examining for statistical significance the coefficients of the three economic indices associated with each of the individual (0-5) years of possible relationship to the pathological indices. This procedure appeared to be effective in only two important cases. First, in the relation of economic changes to cardiovascular-renal disease mortality, it was found that during the first and last (i.e., 0, 5) years the relations were not statistically significant, while for the middle years (i.e., 1-4) significance was observed. The lag structure reported for cardiovascular-renal disease was therefore 1-4 years. Second, in the case of imprisonment rates, the lag structure was narrowed to include only the first three (i.e., 0-2) years, since usually only for these years were statistically significant relations with the economic indices found.

Having initially ascertained the significance of the statistical relations within a five year period after economic trauma, the question was raised as to the form of the distribution of the pathological reactions over the period. A relatively simple hypothesis was entertained that within the six years (one synchronous and five lagged years — i.e., altogether 0-5 years), the distribution over time of economic trauma would be wave-like rather than linear. In the wave-like structure (represented mathematically by a second degree polynomial) of distributed lag relationships, the pathological reactions to economic trauma would build up over time, come to a high point and ultimately decline.

The ability to ascertain more precisely the shape of the lagged relations increases the confidence one has in the validity of the relations. This added confidence would depend on

evidence of greater "degrees of freedom" in a statistical sense, and decreased standard error associated with the sums of the lagged coefficients for each of the economic indices and for the entire equation (11).

It was in fact found that this "distributed lag" procedure was appropriate as judged by the enhanced statistical significance of the effects of each of the economic indices, as well as their combined effects. The distributed lag procedure (with a second degree polynomial as the main hypothesis) was then used throughout the study except for the two instances in which the lag structure was ascertained to include significantly fewer than six years (i.e., cardiovascular-renal disease mortality and imprisonment rates). In those two instances, the ordinary linear estimation procedure (i.e., "ordinary least squares") was retained.

Inclusion of Non-Economic Factors

As indicated above, the initial relationships were determined through procedures which tested the statistical significance of the individual and combined associations of the three economic indices to the indices of "social cost." In a second stage of the research, the decision was made to include other factors than those represented by the three economic indices. These non-economic factors are also thought to influence trends in specific pathologies. For example, high levels of food energy consumption, especially of substances which include substantial animal fats or sugars, may be associated with trends in cardiovascular mortality. Also, it is thought that trends in criminal aggression, and

illegal behavior in general, are influenced by trends in the proportion of the male population that is roughly 15-29 years of age.

It is important to evaluate such additional factors in the equations used to account statistically for trend movements in the pathological indices, even though they are not of primary concern to this study. The addition of such factors in the equations allows us some control over their influence. In order to gauge the significance of the primary (economic) variables, we must permit the added variables to explain some of the trend variance in the pathological indices. To the extent that the additional variables are significant in the relationship, they may serve to diminish or enhance the significance of the primary explanatory variables. Through this procedure our understanding of the activity of the primary variables in relation to pathological trends is increased. This approach was found to be useful in the three cases for which the additional sources of explanation of pathological trends could easily be identified and measured, namely, cardiovascular disease mortality, homicide, and imprisonment.

A third stage of the research was devoted to a closer examination of the long-term trends in the pathological indices. The initial set of hypotheses specified that these indices would bear either a direct or indirect relation to the long-term trends in economic growth as measured by per capita income. This third stage of analysis was introduced largely because several of the observed relationships between the trends in per capita income and those in the pathological indices were subject to alternative interpretation. This problem arose where the relationships between long-term trends in economic

growth and those in societal pathology were understood to be indirect. In the cases of suicide and homicide, for instance, where long term trends appear to coincide with economic growth since the early 1960's, there are a number of plausible interpretations. These include a (1) relative decline in the quality of life for the inner city residents in the face of economic growth, (2) relative decline or lack of relative increase in the standard of living of certain minority groups and (3) the deterioration of family integration as a possible result of higher levels of geographic and social mobility indirectly related to economic growth. Among several others, these types of interpretation also seemed relevant to the positive relationship observed between per capita income and imprisonment since at least the pre-War era.

The case of mental hospitalization also illustrates this problem. It was hypothesized that the long-term increase in mental hospitalization would be due to (1) increased supply of mental health manpower and facilities under conditions of economic growth where the society is willing and financially able to commit increasingly greater resources to mental health care and (2) greater availability of care, and greater public acceptance of it.

In the case of cardiovascular-renal disease mortality, the problem was somewhat different. There may be potentially unsalutary effects of economic growth which result in increased risks of cardiovascular disease. These included tendencies to food consumption beyond what is required in relation to physical activity, especially consumption of foods high in cholesterol and refined sugars. In tests performed during the second stage of this research, both per capita income and high food energy consumption

were found to influence significantly the trends in cardiovascular-renal disease mortality rates. As hypothesized, per capita income itself showed an inverse (i.e., beneficial) relation to the mortality rates, while food energy consumption showed a positive relation. However, these relationships were subject to alternative explanations, and we cannot be certain at this point what the critical factors are.

In addition to the difficulty of choosing among alternative interpretations of these indirect relationships, a problem is created by the policy-oriented nature of this specific research. This orientation toward policy applications carries with it the assumption that the indirect relationships will be maintained at least into the short- to medium-range future (say, 3-5 years). It is not at all clear, however, that the relationships between economic growth and the intervening factors we assume to be more directly related to our indices of pathology will remain stable. It is indeed possible that some of the intervening factors may either disappear or increase in impact.

In order to minimize these problems, efforts were made to substitute mathematically fitted time trends for per capita income in the explanatory equations. It should be emphasized, however, that a successful substitution of a mathematically fitted time trend for per capita income does not rule out the possibility that the latter plays an important role. It may very well be the case that economic growth does initiate a series of social changes which are associated with the pathological indices. The substitution permits a control for the long-term trend to be present in the explanatory equations without

committing us to a particular interpretation of the trend effect. Most importantly, it continues to allow us to measure the relations between the pathological indices (12) and unemployment and inflation rates, with a control for the long-term trends in the pathological indices.

In the effort to substitute the time trends for per capita income, experiments were made with four mathematical factors: (a) a linear function of time (T), (b) a logarithmic function of time ($\log T$), (c) combined linear and logarithmic functions of time (T and $\log T$), and (d) a squared function of time (T^2). These are among the simplest of mathematically fitted time trends and consequently required no assumptions as to factors that might influence the shape of trends in the pathology indices. The decision was made to utilize more complex time trends, only if these simpler mathematical forms were inadequate. However, it was found that successful trend substitution for per capita income could be accomplished with the simpler forms for all of the pathological indices requiring it (cardiovascular-renal disease mortality, suicide, homicide, imprisonment, and mental hospitalization).

Two additional criteria were used in selecting the most appropriate mathematical forms to fit the longer trends. Most important was that the form replacing per capita income should ideally behave like the economic growth measure, so that the relations between the pathological indices and explanatory variables in the equation (especially the unemployment and inflation rates) are minimally altered in statistical significance. The second criterion was that the overall explanatory equations should suffer minimally by

the substitution, both in statistical significance and biases resulting from autocorrelation of regression residuals.

Summary

Uniform statistical procedures were used in the analysis of all relationships between economic and social indices, and the linkages between each of the measures of social cost are quite similar. The initial hypotheses indicate that the combined effects of trends in per capita income and those in unemployment and inflation rates are important in the incidence of a great many types of societal pathology in the areas of physical health, mental health, and criminal aggression.

The hypotheses included specification of the time lag through which economic variables might affect social indices. Tests were performed to ascertain the accuracy of the specific lag structure assumed, including the effects of each of the three economic factors as well as their combined effect. Secondly, it was necessary to identify and examine statistically other, noneconomic, factors which could influence the trends in the individual pathological indices. The need for delineating the statistical effects of these additional factors is based on the problem of overestimating or underestimating the effects of the critical economic variables on the social indices.

The objective was to determine the impact of each of the three major economic variables (as well as other control factors) on the

estimates of social pathology. Once the basic relationships were obtained, the consistency of the findings was examined by replicating the tests of relationship for different age, sex, and racial groups in the United States as a whole, and for three states (California, Massachusetts, and New York), and for two additional countries (England and Wales, and Sweden). Findings of consistency in these replications are the main source of evidence of the validity of our estimates of the relationships.

IV. THE RESEARCH FINDINGS

Total Mortality, by Age, Sex, and Race

It was hypothesized that (a) the long-term downward trends in mortality would be largely accounted for by a measure of economic growth, in this case per capita personal income; (b) "cyclical" changes in mortality would be influenced by fluctuations in the rate of unemployment, and (c) additional variation in mortality would be partly related to the rate of inflation.

For the United States as a whole, it was found for each age, sex, and racial subgroup that the patterns of mortality conform to the overall hypotheses. In nearly all instances, significant relations were observed between each of the three economic indicators and total mortality rates, within a lag period of five years. These findings were obtained for the years, 1940-74. (Equations 1-6, in Table 1 provide examples).

In a replication of these findings for the states of New York, Massachusetts, and California, nearly identical findings were observed (Appendix, Tables 30-43, 44-57). In addition, the relationships for total mortality were replicated by age and sex for England and Wales, and Sweden, with results generally similar to those found for the United States. For each of the age groups, the principal variables appear to be significantly associated with the mortality rates.

In addition, the inclusion of the War years of 1942-45, does not make a statistically significant difference for any of the variables included in the explanation of trends in mortality. The only observable difference is that inclusion

of the War period does appear to increase slightly the size of the coefficient associated with unemployment.

Cardiovascular-Renal Mortality Rates

The relationships between the three economic indices and cardiovascular-renal mortality rates were examined for the years, 1940-1973, for the United States as a whole. In addition to the three economic indices, a measure of overall food consumption (food energy in calories) was included, since evidence exists that being overweight and the ingestion of foods high in cholesterol are risk factors in cardiovascular illness.

Since it was felt that the short- to medium-term effects of economic change on the major group of chronic diseases included in cardiovascular mortality might require a considerable period of lag before mortality would begin to appear, the structure of the lag relationship between cardiovascular mortality and unemployment and inflation was carefully examined. It was found that while the overall hypothesis of increased mortality occurring within a five-year period subsequent to economic downturns is supported by the data, the increase in cardiovascular mortality does not appear to begin until the first year following economic downturns. Moreover, the lag of cardiovascular mortality subsequent to economic downturns appears to end during the fourth year following these downturns. Thus, the complete short- to medium-term relationship between economic changes and cardiovascular disease appears to range between 1 and 4 years following economic downturns (Table 1, Equations 7-9 and Appendix, Tables 15, 17).

It is notable that in the equation for total cardiovascular disease mortality, inflation does not appear to play a statistically significant role. On the other hand, there are a number of middle-age groups in which the relationship between cardiovascular mortality and inflation does attain statistical significance (Appendix, Table 16).

Using our basic predictive equation for cardiovascular mortality, and considering also, food energy consumption, we find that since the Second World War the critical variables tend to be highly significant. However, if we include the War years and examine the relationships over the entire period, 1940-73, we find that the levels of statistical significance of the principal variables are reduced (Appendix, Table 15).

The causal mechanisms underlying the two predictors of longer term trends -- namely, per capita income and food energy consumption -- are not as yet entirely clear from a clinical standpoint. Since these two long-term predictors for cardiovascular disease may appear as relatively smooth trends themselves, a decision was made to simply substitute two indices of time trend (a linear and a logarithmic function of time) to ascertain whether the simpler time trend variables were equally predictive of cardiovascular mortality. If so, then the time trends could be successfully substituted in the predictive equations without requiring further assumptions as to the mechanisms whereby per capita income and food energy consumption might affect the long-term trends in cardiovascular mortality.

The equation utilizing a linear and a logarithmic function of time and including the unemployment and inflation rates was tested. It was found that with the use of this simpler

equation, the unemployment rate showed a significant relationship to cardiovascular mortality for the period, 1940-73. (Table 1, Equations 8, 9). Furthermore, the great majority of age groups showed a significant relationship for the unemployment rate, as did a small number of the middle-age groups for the inflation rate (Appendix, Table 16).

Cirrhosis of the Liver Mortality Rates

We hypothesized that increased cirrhosis mortality would be related to both increased affluence and increased unemployment and inflation over the short- and medium-term. Increased affluence exposes the population to the use of alcohol as a reliever of symptoms of anxiety and depression. Under conditions of stress, such as those brought about by unemployment and inflation, the incidence of alcohol abuse would increase.

This model was supported in our current analysis (Table 1, Equation 10), but was statistically significant largely for the population over age 45. This observation is important because it leads to the conclusion that short- to medium-term stresses, acting to increase cirrhosis mortality, probably tends to operate only among a minority of individuals. This small subset of the population probably incurred liver damage over a period of two decades or more.

Very similar relationships, by age, were found for the states of New York, Massachusetts, and California. These findings remained significant where state-specific indices for per capita income and inflation were used (Appendix, Tables 76-8).

Suicide Rates

For suicide, we hypothesized that declines in per capita income and increases in unemployment and inflation should be related to higher rates of suicide. This model turned out to be correct for the variables of unemployment and inflation but not for per capita income.

It appears that since the mid-1960's, there have been increases in the rate of suicide coincident with increases in per capita income, holding constant the positive and significant relationships between the suicide rate and unemployment and inflation rates. This upward trend in the suicide rate, related to national increases in per capita income and operating contrary to our overall hypothesis, was most pronounced for the age groups under 35 (Appendix, Table 13). Replication of these suicide relationships on the state level, (New York, Massachusetts, and California) gave results nearly identical to the national level findings (Appendix, Tables 67, 70, 73).

While we cannot offer a complete explanation of the recent positive association between increases in per capita income and the suicide rate, there are important intellectual traditions within the social sciences through which an interpretation might be found. The long-term detrimental effects of economic growth have been associated with both (a) a decline in the importance of family and primary relationships, and (b) recent acceleration in the relative deterioration of urban centers.

Accurate interpretation of the long-term trends, however, is neither simple nor crucial to an understanding of the relationship between unemployment or inflation and suicide rates.

An attempt was therefore made to substitute a simpler estimate of time trend for per capita income as a predictor of the long-term trend in suicide rates. An effective substitution of the simpler time trend for per capita income would allow the inclusion of a trend estimate for suicide without assumptions as to the causal mechanism between that estimate and trends in the suicide rate. The trend successfully used was Log of Time. The resulting relationships between economic changes and suicide showed statistical significance for the unemployment and inflation rates throughout the age spectrum for the entire time period (Appendix, Table 14).

Homicide Rates

The overall hypothesis, relating homicide rates to the three independent economic variables, was identical to that for suicide. Moreover, the results were very similar. Unemployment and inflation were both significantly associated with increased homicide mortality. However, contrary to the overall hypothesis, there was a significant positive association between per capita income and homicide mortality (Appendix, Table 7).

A closer examination of this relationship led to the observation that it held only for the years since approximately 1964. Between 1940 and 1964, either insignificant or inverse relationships between per capita income and homicide mortality were obtained (Appendix, Tables 11, 12). Our interpretation of the positive relationship between homicide and per capita income is similar to that for suicide at least since 1964. As in the case of suicide, replication of the national level findings for the three states resulted in very similar findings.

Two major issues may be raised concerning per capita income. On the one hand, the interpretation of the relationship is not entirely clear; and on the other, there has long been speculation that other demographic and social variables might be important in explaining the long-term trends in homicide. Of particular interest has been the hypothesis that changes in the size and proportion of the youthful male population might well be important predictors of the secular trends in homicide, since this population is at greatest risk of committing homicide. For these reasons, both time trend and demographic variables were substituted for per capita income in our equations to test the viability of alternate models of the long-term trend, but including as well the unemployment and inflation factors. It was found that substituting a linear time trend for 1967-73, and a measure of the trend in the proportion of males, aged 15-29, provided superior models to the ones in which per capita income alone was used.

It is also evident (Table 1, Equation 15) that including the War years in the data does not damage the relationship between the economic indices and the homicide rate. On the contrary, the inclusion of those years raises both the size and statistical significance of the coefficients pertaining to unemployment (although the coefficient for inflation remains essentially unaffected). This procedure of substituting time trend and demographic factors for per capita income was tested further through a control for the trend in the youthful male population by dividing the age-specific homicide rate by the proportion of the male population aged 15-29. An appropriate substitution for the per capita income trend with the linear time trend for 1967-73 was also achieved (Table 1, Equation 16).

Imprisonment Rates

State imprisonment rates for the United States as a whole and for each of nine geographic regions were examined for the years, 1935-73, excluding the War period. (1942-45 was excluded because it was felt that the enlistment and draft of a large number of males of an average age similar to that of the imprisoned population might bias the results in favor of the unemployment hypothesis, since unemployment was unusually low during this period.)

Although rates of imprisonment are among the most reliable types of criminal justice system statistics, there was evidently a decline in the level of reporting during the period 1966-70. In 1971, the Law Enforcement Assistance Administration took over the management of these national censuses and the data appear to resume their earlier level of completeness (with minor changes in the definition of certain categories of population transfer) (1). Therefore, in analyzing the data over the full period for which they are available (1935-73), it was necessary to adjust the equation for the years, 1966-71. The usual three economic variables (per capita income, unemployment and inflation rates) were also inserted in the first set of equations, with the result that only the inflation rate did not appear to contribute in a statistically significant way to the relationship (Appendix, Tables 21, 23).

However, as in the cases of homicide and suicide, there is also a problem in the interpretation of the positive relationship between the long-term trend of per capita income and that of imprisonment. As a result, in the second set of equations we have substituted for the per capita income variable a fitted set of time trends (linear and logarithmic functions of time), as well

as the proportion of males aged 15-29. In these alternate equations, which also included the unemployment and inflation rates, it can be seen that once again the trend indicators (including the time trends and the youthful male population) and the unemployment rate show significant relationships to the imprisonment rate. The same equations were run for state imprisonment for each of the nine geographic regions of the United States, and in general, the findings were quite similar to those on the national level (Appendix, Tables 21, 23).

In a further effort to assure validity in the estimate of the relationship found for imprisonment, given the possible deficiencies of data collection during the period 1966-70, the equations in which time trends were substituted for per capita income were also run for the years 1935-65. (The proportion of the youthful male population was not included in this equation because its effects would theoretically not be felt until later in the 1960's and early 1970's.) As in the case of the analogous equations which covered the period ending in 1973, the unemployment rate showed a statistically significant relationship to the imprisonment rate. However, the inflation rate did show statistical significance in this case (Table 1, Equation 18). Similar findings apply to each of the geographic regions for the period ending in 1965 (Appendix, Table 20).

Mental Hospital Admission Rates

The hypotheses put forward linking unemployment and inflation rates to mental hospital admission rates were similar to those which pertained to all of the pathological indices. Thus, these two indices of economic distress would be followed by increases, over time, in mental

hospital admission rates. In the case of the long-term trend in mental hospital admission rates, it was expected that these trends would be similar to those for utilization of medical care services for the United States. These trends tend to reflect increased affluence of the population and increasingly larger investments in health care sciences and technology. In addition, the assumed long-term increases in public acceptance of psychiatric and other mental health care has probably acted to increase further the use of the mental hospital system.

The above hypothetical model specifying significant increases related to per capita income, the unemployment rate, and inflation rates, was found to apply both to the United States (Table 1, Equation 19), and on the state level for New York (the only state for which these data were readily available --- Appendix, Tables 81, 86). There was one exception to the positive association with the three economic indices. This was the case of the elderly in which, both for the United States and for New York State, inverse relationships appeared. We are not, at this point, able to offer a satisfactory interpretation of these findings. Until more is known about the extent to which the elderly are institutionalized in nursing homes and other long-term care facilities apart from mental hospitals, it will probably not be possible to offer a satisfactory interpretation. However, the model operates reasonably well in accounting for trends of admission to mental hospitals for the age groups under 65, and particularly for males.

Finally, in order to have some assurance that the interpretation of the influence of the trends in per capita income on mental hospitalization need not be crucial to the relationships between unemployment and inflation on mental

hospitalization, a time trend (Time squared) was substituted for the long-term trend in per capita income. In these equations, which include the time trend and unemployment and inflation rates, all relationships were positive and significant (Appendix, Tables 26, 29). Similar findings were obtained for New York State both for per capita income, and where a function of time was used to represent the long-term trend (Appendix, Tables 83, 88).

TABLE 1
 MULTIPLE REGRESSION OF NATIONAL ECONOMIC INDICES ON SELECTED MORTALITY RATES, UNITED STATES
 [t—Statistics in parentheses]

Dependent variable	Years	Intercept	Time trend	Log time trends	Per capita income	Unemployment rate	Inflation rate	R ²	F	D.W.
GENERAL MORTALITY RATE ¹ (Lag 0-5) ³										
(1) Mortality rate, total whites.....	1940-74	96.2			-0.53E-2 *(1.92)	0.62 *(5.05)	0.87 *(2.96)	0.89	*21.9	1.93
(2) Mortality rate, total nonwhites.....	1940-74	136.4			-.32E-1 *(6.55)	1.68 *(6.95)	2.83 *(5.16)	.96	*74.1	1.67
(3) Mortality rate, LT 1 whites.....	1940-74	497.7			-.24 *(7.06)	12.65 *(8.01)	3.59 *(5.44)	.97	*98.6	2.11
(4) Mortality rate, LT 1 nonwhites.....	1940-74	936.2			-.43 *(10.48)	17.74 *(10.69)	30.77 *(6.49)	.99	*199.6	2.40
(5) Mortality rate, 75-84 whites.....	1940-74	1,141.0			-.22 *(7.59)	10.39 *(7.02)	17.56 *(5.20)	.97	*103.8	2.47
(6) Mortality rate, 75-84 nonwhites.....	1940-74	767.1			-.93E-1 *(2.07)	15.45 *(6.96)	14.80 *(2.91)	.84	*14.8	2.36
(7) Cardiovascular disease mortality rate ² (Lag 1-4) ⁴	1945-73	537.7			-.33E-1 *(2.49)	5.46 *(2.62)	-.04 (.37)	.85	*11.8	2.89
(8) Cardiovascular disease mortality rate ² (Lag 1-4) ⁴	1940-73	-2,836.8	-17.8 *(4.70)	1,077.0 *(4.76)		2.35 *(1.83)	1.04 (.78)	.74	*6.50	2.36
(9) Cardiovascular disease mortality rate ² (Lag 1-4) ⁴	1945-73	-843.8	-7.5 †(1.43)	436.3 †(1.35)		6.15 *(3.17)	-1.10 (.74)	.79	*6.70	2.02
(10) Cirrhosis mortality rate ² (Lag 0-5) ³	1940-73	-.2			.65E-2 *(8.99)	.14 *(4.21)	.16E-3 (.01)	.98	*114.4	1.65
(11) Cirrhosis mortality rate ² (Lag 0-5) ³	1945-73	-.2			.63E-2 *(8.81)	.12 *(3.62)	.29E-1 (.37)	.98	*114.4	1.82

MULTIPLE REGRESSION OF NATIONAL ECONOMIC INDICES ON SELECTED PATHOLOGICAL INDICES, UNITED STATES

	Years	Intercept	Time trend	Log time trends	Dummy constant or trend	Other trends	Per capita income	Unemployment rate	Inflation rate	R ²	F	D.W.
(12) Suicide rate ¹ (Lag 0-5) ³	1940-73	6.34	-----	-----	-----	-----	.90E-3 †(1.50)	.42 *(14.23)	.27 *(4.23)	.91	*26.2	1.80
(13) Suicide rate ¹ (Lag 0-5) ³	1945-73	6.38	-----	-----	-----	-----	.11E-2 *(2.17)	.40 *(17.30)	.25 *(4.70)	.95	*40.9	2.35
(14) Suicide rate ¹ (Lag 0-5) ³	1940-73	-.62	-----	2.08 *(3.63)	-----	-----	-----	.43 *(12.51)	.31 *(6.68)	.87	*25.3	2.03
(15) Homicide rate ¹ (Lag 0-5) ³	1940-73	-7.60	-----	-----	^δ DT 1967-74 .14E-1 *(3.90)	^γ TJ .30 *(3.16)	.16E-2 †(1.56)	.10 *(2.38)	.11 (.92)	.99	*115.6	2.29
(16) Homicide rate ¹ TJ ^γ (Lag 0-5) ³	1940-73	1.02	-----	-----	^δ DT 1967-74 .18 *(3.79)	-----	-----	.54 *(5.00)	.84 *(5.30)	.94	*47.0	1.88
(17) Imprisonment rate ¹ (minus 1942-45) (Lag 0-2) ⁴	1935-65	-577.90	-3.18 *(3.14)	195.5 *(3.48)	-----	-----	-----	1.59 *(5.92)	.64 *(3.35)	.76	*10.4	1.87
(18) Imprisonment rate ¹ (minus 1942-45) (Lag 0-2) ⁴	1935-73	-594.50	-2.55 *(2.38)	180.9 *(2.93)	^δ DC 1967-71 -8.36 *(8.33)	^γ TJ 1.31 *(4.27)	-----	1.52 *(5.60)	.57 *(3.07)	.90	*23.9	1.90
(19) Mental hospital admission rate LT 65 ¹ (minus 1942-45) (Lag 0-5) ³	1940-71	-77.70	-----	-----	-----	-----	.55E-1 *(9.78)	3.39 *(9.58)	1.78 *(2.58)	.96	*60.0	1.52
(20) Mental hospital admission rate LT 65 ¹ (Lag 0-5) ³	1940-71	-70.00	-----	-----	-----	-----	.49E-1 (8.69)	3.11 *(8.92)	2.19 *(3.21)	.97	*63.4	1.85

¹ Per 10,000 population.
² Per 100,000 population.
³ 2d degree, polynomial distributed lag equation.
⁴ Ordinary least squares equation.
⁵ Dummy trend.
⁶ Dummy constant.
⁷ TJ: Percent of total male population who are ages 15-29.
 1-tailed tests:

†significant at 90 percent level of confidence; t=31.1; F=1.89.
 *significant at 95 percent or greater levels of confidence, i.e.: at 95 percent level of confidence, t=1.71; F=2.28; at 99 percent level of confidence, t=2.49; F=3.31; at 99.9 percent level of confidence, t=3.45; F=4.71.

Statistical note to table 1:

This table consists of predictive equations in which the various pathological indices are the dependent variables and the 3 basic economic factors (real per capita income and the unemployment and inflation rates) and various linear or nonlinear time trends are the independent variables.

The numbers in parenthesis below the coefficients are the "t" values from which the levels of statistical significance for the relationships for each independent variables can be derived at specified levels of confidence (see notes at left).

The R² statistics technically indicate the proportion of variance in the trends and fluctuations in the dependent variables that are statistically accounted for by the entire set of independent variables in each equation. (The relatively high values for these R²'s are not unusual in time series analysis especially where, as in this study, major trends account for much of the variance over time in the dependent variables.) The "F" values are used to estimate the statistical significance of the entire equations at specified levels of confidence.

The D.W. (i.e., Durbin-Watson) statistics indicate the extent of autocorrelation among regression residuals. Freedom from such residual autocorrelation, indicated for these data by values between approximately 1.7 and 2.3, suggest relatively high confidence in the validity of statistical inferences.

V. POSSIBLE APPLICATIONS TO ECONOMIC POLICY

Economic policy has been based on the assumed "inherent" benefits of economic growth or deleterious effects of unemployment and inflation. In this study, we have dealt with additional indices of social pathology that are of particular significance to issues of policy. Without such additional indices it becomes very difficult to comprehend -- let alone, measure -- the social impact of economic policy decisions. In fact, there have been no concrete guidelines for estimating the social costs or benefits of economic policy, apart, perhaps, from journalistic reports or partisan political viewpoint.

Problems in the Estimation of Social Costs

In the present chapter, we attempt to provide estimates of the social costs of unemployment for both the recent past and for the near future (based on projections). First, however, it is necessary to delineate several of the problems due to the preliminary nature of our calculations. These factors include: (1) the comparatively small number of pathological indices that are used to represent "social costs," (2) the fact that the pathological indices measure extremely severe reactions rather than more typical effects, and (3) the fact that our calculation of the lagged effects of economic distress is probably biased downward. These elements all point to the fact that in this report we have just scratched the surface in estimating the social costs of national economic distress.

The prime factor which emphasizes the preliminary nature of the estimates given in this report is the relatively small number of

pathological indices examined. Therefore, the estimates presented here should be taken as only indicative of the far greater depth of pathological reactions that are manifested in the population than is implied by the relatively small number of indices utilized in this report. While our present level of knowledge prevents accurate measurement of the full amount of social pathology created by economic trauma, we can assume that it is a number which probably exceeds the estimates given in this report.

Our second major problem in estimating overall social costs is in the use of extraordinarily severe measures of pathology. These extreme indices can theoretically be extrapolated to the larger conception of mental ill-health, physical ill-health, and aggression. If we wish to estimate the total "human cost" or the monetary cost of the impact of national economic distress in light of these broader conceptual issues, then we must take into account two additional levels of analysis.

In the case of mental ill-health, we must extrapolate from mental hospitalization to other forms of general mental health care, and finally, to the general mental health of the population including those who do not receive care. In the case of physical health, we must extrapolate from mortality to hospitalization and the use of primary and secondary health care, and finally, to the general status of the population's health, without respect to whether or not medical care is utilized. In the case of aggression, we begin with the extreme indicator of imprisonment, and extrapolate to entrance into the criminal justice system (from arrest through conviction); from there we must infer the behavior of criminal aggressors (including those who are not arrested), and finally, extrapolate to the status of

the population with respect to the variety of different types of serious aggressive behavior.

The social costs may be assessed through the aggregation of the various types of human reactions mentioned above. The monetary costs, on the other hand, could be calculated on the basis of (1) the cost of using institutional facilities (prisons, mental hospitals, hospitals, medical care generally; and other health, mental health, or criminal justice manpower actions), (2) the cost to the families of the individuals who are ill, or have died, or have experienced criminal injury, and (3) the costs to the economy as a whole owing to loss of productive work on the part of people who have been debilitated, or otherwise injured, or died as a result of national economic distress.

Finally, our measures of stressful reactions to economic trauma extend over a period of only five years. This is especially problematic in the calculation of stress effects on chronic diseases (and life expectancy in general), where the significant trauma may have occurred during the five-year period, but did not result in mortality within five years. The mortality due to economic stress may well occur within 7-10 years. This is reasonable, for example, where a heart attack (myocardial infarction) or other severe source of cardiovascular morbidity occurs long after that period. We expect that a very substantial proportion of the reduction in life expectancy due to economic distress at the national level occurs in exactly this way.

The problem is most serious where we are attempting to associate chronic disease mortality with national unemployment rates as they fluctuate "cyclically." It is likely that the mortality that would result after the initial five-year

distributed lag period would be attributed, not to the unemployment, but rather to either of the two trend-oriented variables (per capita income or inflation).

Some Tentative Estimates of the Implications of Economic Indices for Social Costs

To the extent that the effects of economic policy can be measured, these effects would ordinarily be seen in levels of, or rates of change in, such indices as unemployment, per capita income, and inflation. One method of assessing the potential impact of future economic policies on societal welfare would be to offer a tentative forecast of the level of societal pathology that would be related to a set of values of a specific economic indicator. Such a forecast would be based on the historical record of the relationship between the economic and social indices.

For example, in making a decision about the relative social costs of unemployment rates at different levels, one might project the associated values of mortality rates (for specific causes) that would be associated with different values for unemployment rates. Thus, part of the resolution to the question of whether, for example, a 5 percent rate of unemployment is "tolerable" would depend on the associated rate of mortality.

In examining the efficacy of alternative economic policies, data such as those presented in this report may be useful for estimating their differential social impact. For instance, if one is considering policies related to unemployment which might take effect within two years, one could look to the hypothetical level of unemployment after two years and ascertain the associated

social costs. Theoretically, policy could be adjusted according to the level at which the unemployment rate would be more nearly acceptable, given its associated level of social cost.

In the examples given below, we provide estimates of the impact of unemployment on measures of societal pathology as they would have applied to specific times in the past. In this procedure, the full equations containing coefficients of the relations between the three economic indices and the various pathological indices were utilized. In the first set of estimates, the incidence of societal pathologies associated with the unemployment rate are calculated on the population base for 1970. The coefficients of the unemployment rate were multiplied by the population (age- and/or sex- and race-specific) for 1970, and divided by (usually) 100,000 (since the pathological indices are expressed in rate form, generally per 100,000). We thereby obtain an estimate of the increased incidence of pathology associated with a hypothetical one percent increase of unemployment that had persisted over the previous 5 years.

For example, if unemployment were to increase by 1 percent in 1965 and sustain that increase through 1970, we could estimate the increased mortality in 1970 due to unemployment -- including all of the lagged effects from preceding years. Similarly, if we assumed that the 1 percent increase were to be sustained over the next 5 years, we could estimate the 1970 and subsequent total effects on mortality in 1975.

For each of the indices of pathology an aggregate incidence was obtained based on the sum of the age-specific incidences (Table 2, Col. 2). The age-specific sum was used rather than the

incidence derived from a single equation (representing the total crude pathology measure). This is based partly on the differences in reaction patterns among age-/sex-subgroups to economic trauma and on the need to control for the effects of national economic changes on the population structure.

It should be emphasized that any inferences as to the future impact of the unemployment rate and the associated values for the social indices are built on the assumption of continuity in historical relationships. Two types of relationships are in fact subsumed -- one among several economic indices (including the unemployment rate) and the other between each of the economic indices and each of several social indices. The relationships themselves are based on empirical research using data covering specific historical periods. In making inferences to the future of any of these relationships, one must assume that the structure and stability of the relationships will continue as they were during the period over which they were tested. Thus, the inferences are constrained by the danger of not taking into account significant political and social changes which may interfere with the strength or stability of the basic relationships.

An attempt was made to ascertain whether the estimates of pathology associated with increased rates of unemployment could be applied with confidence to specific time points early in the time span (1940-59) as against those occurring later within that span (1960-74). This test for continuity of the relationships over the full time span 1940-74, could not rely on the full explanatory models. These models require at least nine independent variables (i.e., three economic variables each with six years of lag in a second degree polynomial structure for each economic

variable) and possibly additional trends, "dummy" trends, or "dummy" constants. If therefore, we attempted to test even the nine-variable model over, say, the period 1960-74, it would not be possible to achieve statistical significance for the explanatory variables with only fifteen years of data.

It was therefore decided to test the stability of the relationships based on the unemployment rates without using the full explanatory model. This must be done at the risk of substantial distortion of those relationships due to lack of control for at least the other two central variables in the model, per capita income and inflation.

Tests of stability of the unemployment coefficients were performed in relation to total mortality because that pathological index did not appear to require factors other than the three economic factors for statistically significant predictions. Another important reason for the use of total mortality in tests of stability of the unemployment relationships was that at least the main trend variable, per capita income, does not in general change direction in relation to age-specific mortality between 1940-59 and 1960-74 (Table 93). This was felt to be a crucial matter for the test since, if the main trend variable in the explanatory model were to behave entirely differently in the second period, then it could not be argued that we were controlling for the same set of phenomena in each of the two periods.

The age groups, 15-24 and 25-34, were thus not used in the test for the stability of the unemployment relationships because it was felt that the unemployment coefficients were not comparable between the two periods. Omission of

these age groups from the comparison was based on the findings that the main trend variable which would have been required for purposes of statistical control (per capita income) had dramatically changed in its relation to mortality for these two age groups. Thus, while for 1940-59 the relationship is inverse (as had been hypothesized), for 1960-74 it becomes positive (Table 93).

It is noteworthy that the positive relationship between per capita income and mortality of 15-34 year olds since 1960 is consistent with similar findings, (discussed several times in this report) of positive relations of per capita income to suicide, homicide and imprisonment -- phenomena which are particularly related to the experience of the 15-34 age group. Since this inversion of sign for the per capita income relationships to age-specific mortality occurs only for the age groups 15-34, the remainder of the age groups were used in the comparison.

However, while the relations of the mortality rate to per capita income are inverse for the two periods for the age groups under 15 and over 35, change does occur in all cases. There are dramatic declines in the coefficients relating per capita income to mortality. These findings are consistent with those obtained with cross-sectional data compared at different points in time both interstate (in the United States) and among both industrialized and developing countries (1, 2).

A different picture emerges when one compares the coefficients for unemployment rates in relation to mortality over the two periods. Except for the age groups 5-14 and 35-44 (and 15-34 in which the coefficients are not comparable over the two periods), there are dramatic increases in the coefficients associated

with unemployment rates. Thus, while in general the strength of the relationships between per capita income and mortality rates have been declining, that for the unemployment rate appears to have increased at least for the age groups under 5 and over 45 (Tables 94, 95).

The importance of these findings is that even in the statistical analysis of trends in mortality rates, where the requirement for control of extraneous trends is not as great as with other pathologies, we still find variation over time in relation to the central independent variables. Some of this variation may be more apparent than real because it has been observed under conditions where other variables in the explanatory model have not been controlled. Nevertheless, it is possible that several of the relationships between the unemployment rate and the mortality rate have become stronger since 1960. This would suggest that the estimates of the numbers of persons who are affected by changes in the unemployment rate (at least in terms of mortality) based on the relationship given for the first period 1940-74, may be somewhat understated.

In any case, these findings of variability in the basic relations as well as the influence of new trends affecting cardiovascular disease mortality, suicide, homicide, and imprisonment should underline the fact that great caution is needed in projecting the estimates of pathology based on these relationships to the future. In making projections of such estimates to the future one must assume replicability of the essential conditions over which the relations have been estimated retrospectively. That there is substantial variability in these conditions over time is evident from this study.

Nevertheless, it would seem that inferences as to future situations are basically worthwhile. In the absence of more accurate indications of how economic trauma might inflict indirect social costs, they do provide at least one indication of the social costs and benefits of alternative economic policies.

TABLE 2

ESTIMATES OF THE TOTAL EFFECTS OF 1 PERCENT CHANGES IN UNEMPLOYMENT RATES SUSTAINED OVER A SIX YEAR PERIOD ON THE INCIDENCE OF SOCIAL TRAUMA (BASED ON THE POPULATIONS OF 1970 and 1965)

Measures of Social Trauma	Incidence of pathology related to 1 percent increase in unemployment based on 1970 population	Incidence of pathology related to 1 percent increase in unemployment, based on 1965 population	Total Incidence of Pathology, 1965	Incidence of Pathology in 1965 related to 1 percent increase in unemployment, 1960 - 65 as a proportion of total 1965 Pathology (5)=(3)+(4)
(1)	(2)	(3)	(4)	(5)
Total Mortality	36,887	35,042	1,828,000	.019
Whites				
Males	12,360	11,866	911,000	.013
Females	16,534	15,709	695,000	.023
Nonwhites				
Males	3,829	3,599	125,000	.028
Females	4,161	3,911	98,000	.040
Cardiovascular Mortality	20,240	19,228	1,000,787	.019
Cirrhosis of Liver Mortality	495	470	24,715	.019
Suicide	920	874	21,507	.041
Homicide	648	616	10,712	.057
State Mental Hospital First Admissions*	4,227	4,045	117,483	.034
Males	3,058	2,935	68,917	.043
Females	1,169	1,110	48,566	.023
State Prison Admissions	3,340	2,952	74,724	.040

Estimates are derived from equation types in Table I as follows: Total mortality classified by sex and race - equations (1)-(6); Cardiovascular mortality - equation (9); cirrhosis of liver mortality - equation (10); suicide - equation (14); homicide - equation (16); mental hospital admissions - equation (19); state prison admissions - equation (17).

* Only includes individuals under 65 years of age.

VI. CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Explanatory equations were developed through which each of the pathological indices was empirically associated with trends and fluctuations in three national economic indices. The combined impact of trends and fluctuation in the national economic indices was significantly related to each of the measures of pathology. Indeed, the combined effect of these economic indicators was generally of sufficient strength to explain more than 90 percent of the variation in the indices of social trauma over the period, 1940-1973. The calculations were based on models in which the pathological reactions were observed to be dispersed over a five-year period following the initial change in the economic indices.

Overall, the data showed that the association between the unemployment rate and all the pathological indices was statistically significant. Consistency was also shown in these relationships across age, sex, and racial groups, among different states, and for three different countries.

Relationships between the inflation rate and pathological indices were often statistically significant, but often quite inconsistent from one of the pathological indices to another, and among countries. The chronic disease mortality, in particular, did not appear to show significant relationships with the inflation rate, while suicide, homicide, and imprisonment did.

Per capita income showed its most important and easily interpretable inverse relationships in connection with total mortality by age and sex for the three countries and three states. Positive relationships between per capita income and

several of the measures of pathology (e.g., suicide, homicide, and imprisonment) were less easy to understand.

The basic findings for each of the major economic indices, while conforming in general to initially stated hypotheses, still require more detailed explanation. More thorough explanations must take into account the indirect relationship among various measures of economic behavior and the processes by which the three economic indices are empirically measured.

It should be noted that important factors which could have a bearing on the types of pathology different individuals might show in response to economic trauma -- or even whether or not pathological reactions will occur -- could not be dealt with in this report. Such factors might include personality, family structure, previous conditions of poor physical health or mental health or other socio-cultural influences.

We have perhaps underestimated the importance of these findings because of the various problems of data inadequacies, incomplete theoretical formulations, and confinement of the analyses to the national level. The problems of data inadequacy are evident in the case of admissions to mental hospitals and prisons. While the count of numbers of admissions is probably accurate, the degree to which hospitalization and imprisonment are reliable measures of serious mental disorder and serious crime will vary with, among other things, administrative policies of these institutions. Thus, the size of the problems of mental disorder and criminal aggression, of which institutionalization is one index, is not only unknown, but may change through time. Moreover, trends in the institutional indices of mental disorder and criminal aggression are probably least sensitive to the effects of

economic and social change simply because they display relatively little variability over time in comparison to non-institutional measures.

Again, even for the mortality based indices of pathology, such as cardiovascular disease, suicide, homicide, and cirrhosis of liver, there are traditional problems of misclassification of the causes of death. Moreover, the mortality indices fluctuate little over time compared to other health indices.

The problems of incomplete theories with respect to the effects of stress on serious pathology -- let alone the effects of economic trauma on stress -- have similarly been understated. Not only have the basic theories not been completely worked out, but few studies of these phenomena at the level of the individual are available for use in national policy analyses. Thus, we have had to make several assumptions about the structure of such relationships on the national level, including a number of non-economic explanations of trends in the pathological phenomena. The fact that we do not presently have the data base needed to pinpoint which groups among the population will respond more sensitively to national economic changes, further restricts the sharpness of our analysis. We are forced to examine large population aggregates, only a small proportion of which actually react pathologically.

Thus, the relatively strong findings of the present study appear all the more remarkable in the face of the problems associated with data inadequacies, incomplete theories, and aggregate levels of analyses. Therefore, it is conceivable that under more nearly ideal study conditions, the relationships would be found to show even greater statistical strength.

Interpretations of the Findings Based on Employment

Clearly, unemployment must be understood as a multidimensional measure of stress, since both conceptually and as a result of the way in which it is usually measured, different types of stress situations can be assumed. Perhaps most poignantly, unemployment has the self-evident meaning of loss of employment. Incorporated in this personal sense of loss, however, is the necessity of adapting to separation from fellow workers who probably constituted a major dimension of the person's closer relationships. The individual has an investment of training, seniority, and emotional ties in his work. These emotional ties are not only to persons, but to the image of the job itself, since for a great many persons, the job defines the individual. Also lost is the opportunity for achievement that was potentially connected with the job. Hopes are destroyed, and the individual is frustrated and anxious about the future. Further, it is frequently difficult to tell whether more serious trauma is involved in the actual separation from the job, or in the seeking of new work during a period of national economic contraction.

These considerations are different from the other immediate implications of loss of work; namely, loss of wages and salaries. The implications of loss of income in terms of stressful experiences are, indeed, almost too broad to define clearly. From a simplified viewpoint, however, it can be said that the loss of income is equivalent to the loss of fundamental resources needed to deal with basic life problems.

The combined impact of loss of employment and loss of associated income can have profound implications for community life. In the case of the family, substantial changes may be necessary

in its pattern of functioning and in its life-style. It is possible for patterns of relationship in the family, including relations between husband and wife, to change, and also for patterns of authority, governing relations between parents and children, to be altered. The intra-familial problems could either stem from the agitation of several of the family members over the loss of income and social position, or from the sense of failure that might be held by the person who becomes unemployed and is felt to initiate the family's problems. Due to a decline in family resources or a general sense of shame, it is possible for community relationships and friendship patterns to suffer as a result of decreased contact. These different types of implications are the most directly associated with unemployment as it is usually understood, but the indirect implications may be equally productive of anxiety. Under conditions of overall increases in the unemployment rate, it is quite possible for even the employed worker to become severely anxious over losing his job or to encounter tense situations with other agitated workers who are victims of unemployment (including the job losers or any members of their families).

Interpretations of the Effects of Inflation

In the case of inflation, it is hard to tell whether its association with certain pathological indices is due to increases in overall price levels or in prices of specific goods and services (medical care, housing, food, maintenance, and repairs). In such cases, increases in price levels are equivalent to the loss of purchasing power with its associated diminution in access to needed goods and services.

It is entirely possible, however, that the major source of stress stemming from price changes is not directly connected with the prices themselves. It might well be that changes in the level of prices are reflecting changes in the structure of income distribution in society. The typical situation occurs when a class of employees or an entire occupational group are suddenly seen to earn higher incomes than groups having similar levels of training, experience, or skill. This can provoke substantial competition among groups, leading to the desire for at least minimal parity in wage or salary increases. A similar situation would prevail where income accruing to a particular industry is observed to be substantially greater, while wages and salaries of employees remain relatively stable. In many societies, inflationary tendencies which ignite industrial conflict are among the most important sources of psychological distress.

One further problem in interpreting the stressful effects of inflation is that, while loss of purchasing power and decline in relative income position might logically produce distress, inflation is also indicative of comparatively high levels of demand for goods and services which are traditionally associated with prosperous times. This potentially conflicting interpretation leads one to believe that the effects of inflation are probably distributed unevenly among different segments of the society. Thus, while the statistical data of this study would indicate a generally adverse effect of inflation, it may well be that certain groups in the society might benefit economically during periods of high inflation.

Interpretation of Per Capita Income Relationships

As in the case of inflation, given our generalized measures of per capita economic growth, it is difficult to ascertain whether the entire measure of growth or particular components of that measure are the basis of the positive relationship to the decline in mortality. It is difficult to ascertain whether it is material wealth, per se, or the fruits of high levels of technology or productivity which are the main sources of the beneficial effects. It is certainly possible that the increased leisure time and decline in physically taxing and dangerous work are significantly related to the improved health status of the population. It is possible that the increased investment in medical technology and health care that is possible under conditions of economic growth are crucial in the decline in mortality rates. It is probable that a combination of all of these elements are important in increasing the life span.

Possible Applications to Economic Policy

There is no question that there is an existing and historical relationship between economic policy and health. This study offers statistical support to the thesis that actions influencing national economic activity have a profound, if not central, influence on physical health, mental health, and aggression.

Therefore, to the extent that economic policy influences national economic activity, it has always greatly influenced the nation's social well-being as well. This study indicates that on a day-to-day basis nearly all political and deliberate economic policy decisions which affect the behavior of the national, regional, and local

economy may also have a profound effect on many aspects of the nation's well-being. The potential applicability of this material to policy-making is clear. The only question is whether this information will be taken into account when economic policy is formulated.

Traditionally, economic policy has not been formulated on the basis of its objective implications for national health and well-being. Thus, it is assumed that high levels of unemployment are undesirable and have untoward implications, but just what the magnitude of those implications is has never been clear.

Thus, the government has a responsibility to ascertain the quantitative implications of its economic policies because: (1) economic policies, deliberately or not, influence much of the nation's health and social behavior, and (2) the government has existing responsibilities to deal with those very problems that are normally impacted by economic policy decisions such as ill health, mental illness and aggression.

Conscious Use of Social Cost Information in Economic Policy Decisions

It is true that we only have preliminary and rough statistical indications of the quantitative impact of economic factors on problems in the areas of health, mental health, and illegal behavior and aggression. Nevertheless, we can begin to see the connections between economic factors that are the subject of policy decisions, and social pathologies. Clearly, the most consistent pattern of relationship between economic change and social cost was demonstrated with the unemployment rate. Unemployment plays a significant (if not major) statistical role in

increasing social trauma for all indices of social cost and for virtually all ages, both sexes, and for whites and nonwhites in the United States. Even in a comparative examination of mortality rates by age and sex for England and Wales, and Sweden, one finds the dominant and consistent association with the unemployment rate.

These findings are remarkable both from the standpoint of the serious problems of measurement of unemployment as a concept, and the very serious problems of comparability of unemployment statistics across demographic and regional groupings, let alone across international boundaries. The difficulties introduced by such sources of measurement error include a decreased likelihood of obtaining statistical significance in a statistical relationship between the unemployment rate and other social factors, and decreased reliability of the resulting measure of association.

Moreover, these measurement problems would tend to significantly bias downward the size of the impact of unemployment on a given social problem as measured by the coefficient associated with it. This necessitates regarding the quantitative estimates of impact of the unemployment rate with caution and with the awareness of possible substantial under-estimates.

The relationships between the rate of inflation and the pathological indices investigated in this report, while frequently strong, were lacking in consistency from one pathological index to another, and particularly, from country to country. Thus, statistically significant relationships appeared for inflation in the

cases of suicide, homicide, and mental hospitalization, but for imprisonment, the relationship was observed only for the years prior to 1965. In general, statistically significant relationships for inflation were not observed for cardiovascular disease mortality and for cirrhosis mortality. Finally, while mortality rates by age and sex showed statistically significant relationships for the United States, this relationship was seen in only a minority of cases for England and Wales, and not at all for Sweden.

These data leave the strong impression that while there are probably statistically significant relationships between the rate of inflation and various indices of social problems, one can have little confidence in the magnitude of those relationships as estimated by the coefficient derived from the basic analyses.

Furthermore, the fact of inconsistency in relationships among pathological indices and countries suggests it may well be that factors indirectly associated with inflation under certain conditions are connected with the pathological indices. Thus, the social environment in which the inflation occurs and social methods for dealing with it may be more crucial than the incidence of price changes themselves. In addition, it is entirely possible that the prices of certain goods and services (e.g., food, medical care, housing) are more crucial than others to the issue of pathological reactions. The present study introduces a method of examining the impact of the overall inflation rate. It has not as yet been determined whether this overall rate, or a rate applicable to particular goods and services, is fundamental in these relationships.

The clear implication of this study is that it would not be reasonable to attempt to ascertain the relative importance of unemployment and inflation in the incidence of social pathology from the material presented in this study. However, one may conclude that the unemployment rate has a statistically significant impact, which is probably under-represented by the coefficients associated with it. But one must also conclude that the estimates of the magnitude of that impact, and its interpretation, will require considerable additional research.

Conclusion

Our findings further corroborated earlier research on the statistical effects of economic downturns on measures of social pathology. They also confirm the tradition of research on the inverse relationship between socio-economic status and pathological consequences of economic distress. The research in this paper added the dimension of formulating the problem in terms of the impact of three interacting sources of economic distress originating at least partly at the national level. The implication is that substantial components of societal stress originate with economic maladjustments which, in turn, can be moderated through national economic policy decisions.

We are quite aware, however, that the models offered here are by no means structurally complete. They represent only a first stage research effort and are based on earlier scientific work which itself has represented discoveries in very different disciplines. This translation of theoretical position and discovery into policy-oriented, empirical models was based on extremely

simple assumptions of linear relationships between the economic and pathological indices. These assumptions of linearity are probably incorrect since they do not take into account the duration, and rate of change in, economic distress. For example, they assume that a change in the unemployment rate from two to three percent would be similar in pathological impact to a change of from seven to eight percent. There is some reason to believe that increases at higher levels of unemployment have considerably more deleterious effects.

More important, however, is that we have not as yet been able to segregate some of the deleterious effects of the recent period of economic growth (possibly connected with urban problems) from the inherently beneficial effects of long-term growth in income per capita. Nor have we been able to account for the effects of structural unemployment, in addition to those of cyclical unemployment, that are particularly damaging to minorities and youth. This is an especially serious deficiency in our model as it relates to the problems of criminal aggression, youthful suicide, and hospitalization of the mentally ill.

It is hoped that this initial effort will encourage research devoted to intensive study of the impact of economic policy on societal well-being. Only the surface has been scratched in this report; yet a number of significant findings have been reported. Solutions to many of the major problems found in the work presented here will doubtless be found as research proceeds on the national and urban levels. It is to the urban level, particularly, that we probably need to look for a determination of the deleterious effects of long-term growth in economic affluence. It is on the urban level, moreover,

that the largest differences in unemployment rates prevail. It is clear that we need to examine these relationships on a disaggregated basis comparing cities, states, industries, and occupational groups.

Another important source of comparison is at the international level. An initial series of comparisons has been presented in this paper in which age- and sex-specific mortality trends were examined in relation to those of England and Wales, and of Sweden. The findings for the United States indicated that our general model of the effects of economic distress was, in large measure, appropriate to at least these three industrialized societies. Extension of this comparative research to other countries will bring us closer to understanding the sources of pathological response to changes in the condition of the economy.

Finally, an urgent research priority is the determination of which components of the estimates of economic growth and inflation are having the most important impact on the indices of societal well-being. For example, it would be important to determine what proportions of declining mortality are statistically related to increased availability and use of medical technology, or to nutrition, or to the general decline in the physical and emotional stress of work life. Also it would be important to break down the components of the consumer price index to determine whether it is indeed increases in prices of specific goods and services that are most responsible for the pathological effects, or, in fact, whether it is the implication of changes in the structure of incomes (related to changes in price levels) that are behind the relationship between inflation rates and pathology indices.

More refined applications which go beyond the use of the broad findings of the present report will require far more extensive analysis. It is recommended that such research be undertaken on both the national and sub-national (or even individual) levels of analysis. From the macroscopic standpoint, it is vital that efforts be taken to study populations that tend to undergo substantial economic difficulty which is heightened by national economic adversity. This is especially true of many urban centers in the United States where serious pathological problems as well as high unemployment and relative economic decline have coexisted in recent years. In addition, age, racial, occupational, and industrial groups that are particularly vulnerable to the instabilities in the national economy represent a priority for substantial study, since one would want to target specific ameliorative economic policy where it would presumably provide the greatest benefit.

Also, it would be important to evaluate the effects of non-economic ameliorative programs in the physical health, mental health, and criminal justice areas in light of national, regional, and local economic trends. It may be that, in many instances, the ameliorative programs are completely overwhelmed by the effects of the economy. In other cases, it may be that such programs act as important buffers to the effects of economic trauma and have prevented much greater pathology.

In addition, with research on a "microscopic" level, a clearer picture can be obtained of the causal mechanisms by which economic changes are associated with societal pathologies. In this type of research, for example, population cohorts would be followed and intensively examined over periods of several years, in order to ascertain the effects of the economic changes specific to their lives, as these changes tend to be associated with specified pathological conditions. Such microscopic studies of the lives of individuals should help to identify how strongly each of the several sources of economic trauma affect the tendency toward serious physical and mental health pathologies and aggression in the population.

REFERENCES: CHAPTER I -- INTRODUCTION AND
BACKGROUND

1. Stanley Lebergott, "Labor Force and Employment Trends," in E. B. Sheldon and W. E. Moore, eds., Indicators of Social Change, Concepts and Measurements. New York: Russell Sage Foundation, 1968, Ch. 4.
2. E. Palmore, "Physical, Mental, and Social Factors in Predicting Longevity," Gerontology, 1969.
3. Marian Mariott, "Worker Conditions and Manner of Aging," Work and Aging, International Center of Gerontology, Paris, 1971.
4. C. D. Jenkins, "Psychologic and Social Precursors of Coronary Disease," New England Journal of Medicine, Vol. 284, 1971.
5. S. C. Cobb and S. Kasl, "Blood Pressure Changes in Men Undergoing Job Loss: A Preliminary Report," Psychosomatic Medicine, January/February, 1970.
6. A. Pepitone, "Self, Social Environment, and Stress," in M. H. Appley and D. Turnbull, eds., Psychological Stress, New York: Appleton-Century-Crofts, 1967.
7. Carey P. McCord, "Life and Death by the Minute," Industrial Medicine, Vol. 17, No. 10, October, 1948.

8. R. Caplan, Organizational Stress and Individual Strain: A Social-Psychological Study of Risk Factors in Coronary Heart Disease Among Administrators, Engineers, and Scientists, Unpublished Ph.D. Thesis, University of Michigan, 1971: Thomasina Smith, "Sociocultural Incongruity and Change: A Review of Empirical Findings," Milbank Memorial Fund Quarterly, Vol. 45, No. 2, Part 2, 1967.
9. R. Caplan, op. cit.
10. R. Caplan, Ibid.
11. S. Seashore, Group Cohesiveness in the Industrial Work Group, Institute for Social Research, Ann Arbor, Michigan, 1954.
12. Y. S. Matsumoto, "Social Stress and Coronary Heart Disease in Japan: A Hypothesis," Milbank Memorial Fund Quarterly, Vol. 48, 1970.
13. S. C. Cobb and S. Kasl, op. cit.
14. Work in America, Report of a Special Task Force to the Secretary of Health, Education and Welfare. Cambridge, Mass., M.I.T. Press, 1974.
15. Saleem A. Shah and Loren H. Roth, "Biological and Psychophysiological Factors in Criminality," in Daniel Glaser, Handbook of Criminology. Chicago: Rand McNally Publishing Company, 1974, Ch. 4.
16. John Dollard, Leonard W. Doob, Neal E. Miller, O. H. Mowrer, and Robert R. Sears, Frustration and Aggression. New Haven, Conn.: Yale University Press, 1939.

17. Leonard Berkowitz, Aggression: A Social Psychological Analysis. New York: McGraw-Hill, 1962.
18. Robert K. Merton, Social Theory and Social Structure. Glencoe, Ill.: Free Press, 1957, Part II.
19. R. Cloward and Lloyd Ohlin, Delinquency and Opportunity. New York: Free Press, 1955.
20. Edwin H. Sutherland and Donald R. Cressey, Principles of Criminology. Seventh Edition. Phila.: J.B. Lippincott Co., 1966.
21. Albert K. Cohen, Delinquent Boys. New York: Free Press, 1955.
22. Emile Durkheim, The Division of Labor in Society; translated by George Simpson. New York: Free Press of Glencoe, 1976.
23. Max Weber, The Theory of Social and Economic Organization, translated by A. M. Henderson and Talcott Parsons. New York: Oxford University Press, 1947.
24. Iwao M. Moriyama, "Problems in the Measurement of Health Status," in E. B. Sheldon and E. Moore, op. cit., Ch. 11.

REFERENCES: CHAPTER II -- REVIEW OF THE
LITERATURE

1. Ernest W. Burgess, "The Growth of the City," in Robert E. Park and Ernest W. Burgess, eds., The City, Chicago: University of Chicago Press, 1951.
2. William Ogburn and Myer Nimoff, Sociology, Boston: Houghton Mifflin, 1946, pp. 414-416.
3. Yale Levin and Alfred Lindesmith, "English Ecology and Criminology of the Past Century," Journal of Criminal Law and Criminology, 27:801-816, March-April 1937.
4. Frederick M. Thrasher, The Gang, Chicago: University of Chicago Press, 1929.
5. Clifford R. Shaw, Henry D. McKay, Delinquent Areas, Chicago: University of Chicago Press, 1929.
6. Clifford R. Shaw, Henry D. McKay, et. al., Juvenile Delinquency in Urban Areas, Chicago: University of Chicago Press, 1942.
7. Terrence Morris, The Criminal Area: A Study in Social Ecology, London: Roufledge and Kegan Paul, 1958.
8. Ernest R. Mowres, Disorganization, Personal, and Social, Philadelphia: Lippincott, 1942.
9. Calvin F. Schmid, "Urban Crime Areas: Part II," American Sociological Review, 25:655-678, October 1960.
10. Robert S. Lynd and Helen Merrell Lynd, Middletown, New York: Harcourt, Brace, 1929.

11. Robert S. Lynd and Helen Merrell Lynd, Middletown in Transition, New York: Harcourt, Brace, 1937.
12. W. Lloyd Warner and Paul S. Lunt, The Social Life of a Modern Community, New Haven: Yale University Press, "Yankee City Series," Vol. I., 1941.
13. W. Lloyd Warner and Paul S. Lunt, The States System of a Modern Community, New Haven: Yale University Press, "Yankee City Series," Vol. II, 1942.
14. W. Lloyd Warner and Leo Srole, The Social Systems of American Ethnic Groups, New Haven: Yale University Press, "Yankee City Series," Vol. III, 1945.
15. August B. Hollingshead, Elmtown's Youth, New York: Wiley, 1949.
16. August B. Hollingshead, "Selected Characteristics of Classes in a Middle Western Community," American Sociological Review 12:285-395, August 1947.
17. Allison, Davis, Burleigh B. Gardner and Mary R. Gardner, Deep South, Chicago: University of Chicago Press, 1941.
18. St. Clair Drake and Horace R. Clayton, Black Metropolis, New York: Harcourt, Brace, 1945.
19. John Dollard, Caste and Class in a Southern Town, New Haven: Yale University Press, 1937.
20. The following discussion draws on the review in M. W. Susser and W. Watson, Sociology in Medicine (2nd ed.). New York: Oxford University Press, 1971, Chapter 4.

21. J. Daric, Vital Statistics-Special Reports, Vol. 32, No. 10, U.S. Public Health Service, 1951.
22. W. P. D. Logan, "Social Class Variations in Mortality", British Journal of Preventive Social Medicine, 8: 128-137, 1954.
23. J. N. Morris, Uses of Epidemiology, Edinburgh, 1964.
24. M. Young "Variation in Mortality from Cancer of Different Parts of the Body in Groups of Men of Different Social Status," Journal of Hygiene (London) 25: 209-217, 1926.
25. Registrar General's Decennial Supplement England and Wales, 1921, Part II, Occupational Mortality, Fertility and Infant Mortality, London, H.M.S.O., 1927.
26. E. Sydenstricker, "Economic Status and the Incidence of Illness": Hagerstown Morbidity Studies No. 10, U.S. Public Health Report 44:1821-1833, 1929.
27. J. Clemmesen and A. Nielsen, "Social Distribution of Cancer in Copenhagen, 1943-47," British Journal of Cancer 5:159-171, 1951.
28. E. M. Kitagawa and P. M. Hauser, "Education Differentials in Mortality be Cause of Death: United States, 1960, " Demograghy, 5:318-353, 1968.
29. A. Antonovsky, "Social Class, Life Expectancy and Overall Mortality," Milbank Memorial Fund Quarterly, 45:63, 1967.

30. E. P. Hunt and E. E. Huyck, "Mortality of White and Non-white Infants in Major U.S. Cities," H.E.W. Indicators, Office of Program Analysis, Department of Health, Education and Welfare, Washington, D.C., pp. 23-41, 1966.
31. L. Guralnick, "Selected Family Characteristics and Health Measures Reported in the Health Interview Survey," Vital and Health Statistics, Publication No. 1000, National Center for the Health Statistics, Washington, D.C., p. 6.
32. Nemat O. Borhani and Thomasina Smith Borkman, Alameda County Blood Pressure Study, Berkeley California: State of California, June 1968.
33. Saxon Graham, Morton Levin, and Abraham M. Lilienfeld, "The Socioeconomic Distribution of Cancer at Various Sites in Buffalo, New York: 1948-1952," Cancer 13:80, 1960.
34. A. Barr, "Hospital Admissions and the Social Environment," Medical Officer 100:351-354, 1958.
35. J. W. Marr, E. B. Hope, L. D. Stevenson and A. M. Thompson, "Consumption of Milk and Vitamin Concentrates by Pregnant Women in Aberdeen," Proceedings of the Nutrition Society, 14:7, 1955.
36. L. Bergmann and A. S. Yerby, "Low Income and Barriers to Use of Health Services," New England Journal of Medicine 278:541-546, 1968.
37. J. W. B. Douglas and J. M. Blomfield, Children Under Five, London, 1958.

38. F. Edwards, T. McKeown and A. G. W. Whitfield, "Contributions and Demands of Elderly Men," British Journal of Preventive Medicine, 13:59-66, 1959.
39. F. Brockington and S. M. Lempert, The Social Needs of the Over-Eighties, Manchester, 1966.
40. Merwin W. Susser, Community Psychiatry: Epidemiological and Social Themes, New York, 1968.
41. E. G. Jaco, The Social Epidemiology of Mental Disorders: A Psychiatric Study of Texas, Russell Sage Foundation, New York, 1960.
42. G. Innes, and G. A. Sharp, "A Study of Psychiatric Patients in North-East Scotland," Journal of Mental Science 108:447-456, 1922.
43. B. Pasamanick ed., "Epidemiology of Mental Disorder," American Association for the Advancement of Science, Publication No. 60, Washington, D.C. 1959.
44. G. Gurin, J. Veroff and S. Feld, Americans View Their Mental Health, Joint Commission on Mental Illness and Health Monograph, Series 4, New York.
45. L. Srole, T. S. Langner, S. T. Michael, M. K. Opler and T. A. C. Rennie, Mental Health in the Metropolis: The Midtown Manhattan Study, New York, 1962.
46. D. C. Leighton, J. S. Harding, D. B. Macklin, A. M. MacMillan and A. H. Leighton, The Character of Danger: Psychiatric Symptoms in Selected Communities, Stirling County Study 3, New York, 1963.

47. August B. Hollingshead and F. C. Redlick, Social Class and Mental Illness, New York, 1958.
48. A. M. Adelstein, D. Y. Dunhan, Z. A. Stein and M. W. Susser, "The Epidemiology of Mental Illness in an English City," Social Psychiatry, 3:47-59, 1968.
49. E. M. Brooke, "National Statistics in the Epidemiology of Mental Health," Journal of Mental Science, 105:893-908, 1959.
50. C. Tietze, P. V. Lemkau and M. M. Cooper, "Schizophrenia, Manic-Depressive Psychosis and Social Economic Status," American Journal of Sociology, 47:167-175, 1941.
51. R. E. Clark, "The Relationship of Schizophrenia to Occupational Income and Prestige," American Sociological Review, 13:325-330, 1948.
52. R. H. Hare, "Mental Illness and Social Class in Bristol," British Journal of Preventative Social Medicine, 102:349-357, 1956.
53. R. E. L. Faris and H. W. Dunham, Mental Disorders in Urban Areas: An Ecological Study of Schizophrenia and Other Psychoses, New York, 1960.
54. E. H. Hare, "Mental Illness and Social Conditions in Bristol," Journal of Mental Science 102:349-357, 1956.
55. R. E. Clark, "Psychoses, Income and Occupational Prestige: Schizophrenia in American Cities," American Journal of Sociology, 54:433-440, 1949.

56. L. Stein, "Social Class' Gradient in Schizophrenia," British Journal of Preventative Social Medicine, 11:181-195, 1957.
57. F. Van Nye, James F. Short, Jr., and V. J. Olson, "Socioeconomic Status and Delinquent Behavior," American Journal of Sociology, 63:381-389, January 1958.
58. Lamar T. Empey and Maynard L. Erickson, "Hidden Delinquency and Social Status," Social Forces, 44:546-554, June 1966.
59. Robert H. Hardt, "Delinquency and Social Class: Bad Kids or Good Cops," in Irwin Deutscher and Elizabeth J. Thompson, (eds.), Among the People: Encounters with the Poor. New York: Basic Books, pp. 132-145, 1968.
60. William J. Goode, Women in Divorce, New York: Free Press, 1965, chapters 4, 5.
61. William J. Goode, "Marital Satisfaction and Instability: A Cross-cultural Class Analysis of Divorce Rates," International Social Science Journal 14:507-526, No. 3, 1962.
62. Karen G. Hillman, "Marital Instability and Its Relation to Education, Income and Occupation: An Analysis Based on Census Data," in R. F. Winch et. al., (eds.) Selected Studies in Marriage and the Family (rev. ed.), New York: Holt, 1962, pp. 603-608.
63. J. C. Colcord, Broken Homes, New York: Russell Sage Foundation, 1919.
64. William M. Kephart and Thomas P. Monahan, "Desertion and Divorce in Philadelphia," American Sociological Review, 17:719-720, December 1952.

65. Gilbert Dooghie, "Premarital Conception with Married Couples According to Socio-Professional Status," Journal of Marriage and the Family 80:124-128.
66. D. Cahalan, I. H. Cisin and H. M. Crossley, American Drinking Practices: A National Survey of Drinking Behavior and Attitudes, New Brunswick Rutgers Center for Alcohol Studies, 1969.
67. Abernathy, W. J. and E. L. Schrems, "Distance and health services: issues of utilization and facility choice for demographic strata," Research Paper No. 19, Stranford University: Graduate School of Business, 1971.
68. R. Andersen, A Behavioral Model of Families' Use of Health Services. Research Series, No. 25, Center for Health Administration Studies. Chicago: University of Chicago Press, 1968.
69. R. and O. W. Andersen, A Decade of Health Services. Chicago: University of Chicago Press, 1967.
70. R. Andersen and L. Benham, "Factors affecting the relationship between family income and medical care consumption." In H. E. Klarman (ed.), Empirical Studies in Health Economics. Baltimore: The Johns Hopkins Press, 1970.
71. R. Andersen, et. al., Medical care use in Sweden and the United States -- A comparative analysis of systems and behavior. Research Series No. 27. Center for Health Administration Studies, Chicago: University of Chicago Press, 1970.

72. J. G. Anderson, "Demographic factors affecting health services utilization: a causal model." Unpublished manuscript. Purdue University: Department of Sociology. (To be published in Medical Care), 1972.
73. O. W. Anderson and R. Anderson, "Patterns of use of health services." In Freeman, H. et. al. (eds.) Handbook of Medical Sociology, Englewood Cliffs, N.J.: Prentice-Hall, 1972.
74. O. W. Anderson, et. al., Changes in Family Medical Care Expenditures and Voluntary Health Insurance. Cambridge: Harvard University Press, 1963.
75. A. Antonovsky and R. Kats, "The model dental patient: an empirical study of preventive health behavior." Soc. Sci. Med. 4 November, 1970, 267-280.
76. T. W. Bice, "Medical care for the disadvantaged: report on a survey of use of medical services in the Baltimore Standard Metropolitan Statistical Area 1968-1969." Final report of research conducted under Contract Number HSM 110 69 203, NCHSRD, 1971.
77. T. W. Bice and R. L. Eichhorn, "Socioeconomic status and use of physicians' services: a reconsideration." Med. Care 12 (May-June): 261-271, 1972.
78. T. W. Bice, et. al., "Economic class and use of physicians' services" Unpublished manuscript. Johns Hopkins University: Department of Medical Care and Hospitals, 1971.

79. B. J. Darsky, et. al., Comprehensive Medical Services under Voluntary Health Insurance: A Study of Windsor Medical Services. Cambridge: Harvard University Press.
80. P. M. Densen, et. al., "Concerning high and low utilizers of services on medical care plan, and the persistence of utilization levels over a three-year period." Milbank Mem. Fund. Quart. 37 (July 1959): 217-250.
81. R. L. Durbin and G. Antelman, "A study of the effects of selected variables on hospital utilization." Hospital Manage. 98 (August 1964): 57-60.
82. P. J. Feldstein, "Research on the demand for health services." Milbank Mem. Fund. Quart. 44 (July 1966): 128-162.
83. T. B. Fitzpatrick, et. al., "Character and effectiveness of hospital use." In McNerny, W.J., et. al., Hospital and Medical Economics. Chicago: Hospital Research and Educational Trust.
84. M.C. Klem, "Physician services received in an urban community in relation to health insurance coverage." Amer. J. Pub. Health 55 (November 1965): 1699-1716.
85. L. Kriesberg, "The relationship between socio-economic rank and behavior." Soc. Prob. 10 (Spring 1963): 334-352.
86. C. Muller, "Income and the receipt of medical care." Amer. J. Public Health 55 (April 1965): 510-521.
87. Family Income in Relation to Selected Health Characteristics. No. 2, 1963.

88. Medical Care, Health Status, and Family Income: United States -- 1963. No. 9, 1964.
89. Current Estimates from the Health Interview Survey: United States -- July 1964. No. 13, 1964.
90. Physician Visits -- Interval of Visits and Children's Routine Checkup: United States -- July 1963-June 1964. No. 19, 1965.
91. Persons Hospitalized by Number of Hospital Episodes and Days in a Year: United States -- July 1960-June 1962. No. 20, 1965.
92. Personal Health Expenses -- Per Capita Annual Expenses: United States -- July-December 1962. No. 27, 1966.
93. Hospital Discharges and Length of Stay: Short-Stay Hospitals: United States -- July 1963-June 1964. No. 30, 1966.
94. Age Patterns in Medical Care, Illness, and Disability: United States -- July 1963-June 1965. No. 32, 1966.
95. Volume of Physician Visits: United States -- July 1966-June 1967. No. 49, 1968.
96. Persons Hospitalized by Number of Hospital Illness Episodes and Days in a Year: United States -- July 1965-June 1966. No. 50, 1969.
97. Family Use of Health Services: United States -- July 1963-June 1964. No. 55, 1969.
98. Differentials in Health Characteristics by Color: United States -- July 1965-June 1967. No. 56, 1969.

99. Children and Youth -- Selected Health Characteristics: United States--1958 and 1968.
No. 62, 1971.
100. T. Purola, et. al., The Utilization of Medical Services and its Relationship to Morbidity, Health Resources and Social Factors.
Helsinki: Research Institute for Social Security, 1968.
101. W. C. Richardson, "Poverty, illness and use of health services in the United States."
Hospital 43 (July 1, 1969): 34-40.
102. J. A. Ross, "Social class and medical care."
J. Health Hum. Behav. 4 (Spring 1962): 35-40.
103. G. and L. Sparer, "Differential patterns of poverty and health care utilization in eight urban areas." Paper presented at the meetings of the American Association for Public Opinion Research, Pasadena, California (May 22, 1971).
104. U.S. Public Health Service, 1969. Proceedings of a Conference on Conceptual Issues in the Analysis of Medical Care Utilization Behavior. Conference sponsored by Kaiser Foundation Hospitals and National Center for Health Services Research and Development. Portland, Oregon (October, 1969).
105. E. L. White, "A graphic presentation on age and income differentials in selected aspects of morbidity, disability, and utilization of health services." Inquiry 5 (March, 1968): 18-30.
106. G. C. Wirick, "A multiple equation model of demand for health care." Health Services Research 1 (Winter 1966): 301-346.

107. R. L. Bushshur, et. al., "Some ecological differentials in the use of medical services." Health Services Research 6 (Spring 1971): 61-75.
108. L. Kriesberg, "The relationship between socio-economic rank and behavior." Soc. Prob. 10 (Spring 1963): 334-352.
109. E. G. Ludwig and G. Gibson, "Self perception of sickness and the seeking of medical care." J. Health Soc. Behav. 10 (June 1969): 125-132.
110. L. Bergner and A. Yerby, "Low income and barriers to use of health services." New Eng. J. Med. 278 (March 7, 1968): 541-546.
111. W. F. Dodge, et. al., "Patterns of maternal desires for child health care." Amer. J. Pub. Health 60 (August 1970): 1421-1429.
112. R. Fink, et. al., "The reluctant participant in breast cancer screening programs." Pub. Health Rep. 83 (June 1968): 479-490.
113. U.S. Public Health Service, Population Characteristics and Participation in the Poliomyelitis Vaccination Program. PHS No. 722. Washington, D.C.: U.S. Govt. Printing Office, 1960.
114. W. Winkelstein, Jr., and S. Graham, "Factors in participation in the 1954 poliomyelitis vaccine field trials, Erie Country, New York." Amer. J. Pub. Health 49 (November 1959): 1454-1466.
115. Volume of Dental Visits: United States -- July 1963-June 1964. No. 23, 1965.

116. A. M. Richardson, et. al., "Use of medical resources by SPANCOS: II. Social factors and medical care experience." Milbank Mem. Fund. Quart. 45 (January 1967): 61-75.
117. R. Anderson, et. al., "Perceptions of and response to symptoms of illness in Sweden and the United States." Med. Care 6 (January-February 1968): 18-31.
118. W. C. Richardson, "Measuring the urban poor's use of physicians' services in response to illness episodes." Med. Care 8 (March-April 1970): 132-142.
120. Thomas McKeown, "A Sociological Approach to the History of Medicine," in Gordon McLachlan and Thomas McKeown eds., Medical History and Medical Care, Oxford University Press, 1971, Chapter 1.
121. Calvin Goldscheider, "The Mortality Revolution," in Population, Modernization, and Social Structure, Little, Brown and Company, 1971, Chapter 5.
122. United Nations, The Determinants and Consequences of Population Trends, (New York, 1953); and United Nations, The Situation and Recent Trends of Mortality in the World, Population Bulletin No. 6 (1963), Table IV. 1.
123. H. Frederiksen, "Dynamic Equilibrium of Economics to Demographic Transition," Economic Development and Cultural Change, 14: April 1966; H. Frederiksen, "Feedbacks in Economic and Demographic Transition," Science, 166, November 1969.
124. A. F. Henry and T. F. Short, Jr., Suicide and Homicide, Glencoe, Ill.: Free Press, 1954.

125. Brian MacMahon, S. Johnson, and T. F. Pugh, "Relation of Suicide to Social Conditions," U.S. Public Health Reports, 78, 285-293.
126. Neil A. Dayton, New Facts on Mental Disorders. Springfield, Ill.: Charles C. Thomas, 1940, pp. 23-27.
127. Thomas F. Pugh, and Brian MacMahon, Epidemiological Findings in United States Mental Hospital Data. Boston: Little, Brown, 1962, p. 70.
128. M. Harvey Brenner, Mental Illness and the Economy. Cambridge, Mass.: Harvard University Press, 1973.
129. M. Harvey Brenner, "Economic Instability and Mental Hospitalization in the United States, 1922-1968: An Issue of Primary Prevention in Severe Mental Disorders," Paper presented at the Annual Meeting of the American Public Health Association, 1973.
130. M. Harvey Brenner, "Trends in Alcohol Consumption and Associated Illnesses," American Journal of Public Health, 65: December, 1975.
131. M. Harvey Brenner, The Johns Hopkins University, unpublished data.
132. A. F. Henry, and T. F. Short, Suicide and Homicide, Glencoe, Ill.: Free Press, 1954.
133. M. Harvey Brenner, The Johns Hopkins University, unpublished data.
134. M. Harvey Brenner, "Economic Changes and Heart Disease Mortality," American Journal of Public Health, 61: March, 1971.

135. M. Harvey Brenner, "Cardiovascular-Renal Disease Mortality and Economic Instability in the United States," Paper presented at the Annual Meeting of the American Public Health Association, 1973.
136. M. Harvey Brenner, "Fetal, Infant, and Maternal Mortality During Periods of Economic Instability," International Journal of Health Services, 3, 1974.
137. Daniel Glaser, and Kent Rice, "Crime, Age, and Unemployment," American Sociological Review, October, 1959, pp. 679-686.
138. Belton M. Fleisher, "The Effects of Unemployment in Delinquent Behavior," Journal of Political Economy, LXXI, 1963, pp. 545-555.
139. Belton M. Fleisher, The Economics of Delinquency, Chicago, Quadrangle Books, 1966.
140. M. Harvey Brenner, Time Series Analysis of the Relationships Between Selected Economic and Social Indicators. National Technical Information Service, Springfield, Va.; Volumes I and II, March, 1971.
141. George H. Cox, and Timothy S. Carr, "Unemployment and Prison Population Trends in Georgia: 1967-1974." Atlanta, Ga.; Georgia Department of Corrections/Offender Rehabilitation, March 5, 1975.
142. U.S. Bureau of Prisons, "Correlation of Unemployment and Federal Prison Population," Washington, D.C., U.S. Bureau of Prisons Report, March 1975.

143. William H. Robinson, Phyllis Smith and Jean Wolf, "Prison Population and Costs -- Illustrative Projections to 1980." Washington, D.C., Congressional Research Services, Library of Congress (HV 8442; 74-95 ED), August 24, 1975.
144. M. Harvey Brenner, "Effects of the Economy on Criminal Behavior and the Administration of Criminal Justice in the United States, Canada, England and Wales, and Scotland," in Economic Crises and Crime: Correlations Between the State of the Economy, Deviance and the Control of Deviance. Rome, Italy: United Nations Social Defense Research Institute, 1976.
145. M. Harvey Brenner, Ibid.
146. Dean Babst and James E. Cowden, Program Research in Correctional Effectiveness, Report #1, Madison, Wisconsin, Department of Public Welfare, Division of Research, 1967.
147. Daniel Glaser, The Effectiveness of a Prison and Parole System. New York: The Boobs-Merrill Company, Inc., 1964, pp. 232-259.

REFERENCES: CHAPTER III -- METHODOLOGY

1. Time Series Processor, Version 2.7 Manual. . Technical Paper No. 12, Harvard Institute of Economic Research. Cambridge, Mass.: Harvard University, July, 1975. (Original authors are Robert Hall et. al., Sloan Computer Facility, Massachusetts Institute of Technology, Cambridge, Mass..
2. J. Johnston, Econometric Methods. New York: McGraw-Hill, 1963.
3. Carl Christ, Econometric Models and Methods. New York: Wiley, 1966.
4. M. Harvey Brenner, Time Series Analysis of the Relationships Between Selected Economic and Social Indicators. National Technical Information Service, Springfield, Va.; Volumes I and II, March, 1971.
5. M. Harvey Brenner, "Economic Changes and Heart Disease Mortality," American Journal of Public Health, 61: March, 1971; M. Harvey Brenner, "Cardiovascular-Renal Disease Mortality and Economic Instability in the United States," Paper presented at the Annual Meeting of the American Public Health Association, 1973.
6. M. Harvey Brenner, "Trends in Alcohol Consumption and Associated Illnesses," American Journal of Public Health, 65: December, 1975.
7. M. Harvey Brenner, "Fetal, Infant, and Maternal Mortality During Periods of Economic Instability," International Journal of Health Services, 3, 1973.

8. M. Harvey Brenner, Mental Illness and the Economy. Cambridge, Mass., Harvard University Press, 1973; M. Harvey Brenner, "Economic Instability and Mental Hospitalization in the United States, 1922-1968: An Issue of Primary Prevention in Severe Mental Disorders," Paper presented at the Annual Meeting of the American Public Health Association, 1973.
9. M. Harvey Brenner, "Effects of the Economy on Criminal Behavior and the Administration of Criminal Justice in the United States, Canada, England and Wales, and Scotland," in Economic Crises and Crime: Correlations Between the State of the Economy, Deviance and the Control of Deviance. Rome, Italy: United Nations Social Defense Research Institute, 1976.
10. Wesley C. Mitchell, What Happens During Business Cycles: A Progress Report. New York: National Bureau of Economic Research, 1951; Geoffrey H. Moore (ed.), Business Cycle Indicators. Princeton, N.J.: Princeton University Press, 1961, 2 vols..
11. Peter Schmidt and Roger N. Wand, "The Almon Lag Technique and the Monetary Versus Fiscal Policy," Journal of the American Statistical Association. 68: March, 1973, pp. 11-15.
12. Zvi Griliches, "Errors in Variables and Other Unobservables," Econometrica. 42: November, 1974, pp. 971-998.

General Reference:

Historical Statistics of the United States: Colonial Times to 1957; A Statistical Abstract Supplement (GPO: Wash., DC).

1960, Continuation to 1962 & Revision (GPO: Wash., DC)

Historical Statistics of the United States, Bicentennial Edition (GPO: Wash., DC).

References:Source Key

- | | |
|--|---|
| 1933-67, <u>Vital Statistics of the United States,</u>
U.S. Public Health Service,
(GPO: Wash., DC), Volume II,
1967. | 1 |
| 1968-73, same report, annual issues. | 2 |
| 1940-68, <u>Cardiovascular Disease in the U.S.,</u> Moriyama, Iwao Milton;
Krueger, Dean E.; Stamler,
Jeremiah (Harvard University
Press: Boston) 1971. | 3 |
| 1969-73, <u>Monthly Vital Statistics Report, Annual Summary</u> U.S. Public Health
Service (GPO: Wash., DC), annual
issues. | 4 |
| 1923-67, <u>Patients in Mental Institutions</u>
(title varies), U.S. National
Institute of Mental Health (GPO:
Wash., DC), annual issues. | 5 |

- 1968-72, Mental Health Statistics & Reference Tables, Office of Biometry, Survey & Reports Section, U.S. National Institute of Mental Health. 6
- 1926-71, National Prisoner Statistics: Prisoners in State & Federal Institutions (title varies), Bureau of Prisons, U.S. Department of Justice (GPO: Wash., DC), annual issues. 7
- 1972-73, Sourcebook of Criminal Justice Statistics (1974) Law Enforcement Assistance Administration, National Criminal Justice Service, U.S. Department of Justice (GPO: Wash, DC). 8
- 1974, Statistical Abstract. U.S. Bureau of the Census (GPO; Wash., D.C.), annual issues. 9
- 1920-70, Population Characteristics, U.S. Bureau of the Census 1950, 1960, 1970 (GPO: Wash., DC). 10
- 1938-70, Annual Report, Department of Mental Health, Albany, New York. 11
- 1933-65, 2nd Abstract of British Historical Statistics Mitchell, Brian R. with collaboration of Phyllis Dean (Cambridge University Press) 1971. 12
- 1966-72, Annual Abstract of Statistics, (Her Majesty's Stationery Office: London) 1971; 1974. 13

- 1940-73, Statistisk Arsbok fur Sverige, 14
Stockholm, annual issues.
- 1929-70, Consumer Price Index for Urban 15
Wage Earners & Clerical Workers;
U.S. City Averages; Boston, Mas-
sachusetts; New York, New York;
San Franscisco, California.
- 1929-72, Survey of Current Business, 16
1929, 1940, 1949, 1956, 1969,
1973, U.S. Bureau of Economic
Analysis (GPO: Wash., DC).
- 1929-70, Employment: Earnings, U.S. 17
Bureau of Labor Statistics
(GPO: Wash., DC), May, 1972.

REFERENCES: CHAPTER IV -- THE RESEARCH FINDINGS

Michael J. Hindelang, Christopher S. Dunn, Alison L. Aumick, L. Paul Litton, Sourcebook of Criminal Justice Statistics, Washington, D.C.: National Criminal Justice Information and Statistics Service, Law Enforcement Assistance Administration, U.S. Department of Justice, G.P.O., 1975. p. 430, Note for Table 6.14.

REFERENCES: CHAPTER V -- POSSIBLE APPLICATIONS
TO ECONOMIC POLICY

1. Victor R. Fuchs, "Some Economic Aspects of Mortality in Developed Countries," in Marc Perlman (ed.), The Economics of Health and Medical Care. Proceedings of a Conference held by the International Economic Association at Tokyo. New York: John Wiley and Sons, 1974.
2. Samuel H. Preston, "An International Comparison of Excessive Adult Mortality," Population Studies 24 (March, 1970), pp. 5-20.

TABLES

I United States (PDL/2) Polynomial Distributed Lag, Second Degree Polynomial, with Independent Variables: U.S. Income Per Capita, U.S. Unemployment Rate, and a U.S. Inflation Measure.

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 b. White Males 2

 c. White Females 3

 d. Nonwhite Totals 4

 e. Nonwhite Males 5

 f. Nonwhite Females 6

B. Homicide Rates (Total) per 100,000

 a. PDL/2 Equation for PCI, UN, INF 7

 b. PDL/2 Equation for D_{Time} , PCI, UN, INF where dependent variable controlled for growth of population ages 15-29 8

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 d. PDL/2 Equation for D_{Time} , PCI, UN, INF where dependent variable controlled for growth of population ages 15-29 10

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b.	Without the War, PDL/2 Equation for PCI, UN, INF	25
c.	With the War, T ² , UN, INF	26
II	States (PDL/2: Polynomial Distributed Lag, Second Degree Polynomial) with Independent Variables: U.S. Income per Capita, U.S. Unemployment Rate, and a U.S. Inflation Measure.	
A.	Total Mortality Rates (per 100,000) by Age, Sex and Race with PDL/2 Equation for PCI, UN, INF	
a.	New York	
1.	White Males	30
2.	White Females	31
3.	Nonwhite Males	32
4.	Nonwhite Females	33
b.	California	
1.	Total	34
2.	White Males	35
3.	White Females	36
4.	Nonwhite Males	37
5.	Nonwhite Females	38
c.	Massachusetts	
1.	Total	39
2.	White Males	40
3.	White Females	41
4.	Nonwhite Males	42
5.	Nonwhite Females	43
B.	Total Mortality Rates (per 100,000) by Age, Sex and Race with PDL/2 Equation for PCI (State Indicator), UN, INF (State Indicator)	
a.	New York	
1.	White Male	44
2.	White Female	45

3. Nonwhite Males	46
4. Nonwhite Females	47
b. California	
1. Total	48
2. White Males	49
3. White Females	50
4. Nonwhite Males	51
5. Nonwhite Females	52
c. Massachusetts	
1. Total	53
2. White Males	54
3. White Females	55
4. Nonwhite Males	56
5. Nonwhite Females	57
C. Homicide Mortality Rates (Total) per 100,000	
a. New York	
1. PDL/2 Equation for PCI, UN, INF	58
2. PDL/2 Equation for PCI (NY), UN, INF (NY)	59
3. PDL/2 Equation for T^2 , UN, INF	60
b. California	
1. PDL/2 Equation for PCI, UN, INF	61
2. PDL/2 Equation for PCI (Cal), UN, INF (Cal)	62
3. PDL/2 Equation for T^2 , UN, INF	63
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1. PDL/2 Equation for PCI, UN, INF	64
2. PDL/2 Equation for PCI (Mass), UN, INF (Mass)	65
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a. New York	
1. PDL/2 Equation for PCI, UN, INF	67
2. PDL/2 Equation for PCI (NY), UN, INF (NY)	68
3. PDL/2 Equation for T^2 , UN, INF	69
b. California	
1. PDL/2 Equation for PCI, UN, INF	70
2. PDL/2 Equation for PCI (Cal), UN, INF (Cal)	71
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4.	Without the War, PDL/2 Equation for PCI (NY), UN, INF (NY)	82
5.	With the War, PDL/2 Equation for DT, Log of Time, UN, INF	83
G.	New York State Mental Hospital First Admission Rates (Female) per 100,000	
1.	With the War, PDL/2 Equation for PCI, UN, INF	84
2.	With the War, PDL/2 Equation PCI (NY), UN, INF (NY)	85
3.	Without the War, PDL/2 Equation for PCI, UN, INF	86
4.	Without the War, PDL/2 Equation PCI (NY), UN, INF (NY)	87
5.	Without the War, PDL/2 Equation for DT, Log of Time, UN, INF	88
III	Countries (PDL/2: Polynomial Distributed Lag, Second Degree Polynomial with Independent Variables: Income Per Capita, Unemployment Rate and an Inflation Measure.	
A.	England and Wales	
1.	Total Mortality Rates by Age and Sex with PDL/2 Equation for National Income Per Capita, UTO, PCI	
a.	Males	89
b.	Females	90
B.	Sweden	
1.	Total Mortality Rates by Age and Sex with PDL/2 Equation for Gross Domestic Product Per Capita, UN, INF	
a.	Males	91
b.	Females	92

TABLE 1

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

United States: 1940-1974 White Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	96.2	-.50E-2 [*] (1.92)	.65 * (5.05)	.87 * (2.94)	.89	21.9 *	1.93
LT 1	497.7	-.24 * (7.41)	12.60 * (8.04)	3.59 * (5.73)	.97	98.6 *	2.11
1-4	18.0	-.83E-2 [*] (6.32)	.86 * (13.26)	.83 * (5.54)	.98	180.1 *	2.01
5-14	7.66	-.34E-2 (1.02)	.25 + (1.53)	.43 (1.14)	.49	2.68*	2.00
15-24	11.8	-.46E-2 [*] (4.42)	.51 * (9.84)	.93 * (7.85)	.96	63.0 *	2.00
25-34	15.9	-.65E-2 [*] (4.67)	.83 * (12.14)	1.10 * (7.06)	.97	91.0 *	1.18
35-44	34.9	-.11E-1 [*] (5.17)	1.03 * (9.92)	1.61 * (6.78)	.97	81.0 *	.94
45-54	87.5	-.17E-1 [*] (6.11)	1.29 * (8.96)	2.10 * (6.37)	.98	111.0 *	1.03
55-64	208.6	-.40E-1 [*] (5.93)	1.97 * (6.02)	4.31 * (5.74)	.96	76.2 *	1.31
65-74	475.1	-.75E-1 [*] (5.17)	3.69 * (5.14)	4.17 * (2.54)	.96	65.7 *	1.34
75-84	1141.0	-.22 * (7.45)	10.4 * (7.04)	17.6 * (5.20)	.97	103.8 *	2.47
85+	2228.5	.20E-1 (0.12)	7.64 (0.90)	-38.8 * (1.99)	.73	7.52*	1.15

¹Per 10,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

TABLE 2

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

United States: 1940-1974 White Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	116.7	-.77E-2 [*] (2.11)	.23 (1.26)	.88 * (2.14)	.84	14.7 *	2.21
LT1	561.5	-.26 * (7.28)	13.9 * (7.84)	22.6 * (5.56)	.97	95.5 *	2.15
1-4	19.7	-.96E-2 [*] (6.35)	.96 * (12.86)	1.01 * (5.95)	.98	159.9 *	2.03
5-14	9.29	-.45E-2 [*] (7.44)	.32 * (10.97)	.65 * (9.63)	.98	148.2 *	2.38
15-24	16.3	-.56E-2 [*] (2.95)	.43 * (4.64)	1.27 * (5.95)	.91	26.8 *	2.44
25-34	19.4	-.66E-2 [*] (4.14)	.76 * (9.67)	1.29 * (7.19)	.96	74.6 *	1.92
35-44	43.6	-.12E-1 [*] (4.90)	1.01 * (8.31)	1.73 * (6.22)	.96	65.1 *	1.17
45-54	112.7	-.17E-1 [*] (4.94)	.88 * (5.28)	1.50 * (3.90)	.96	68.9 *	1.02
55-64	251.4	-.23E-1 [*] (2.54)	.97 * (2.16)	2.01 * (1.96)	.85	15.4 *	1.09
65-74	481.8	.57E-3 (0.03)	2.98 * (3.22)	-2.37 (1.12)	.72	7.01*	1.09
75-84	1083.9	-.11 * (3.35)	13.0 * (8.01)	15.8 * (4.26)	.92	33.1 *	2.48
85+	2055.1	.12 (0.66)	18.7 * (2.07)	-22.5 (1.09)	.62	4.59*	1.24

¹Per 10,000 population

+.10 Level of significance t = 1.31; F = 1.89

*.05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

TABLE 3

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

United States: 1940-1974 White Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	75.6	-.18E-2 (0.78)	.97 (8.34)*	.90 (3.37)*	.90	25.0 *	2.11
LT 1	433.0	-.21 (7.31) *	11.1 (7.90)*	18.1 (5.65)*	.97	96.6 *	2.03
1-4	16.6	-.82E-2 (6.48) *	.83 (13.38)*	.78 (5.50)*	.98	162.5 *	1.88
5-14	8.46	-.53E-2 (7.35) *	-.26 (7.27)*	.59 (7.31)*	.95	54.9 *	1.97
15-24	6.43	-.33E-2 (3.34) *	.58 (11.94)*	.67 (6.07)*	.96	70.0 *	.95
25-34	13.2	-.62E-2 (5.86) *	.79 (15.11)*	.90 (7.47)*	.98	163.5 *	1.22
35-44	27.5	-.11E-1 (5.97) *	1.06 (11.94)*	1.56 (7.69)*	.97	104.3 *	1.01
45-54	60.5	-.17E-1 (5.81) *	1.62 (11.41)*	2.47 (7.61)*	.98	120.0 *	.98
55-64	160.0	-.50E-1 (9.36) *	2.86 (10.96)*	6.08 (10.18)*	.99	182.1 *	1.61
65-74	431.7	-.12 * (8.97)	4.75 (7.36)*	9.01 (6.10)*	.98	161.5 *	1.47
75-84	1112.5	-.28 (9.40) *	10.4 (7.19)*	20.0 (6.06)*	.98	157.1 *	2.33
85+	2317.1	-.33E-1 (0.20)	-4.90 (0.59)	-45.1 (2.39)*	.75	8.34*	1.16

¹Per 10,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

TABLE 4

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

United States: 1940-1974 Nonwhite Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	136.4	-.32E-1 [†] (6.55)	1.67 * (6.95)	2.83 * (5.16)	.96	74.1 *	1.67
LT1	936.2	-.43 * (11.62)	21.0 * (11.59)	30.5 * (7.34)	.99	199.6 *	2.40
1-4	43.0	-.24E-1 [†] (11.12)	1.64 * (15.15)	2.27 * (9.13)	.99	245.4 *	2.84
5-14	12.9	-.66E-2 [†] (7.97)	.45 * (11.16)	.74 * (7.95)	.98	153.1 *	1.72
15-24	27.5	-.20E-1 [†] (5.64)	2.30 * (12.97)	3.71 * (9.14)	.97	90.0 *	0.93
25-34	51.3	-.29E-1 [†] (5.81)	3.02 * (12.35)	4.47 * (7.98)	.97	81.5 *	0.65
35-44	86.8	-.32E-1 [†] (3.84)	3.65 * (8.84)	5.05 * (5.35)	.95	52.1 *	0.59
45-54	219.1	-.77E-1 [†] (6.62)	4.13 * (7.36)	8.89 * (6.93)	.97	82.4 *	0.88
55-64	398.0	-.77E-1 [†] (4.83)	.59 (0.76)	3.74 * (2.09)	.93	37.5 *	1.55
65-74	433.5	.61E-1 (0.92)	4.22 (1.30)	-12.2 + (1.63)	.39	1.76	0.72
75-84	767.1	-.93E-1 [†] (2.07)	15.5 * (6.97)	14.8 * (2.92)	.84	14.8 *	2.36
85+	1484.6	-.12 (0.40)	23.1 * (3.47)	.98 (0.06)	.85	15.4 *	1.20

¹Per 10,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

TABLE 5

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

United States: 1940-1974 Nonwhite Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	143.5	-30.0E-1 (5.15) *	1.83 (6.38)*	3.26 (4.98)*	.94	43.6 *	1.72
LT 1	1043.9	-.48 (11.89) *	24.3 (12.21)*	34.4 (7.54)*	.99	207.4 *	2.33
1-4	43.1	-.24E-1 (11.40) *	1.84 (17.66)*	2.30 (9.65)*	.99	301.0 *	2.67
5-14	13.8	-.69E-2 (7.68) *	.49 (10.92)*	.86 (8.45)*	.98	125.6 *	2.44
15-24	26.9	-.17E-1 (4.34) *	2.12 (11.08)*	3.79 (8.67)*	.95	52.4 *	.84
25-34	43.1	-.24E-1 (3.92) *	3.54 (11.86)*	5.15 (7.54)*	.94	45.2 *	.77
35-44	66.4	-.16E-1 (1.52) +	4.35 (8.12)*	5.13 (4.19)*	.89	23.5 *	.56
45-54	196.1	-.51E-1 (3.57) *	5.00 (7.05)*	8.81 (5.43)*	.93	36.6 *	.73
55-64	379.5	-.48E-1 (1.92) *	1.92 (1.55)+	4.28 (1.50)+	.64	4.99*	1.27
65-74	431.2	.15 (2.05) *	-.30 (0.08)	-22.79 * (2.73)	.49	2.70*	.71
75-84	732.1	-.74E-1 (1.10)	24.0 (7.24)*	25.9 (3.41)*	.74	7.98*	2.25
85+	1909.2	-.35 (1.84) *	23.6 (2.50)*	23.6 (1.09)	.82	12.9 *	.98

¹ Per 10,000 population

+.10 Level of significance t = 1.31; F = 1.89

*.05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

United States: 1940-1974 Nonwhite Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	126.4	-.35E-1 [*] (5.48)	1.48 * (4.70)	3.16 * (4.36)	.94	44.8 *	2.13
LT1	780.1	-.34 * (9.29)	17.1 * (9.61)	23.8 * (5.84)	.98	134.2 *	1.89
1-4	36.1	-.19E-1 [*] (8.08)	1.61 * (13.68)	1.69 * (6.25)	.98	154.4 *	2.18
5-14	9.42	-.48 E-2 [*] (6.37)	.49 * (13.20)	57.8 * (6.82)	.98	153.4 *	1.87
15-24	27.3	-.23E-1 [*] (7.20)	2.35 * (15.21)	3.34 * (9.41)	.98	141.3 *	1.03
25-34	52.4	-.28E-1 [*] (6.41)	2.37 * (11.15)	3.15 * (6.44)	.98	112.1 *	0.92
35-44	95.8	-.39E-1 [*] (6.02)	2.96 * (9.35)	4.13 * (5.69)	.97	96.6 *	0.88
45-54	218.9	-.85E-1 [*] (8.99)	3.08 * (6.64)	8.55 * (8.04)	.98	130.8 *	1.15
55-64	394.5	-.99E-1 [*] (7.69)	.69 (1.08)	4.01 * (2.75)	.97	93.9 *	1.70
65-74	408.8	.33E-1 (0.57)	2.47 (0.88)	-9.87 + (1.54)	.46	2.23 +	0.61
75-84	771.2	-.13 * (3.71)	6.92 * (4.07)	13.6 * (3.48)	.84	14.5 *	2.95
85+	1407.5	-.12 (0.95)	14.1 * (2.26)	-2.76 (0.19)	.73	7.31 *	0.97

¹Per 10,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-3.66	.25E-2 [*] (3.13)	.43 * (11.30)	.67 * (7.98)	.94	40.1 *	0.76
LT 1	-1.99	.42E-2 [*] (3.19)	.17 * (2.69)	-.13 (0.94)	.50	2.46	1.30
5-14	-.76	.69E-3 [*] (5.67)	.41E-1 ⁻¹ (7.05)	.15E-1 (1.15)	.88	19.5 *	2.33
15-24	-5.76	.30E-2 [*] (2.74)	.59 * (11.34)	1.02 * (8.91)	.95	53.2 *	0.78
25-34	-8.98	.65E-2 [*] (3.80)	.83 * (10.21)	1.07 * (5.88)	.93	37.2 *	0.83
35-44	-7.06	.57E-2 [*] (3.75)	.63 * (8.74)	.92 * (5.76)	.92	31.6 *	0.94
45-54	-2.75	.32E-2 [*] (3.34)	.37 * (8.21)	.53 * (5.26)	.92	31.8 *	0.92
55-64	-4.24	.39E-2 [*] (5.75)	.30 * (9.46)	.26 * (3.59)	.94	41.4 *	1.55
65-74	-1.75	.17E-2 ^k (2.68)	.21 * (7.09)	.28 * (4.24)	.88	19.8 *	1.84
75-84	-.40	.27E-3 (0.32)	.18 * (4.56)	.37 * (4.17)	.72	6.81*	1.47
85+	-.86	.17E-2+ (1.54)	.92E-1 ⁻¹ (1.77)	.73E-1 (0.63)	.58	3.68*	2.43

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable ²	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-4.03	.73E- ² (3.70)	.83 * (8.93)	1.22 * (5.88)	.93	34.9 *	0.96
LT 1	-2.22	.14E- ¹ (3.09)	.20 (0.94)	-1.05 * (2.24)	.34	1.38	1.19
5-14	-1.65	.22E- ² (5.75)	.77E- ¹ (4.34)	-.50E-1 (1.28)	.83	12.7 *	2.43
15-24	-7.80	.85E- ² (2.93)	1.18 * (8.62)	2.04 * (6.71)	.95	46.1 *	0.95
25-34	-13.6	.20E- ¹ (4.17)	1.63 * (7.27)	1.60 * (3.21)	.92	29.2 *	0.92
35-44	-9.80	.17E- ¹ (4.20)	1.13 * (5.88)	1.39 * (3.25)	.90	24.9 *	1.07
45-54	.37	.92E- ² (3.83)	.58 * (5.10)	.62 * (2.44)	.92	29.0 *	1.31
55-64	-7.25	.12E- ¹ (6.11)	.55 * (5.96)	.60E-1 (0.29)	.92	32.4 *	1.89
65-74	-1.18	.49E- ² (2.54)	.37 * (4.05)	.37 * (1.82)	.82	12.1 *	1.82
75-84	2.80	.18E-3 (0.07)	.33 * (2.91)	.79 * (3.11)	.63	4.48*	1.70
85+	.60	.52E-2+ (1.55)	.68E-1 (0.43)	-.20 (0.55)	.50	2.72*	2.63

¹Per 100,000 population

²Rated by % of male population ages 15-29.

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

TABLE 9

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Dummy Time Trend 1967-73	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-1.64	.18E-1* (3.28)	.20E-2* (3.00)	.34 * (8.09)	.48 * (5.22)	.96	51.8 *	1.11
LT 1	-3.48	-.13E-1 (1.23)	.45E-2* (3.40)	.23 * (2.87)	.98 (0.05)	.59	2.42*	1.46
5-14	-.72	.29E-3 (0.28)	.68E-3* (5.40)	.39E-1* (5.09)	.12E-1 (0.69)	.88	16.9 *	2.31
15-24	-2.46	.30E-1* (4.33)	.23E-2* (2.71)	.44 * (8.60)	.71 * (6.31)	.97	85.1 *	1.47
25-34	-4.13	.44E-1* (3.81)	.55E-2* (3.92)	.62 * (7.27)	.61 * (3.25)	.96	53.9 *	1.23
35-44	-3.17	.35E-1* (3.33)	.48E-2* (3.73)	.46 * (5.78)	.55 * (3.18)	.95	41.6 *	1.45
45-54	-.80	.18 * (2.45)	.28E-2* (3.12)	.28 * (5.29)	.34 * (2.91)	.94	35.2 *	1.32
55-64	-3.26	.89E-2+ (1.64)	.37E-2* (5.51)	.26 * (6.40)	.16 * (1.83)	.95	40.1 *	1.74
65-74	-.32	.13E-1* (2.83)	.14E-2* (2.43)	.15 * (4.31)	.14 * (1.92)	.91	23.8 *	2.33
75-84	.68	.97E-2+ (1.41)	.42E-4 (0.05)	.14 * (2.64)	.27 * (2.39)	.74	6.58*	1.59
85+	.57	.13E-1+ (1.44)	.14E-2 (1.26)	.30E-1 (0.45)	-.62 (0.42)	.61	3.67*	2.65

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.50; F = 3.21

.001 Level of significance t = 3.49; F = 4.73

TABLE 10

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent ² Variable	Intercept	Dummy Time Trend 1967-73	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1.87	.53E-1 [†] (4.25)	.60E-2 [*] (3.92)	.58 * (6.15)	.67 * (3.24)	.96	55.6 *	1.70
LT 1	-7.82	-.15E-1+ (1.40)	.15E-1 [†] (3.36)	.44 + (1.63)	-.52 (0.88)	.39	1.49	1.36
5-14	-1.62	.27E-3 (0.08)	.21E-2 [†] (5.51)	.76E-1 [†] (3.19)	-.53E-1 (1.10)	.83	10.9 *	2.42
15-24	2.00	.89E-1 [†] (5.46)	.63E-2 [†] (3.21)	.75 * (6.21)	1.12 * (4.21)	.98	94.4 *	2.28
25-34	.39	.13 * (4.17)	.17E-1 [†] (4.49)	1.02 * (4.49)	.28 (0.56)	.95	46.0 *	1.45
35-44	1.56	.10 * (3.78)	.15E-1 [†] (4.40)	.63 * (3.14)	.32 (0.72)	.94	36.3 *	1.81
45-54	5.75	.49E-1 [†] (2.73)	.81 * (3.70)	.35 * (2.61)	.11 (0.39)	.94	33.8 *	1.97
55-64	-4.75	.23E-1+ (1.43)	.11E-1 [†] (5.85)	.44 * (3.71)	-.18 (0.68)	.93	30.7 *	2.06
65-74	2.85	.36E-1 [†] (2.49)	.40E-2 [†] (2.26)	.20 * (1.79)	-.91E-2 (0.04)	.86	13.8 *	2.18
75-84	5.98	.29E-1+ (1.47)	-.53E-3 (0.22)	.19 + (1.32)	.49 + (1.52)	.66	4.44*	1.86
85+	4.65	.37E-1+ (1.33)	.43E-2 (1.29)	-.11 (0.53)	-.58 (1.28)	.54	2.70*	2.83

¹ Per 100,000 population

² Rated by % of U.S. male population ages 15-29

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.50; F = 3.21

.001 Level of significance t = 3.49; F = 4.73

Table 11

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Dummy Per Capita Income 1964-73	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-1.42	.40E-3 [*] (2.42)	.12E-2+ (1.34)	.37 [*] (9.17)	.65 [*] (8.42)	.95	43.9 [*]	1.17
LT 1	.22E-1	.36E-3 (1.20)	.31E-2 (1.89)	.12 ⁺ (1.65)	-.15 (1.08)	.51	2.40*	1.28
5-14	-1.09	-.59E-4 [*] (2.32)	.88E-3 (6.35)	.48E-1 [*] (7.73)	.18E-1+ (1.51)	.90	21.3 [*]	2.46
15-24	-3.57	.39E-3+ (1.62)	.17E-2+ (1.33)	.53 [*] (9.03)	1.00 [*] (8.95)	.96	51.4 [*]	0.95
25-34	-2.85	.11E-2 [*] (3.30)	.30E-2+ (1.69)	.69 [*] (8.48)	1.01 [*] (6.56)	.95	48.4 [*]	1.60
35-44	-1.62	.97E-3 [*] (3.37)	.25E-2+ (1.63)	.50 [*] (7.02)	.87 [*] (6.45)	.95	41.8 [*]	1.53
45-54	.35E-2	.49E-3 [*] (2.50)	.16E-2+ (1.50)	.31 [*] (6.32)	.50 [*] (5.48)	.94	35.5 [*]	1.39
55-64	-16.1	.76E-4 (0.34)	.37E-2 [*] (4.35)	.30 [*] (7.65)	.25 [*] (3.46)	.96	37.4 [*]	2.07
65-74	-11.1	.20E-3 (0.89)	.13E-2 (1.68)	.19 [*] (5.52)	.27 [*] (4.09)	.91	14.9 [*]	2.21
75-84	-7.63	.29E-3 (1.23)	-.12E-2 (1.26)	.12 [*] (2.89)	.35 [*] (4.33)	.87	10.2 [*]	2.57
85+	-.29	.10E-3 (0.40)	.14E-2 (0.98)	.79E-1 (1.25)	.67E-1 (0.57)	.58	3.21*	2.45

¹Per 100,000 population

+ .10 Level of significance t = 1.33; F = 1.89

* .05 Level of significance t = 1.73; F = 2.28

.01 Level of significance t = 2.53; F = 3.23

.001 Level of significance t = 3.55; F = 4.82

Table 12

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Dummy Per Capita Income 1964-73	Per Capita Income	Unemployment Rate	Inflation Rate	% Male Pop. Ages 15-29	R ²	F-Value	D.W.
Total	-19.1	.38E-3 [*] (2.11)	.41E-2+ (2.98)	.13 [*] (2.52)	-.22E-1 (0.14)	54.1 [*] (4.25)	.98	79.9 [*]	1.87
LT 1	39.5	-.25E-3 (0.60)	-.52E-2 (1.62)	.36 [*] (3.02)	.99 [*] (2.75)	-99.8 [*] (3.35)	.69	3.40 [*]	1.99
5-14	-2.21	-.68E-4+ (1.65)	.11E-2 [*] (3.37)	.31E-1 [*] (2.64)	-.28E-1 (0.79)	3.55 (1.21)	.92	16.9 [*]	2.68
15-24	-36.7	.66E-3 [*] (2.40)	.80E-2 [*] (3.78)	.22 [*] (2.83)	-.82E-1 (0.34)	91.2 [*] (4.62)	.98	81.9 [*]	1.59
25-34	-26.5	.10E-2 [*] (2.14)	.66E-2 [*] (1.82)	.32 [*] (2.40)	.76E-1 (0.19)	75.5 [*] (2.24)	.97	49.8 [*]	1.93
35-44	-21.2	.86E-3 [*] (2.21)	.55E-2+ (1.69)	.15 ⁺ (1.37)	.60E-1 (0.18)	65.8 [*] (2.37)	.97	48.3 [*]	1.81
45-54	-13.7	.34E-3+ (1.34)	.34E-2 [*] (1.76)	.42E-1 (0.71)	-.92E-1 (0.42)	46.6 [*] (2.57)	.97	45.1 [*]	2.03
55-64	-3.94	.54E-4 (0.34)	.55E-2 [*] (3.25)	.13 [*] (1.99)	-.20 (1.02)	37.5 [*] (2.36)	.94	35.9 [*]	1.60
65-74	-1.12	.11E-3 (0.78)	.36E-2 [*] (2.08)	.13 [*] (2.05)	-.40E-1 (0.20)	25.0 ⁺ (1.55)	.88	17.6 [*]	2.00
75-84	2.15	.45E-3 [*] (2.63)	.45E-3 (0.25)	-.49E-1 (0.72)	-.93E-1 (0.46)	32.2 [*] (1.92)	.78	8.34 [*]	1.77
85+	-3.68	.16E-3 (0.41)	.13E-2 (0.40)	.34E-3 (0.03)	-.50E-1 (0.14)	13.3 (0.45)	.65	2.83 [*]	2.68

¹ Per 100,000 population

+ .10 Level of significance $t = 1.32$; $F = 1.89$

* .05 Level of significance $t = 1.71$; $F = 2.28$

.01 Level of significance $t = 2.50$; $F = 3.21$

.001 Level of significance $t = 3.49$; $F = 4.73$

TABLE 13

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL SUICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	6.34	.90E-3+ (1.50)	.42 * (14.77)	.27 * (4.23)	.91	26.2 *	1.80
5-14	-.11	.12E-3+ (1.58)	.97E-2 [†] (2.69)	.20E-1 [†] (2.51)	.73	7.37*	1.84
15-24	-7.45	.53E-2 [†] (8.53)	.50 * (16.80)	.39 * (6.00)	.97	100.5 *	1.74
25-34	-5.80	.78E-2 [†] (8.55)	.69 * (15.99)	.50E-1 (0.52)	.96	59.1 *	2.01
35-44	1.35	.63E-2 [†] (3.72)	.70 * (8.71)	.63E-1 (0.35)	.81	11.0 *	1.13
45-54	14.6	.21E-2+ (1.47)	.65 * (9.79)	-.11 (0.77)	.87	17.6 *	2.20
55-64	26.5	-.29E-2+ (1.54)	.65 * (7.20)	.70E-1 (0.34)	.90	23.5 *	1.80
65-74	38.2	-.12E-1 [†] (6.37)	.42 * (4.61)	1.01 * (4.93)	.93	36.4 *	2.38
75-84	42.8	-.12E-1 [†] (4.45)	.18 + (1.49)	.66 * (2.39)	.91	27.4 *	2.18
85+	31.5	0.24E-2 (0.61)	-.35 * (1.87)	-.74 * (1.77)	.78	9.58*	2.03

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 14

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL SUICIDE RATES¹

United States: 1940-1973 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Logged	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-.62	2.08 * (3.63)	.43 * (12.51)	.31 * (6.68)	.87	25.3 *	2.03
5-14	-1.43	.37 * (5.65)	.12E-1 * (3.03)	.25E-1 * (4.77)	.69	8.24*	1.73
15-24	-55.5	13.8 * (16.09)	.60 * (11.49)	.68 * (9.89)	.92	45.4 *	1.51
25-34	-55.3	14.8 * (13.80)	.81 * (12.47)	.56 * (6.51)	.91	37.1 *	2.01
35-44	-26.8	8.90 * (5.85)	.77 * (8.37)	.52 * (4.21)	.76	11.7 *	1.24
45-54	20.6	-.98 * (0.77)	.65 * (8.50)	.83E-1 (0.82)	.84	19.1 *	1.77
55-64	71.9	-12.4 * (7.96)	.56 * (5.59)	-.50E-1 (0.40)	.90	32.0 *	1.65
65-74	103.3	-19.8 * (12.05)	.25 * (2.55)	.94E-1 (0.71)	.92	45.7 *	2.11
75-84	128.7	-25.0 * (11.96)	-.22E-1 (0.17)	-.12 (0.72)	.91	39.0 *	2.09
85+	121.9	-22.8 * (5.51)	-.49 * (1.96)	-.18 (0.53)	.64	6.63*	1.39

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.96

* .05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

Table 15

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
CARDIOVASCULAR-RENAL DISEASE MORTALITY RATES¹

United States: 1940-1973 Total Population

Ordinary Least Squares Lags 1-4

Dependent Variable	Intercept	Time Trend	Time Trend Logged	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-2836.8	-17.8 * (4.70)	1077.0 * (4.76)	2.35 * (1.83)	1.04 (0.78)	.74	6.48*	2.36
0-4	222.7	1.08 * (6.91)	-69.5 * (7.45)	-.58E-1 (1.10)	-.26E-2 (0.05)	.97	828.0 *	1.45
5-14	353.3	1.61 * (9.94)	-109.1 * (11.28)	-.64E-1 (1.17)	-.23E-1 (0.40)	.99	309.0 *	1.36
15-24	328.1	1.17 * (4.60)	-95.0 * (6.26)	-.47E-1 (0.55)	.22E-1 (0.24)	.99	324.7 *	2.39
25-34	166.8	-.20 (0.40)	-31.7 (1.04)	.36 * (2.11)	-.68E-1 (0.39)	.99	208.9 *	1.90
35-44	399.8	-.38 (0.26)	-67.7 (0.76)	.60 (1.18)	.70 + (1.35)	.98	102.9 *	1.01
45-54	-834.1	-12.9 * (3.88)	476.1 * (2.39)	1.70 + (1.50)	3.39 * (2.90)	.99	152.9 *	1.37
55-64	-3077.6	-35.9 * (4.63)	1504.4 * (3.25)	3.50 + (1.33)	5.05 * (1.86)	.98	117.8 *	1.83
65-74	-8860.8	-88.2 * (3.38)	4016.1 * (2.58)	21.4 * (2.42)	2.19 (0.24)	.95	44.8 *	1.34
75-84	-21172.1	-217.4 * (3.79)	9762.4 * (2.84)	54.8 * (2.81)	19.1 (0.95)	.96	60.7 *	2.26
85+	-141742.0	-898.2 * (2.92)	512.1 * (2.78)	195.7 * (1.87)	-5.41 (0.85)	.49	2.18+	1.09

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.89

* .05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.50; F = 3.21

.001 Level of significance t = 3.49; F = 4.73

Table 16

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
CARDIOVASCULAR-RENAL DISEASE MORTALITY RATES¹

United States: 1945-1973 Total Population

Ordinary Least Squares Lag 1-4

Dependent Variable	Intercept	Time Trend	Time Trend Logged	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-843.8	-7.5 + (1.43)	436.3 + (1.35)	6.15 * (3.17)	-1.10 (0.74)	.79	6.66*	2.02
0-4	321.7	1.59* (6.56)	-101.3 * (6.80)	.76E-1 (0.86)	-.12 * (1.75)	.95	35.1 *	1.58
5-14	415.7	1.92* (10.39)	-129.3 * (11.35)	.17 * (2.50)	-.61E-1 (1.18)	.99	252.6 *	1.50
15-24	441.2	1.75* (4.14)	-131.5 * (5.07)	.26 + (1.65)	-.84E-1+ (1.71)	.99	151.2 *	2.12
25-34	427.9	1.13* (1.92)	-115.9 * (3.21)	1.25 * (5.77)	-.23 + (1.38)	.99	200.7 *	1.52
35-44	312.1	-.86 (0.35)	-40.6 (0.27)	1.53 + (1.69)	1.19 + (1.71)	.97	54.1	1.21
45-54	-245.9	-9.94* (1.80)	285.1 (0.84)	4.54 * (2.23)	3.52 * (2.26)	.98	108.3 *	1.62
55-64	-948.8	-24.9 * (2.00)	819.0 (1.07)	7.50 + (1.63)	3.29 (0.94)	.98	92.9 *	1.56
65-74	-8225.2	-84.8 * (1.95)	3809.6 + (1.42)	23.4 + (1.46)	2.17 (0.18)	.93	25.6 *	1.03
75-84	955.8	-102.5 + (1.54)	2683.9 (0.65)	57.5 * (2.34)	-18.25 (0.97)	.98	74.0 *	2.02
85+	50856.8	90.5 (0.20)	-10725.9 (0.38)	595.3 * (3.54)	-205.9 + (1.60)	.67	3.66*	1.20

¹Per 100,000 population

+ .10 Level of significance t = 1.33; F = 1.98

*.05 Level of significance t = 1.73; F = 2.41

.01 Level of significance t = 2.55; F = 3.51

.001 Level of significance t = 3.62; F = 5.39

Table 17

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
CARDIOVASCULAR-RENAL DISEASE MORTALITY RATES¹

United States: 1945-1973 Total Population

Ordinary Least Squares Lags 1-4

Dependent Variable	Intercept	Per Capita Income Lag = 0	Food Energy Lag = 0	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	584.3	.62E-2 (0.92)	-.25E-1 (0.49)	5.41 * (1.93)	-2.04 + (1.65)	.77	5.96*	1.88
0-4	-43.4	-.25E-2* (6.34)	.15E-1* (5.05)	.45 + (2.72)	.39E-1 (0.53)	.91	18.7 *	1.46
5-14	-48.8	-.51E-2* (7.90)	.18E-1* (3.73)	.50 * (1.87)	.23 * (1.94)	.94	29.7 *	1.12
15-24	-67.3	-.10E-1* (10.58)	.29E-1* (3.88)	.78 * (1.95)	.17 (0.99)	.96	41.9 *	1.62
25-34	-50.8	-.18E-1* (11.36)	.32E-1* (2.69)	1.59 * (2.45)	.15 (0.53)	.96	41.5 *	1.34
35-44	-22.1	-.35E-1* (9.63)	.55E-1* (1.99)	2.22 + (1.46)	1.37 * (2.05)	.95	36.3 *	1.43
45-54	83.9	-.12 * (14.93)	.14 * (2.31)	5.71 + (1.72)	3.44 * (2.36)	.98	77.5 *	1.62
55-64	440.5	-.26 * (13.13)	.29 * (1.93)	9.49 (1.16)	2.71 (0.75)	.97	55.7 *	1.36
65-74	2461.9	-.47 * (8.07)	.22 (0.48)	17.2 (0.70)	-1.24 (0.12)	.92	20.7 *	1.10
75-84	3326.7	-1.30 * (12.14)	1.49 * (1.82)	65.9 + (1.47)	-16.1 (0.82)	.96	41.9 *	1.67
85+	19891.6	-1.49 * (2.63)	-1.36 (0.31)	444.4 * (1.88)	-86.3 (0.83)	.66	3.46*	1.15

¹Per 100,000 population

+ .10 Level of significance $t = 1.33$; $F = 1.98$

* .05 Level of significance $t = 1.73$; $F = 2.41$

.01 Level of significance $t = 2.55$; $F = 3.51$

.001 Level of significance $t = 3.62$; $F = 5.39$

Table 18

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL CIRRHOSIS RATES¹
United States: 1940-73 Total Population
Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-.21	.65E-2 [*] (8.99)	.14 * (4.21)	.16E-3 (0.02)	.98	114.4 *	1.65
LT1	1.59	-.87E-3+ (1.52)	.38E-1+ (1.40)	.11 * (1.82)	.51	2.75*	1.29
1-4	.32	-.22E-3 [*] (1.77)	.39E-2 (0.66)	.36E-1* (2.73)	.58	3.70*	1.70
5-14	.24	.42 (0.67)	.71E-2 [*] (2.36)	.46E-2 (0.68)	.63	4.48*	2.69
15-24	.27	-.73E-4 (0.42)	.36 (0.42)	.33E-1* (1.73)	.33	1.33	2.74
25-34	-1.29	.22E-2 [*] (4.92)	.59E-1 [*] (2.80)	.86E-2 (0.18)	.94	43.3 *	1.56
35-44	-8.00	.12E-1 [*] (8.22)	.23 * (3.43)	-.54E-1 (0.36)	.97	95.6 *	1.12
45-54	-11.98	.24E-1 [*] (12.32)	.34 * (3.61)	-.78 * (3.78)	.98	173.4 *	1.97
55-64	-14.65	.27E-1 [*] (8.96)	.93 * (6.58)	.18 (0.58)	.97	90.2 *	0.75
65-74	24.76	.35E-2 (1.26)	.68 * (5.14)	.66 * (2.24)	.83	12.6 *	2.24
75-84	55.77	-.19E-1 [*] (4.90)	.67 * (3.70)	2.26 * (5.58)	.96	60.4 *	1.76
85+	71.42	-.32E-1 [*] (3.69)	1.03 * (2.51)	2.97 * (3.25)	.91	28.0 *	2.67

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 19

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL IMPRISONMENT RATE¹United States: 1935-1965 by Region²

Without the War 1942-1945

Lag = 0-2 PDL/1

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total U.S.	23.0	.11E- ¹ (4.36)	.63 * (3.64)	-.84 * (2.09)	.67	6.69*	1.60
Northeast	14.4	.35E-2+ (1.61)	.90 * (5.79)	.46E-1 (0.13)	.88	24.6 *	1.60
Mid Atlantic	43.2	-.66E- ² (4.05)	-.12 (1.07)	-.40 + (1.48)	.83	16.1 *	1.07
East North Central	34.9	.18E-2 (0.42)	.46 + (1.46)	-.82 (1.12)	.70	7.24*	1.79
West North Central	15.6	.87E- ² (2.74)	1.09 * (4.83)	-.53 (1.02)	.82	15.6 *	2.00
South Atlantic	20.9	.21E- ¹ (4.20)	1.21 * (3.48)	.88 (1.09)	.64	5.89*	1.12
East South Atlantic	74.0	-.16E- ¹ (2.67)	2.05 * (2.48)	-2.12 * (2.44)	.67	4.32*	1.67
West South Atlantic	-19.6	.33E- ¹ (8.58)	2.70 * (9.93)	-.58E-1 (0.09)	.92	36.7 *	1.62
Mountain	63.1	-.55E-2 (1.28)	.37 (1.21)	.22 (0.32)	.66	6.36*	2.32
Pacific	20.9	.74E- ² (2.21)	.53 * (2.24)	-.39 (0.73)	.41	2.22*	1.58

¹Per 100,000 population²Samples vary.

+.10 Level of significance t = 1.33; F = 2.09

*.05 Level of significance t = 1.73; F = 2.40

.01 Level of significance t = 2.53; F = 3.45

.001 Level of significance t = 3.55; F = 5.24

Table 20

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL IMPRISONMENT RATE¹United States: 1935-1973 by Region²

Without the War 1942-1945

Lag = 0-2 PDL/1

Dependent Variable	Intercept	Dummy Constant 1966-71	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
TOTAL U.S.	12.7	-9.76 * (8.17)	.14E-1 [†] (7.33)	.96 * (8.82)	-.83E-1 (0.26)	.83	18.8 *	1.38
Northeast	4.22	-5.80 * (4.49)	.73E-2 [‡] (4.20)	1.23 * (12.09)	.73 * (2.48)	.88	31.7 *	1.64
Middle Atlantic	15.3	-9.92 * (5.80)	.39E-2+ (1.42)	.79 * (5.07)	1.33 * (2.98)	.68	8.23*	0.94
East North Central	24.8	-4.56 * (2.07)	.53E-2+ (1.60)	.79 * (3.94)	-.10 (0.19)	.74	9.88*	1.52
West North Central	21.2	-5.45 * (3.34)	.65E-2 [‡] (2.83)	.90 * (7.01)	-.86 * (2.33)	.83	16.8 *	2.09
South Atlantic	2.78	-17.9 * (5.76)	.28E-1 [†] (6.56)	1.82 * (7.36)	1.92 * (2.85)	.83	15.9 *	1.16
East South Central	37.9	-9.52 * (3.62)	.14E-2 (0.27)	1.39 + (1.42)	.51 (0.70)	.67	5.73*	1.30
West South Central	-6.07	-7.43 * (3.28)	.28E-1 [†] (8.71)	2.26 * (12.65)	-.90 * (1.75)	.91	35.3 *	1.74
Mountain	70.0	-13.7 * (6.64)	-.88E-2 [‡] (2.66)	.11 (0.60)	.60E-1 (0.11)	.90	34.4 *	1.81
Pacific	15.9	-10.9 * (6.56)	.89E-2 [‡] (3.29)	.67 * (4.44)	.97E-1 (0.22)	.70	8.82*	1.41

¹Per 100,000 population admitted to state prisons²Samples vary

+.10 Level of significance t = 1.31; F = 1.89

*.05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

Table 21

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL IMPRISONMENT RATE¹United States: 1935-1965 by Region²

Without the War 1942-1945

Lag = 0-2 PDL/1

Dependent Variable	Intercept	Time Trend	Time Trend Logged	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
TOTAL U.S.	-578.0	-3.18 * (3.14)	195.5 * (3.48)	1.59 * (5.92)	.64 * (3.35)	.76	10.4 *	1.87
Northeast	50.8	.28 (0.24)	-11.9 (0.19)	.84 * (2.78)	.45 * (2.09)	.86	21.2 *	1.56
Middle Atlantic	-287.0	-2.18 * (2.63)	108.4 * (2.37)	.52 * (2.39)	.24 + (1.57)	.82	14.9 *	1.40
East North Central	-894.0	-5.46 * (2.56)	303.9 * (2.57)	2.06 * (3.73)	1.30 * (3.35)	.69	7.20*	1.66
West North Central	-345.9	-1.74 + (1.40)	116.6 + (1.69)	1.64 * (4.99)	.54E-2 (0.02)	.89	26.0 *	1.65
South Atlantic	-146.4	-.32 (0.13)	53.4 (0.40)	1.31 * (2.08)	1.72 * (3.84)	.64	5.92*	1.30
East South Central	-1797.6	-10.8 * (4.09)	606.8 * (3.99)	1.68 * (1.86)	.51 + (1.35)	.74	6.26*	1.92
West South Central	524.3	4.38 * (3.21)	-181.6 * (2.40)	1.58 * (4.37)	-.16 (0.63)	.96	71.9 *	1.34
Mountain	-384.3	-2.77 + (1.34)	146.2 (1.28)	1.18 * (2.15)	.72 * (1.85)	.66	6.59*	2.48
Pacific	-380.0	-2.09 + (1.36)	130.2 + (1.54)	1.15 * (2.93)	.44 + (1.58)	.51	3.28*	1.57

¹ Per 100,000 admitted to state prisons² Samples vary

+.10 Level of significance t = 1.33; F = 2.09

*.05 Level of significance t = 1.73; F = 2.40

.01 Level of significance t = 2.53; F = 3.45

.001 Level of significance t = 3.55; F = 5.24

Table 22

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL IMPRISONMENT RATE¹United States: 1935-1973 by Region²

Without the War 1942-1945

Lag = 0-2 PDL/1

Dependent	Inter- cept	Dummy Constant 1966-71	Time Trend	Time Trend Logged	Unemploy- ment Rate	Infla- tion Rate	% Male Pop. 15-29	R ²	F-Value	D.W.
TOTAL U.S.	-594.5	-8.36 *	-2.55 *	180.9*	1.52 *	.50 *	1.31 *	.90	23.9 *	1.90
		(8.33)	(2.38)	(2.93)	(5.60)	(3.07)	(4.27)			
Northeast	22.1	-5.36 *	.50	-13.6	.82 *	.43 *	.75 *	.89	20.5 *	1.72
		(4.03)	(0.41)	(0.19)	(2.68)	(2.06)	(2.17)			
Middle Atlantic	-680.9	-7.39 *	-3.37 *	203.6*	.72 *	.22 +	2.49 *	.95	51.8 *	2.38
		(10.07)	(4.30)	(4.51)	(3.64)	(1.59)	(11.11)			
East North Central	-1094.7	-3.42 +	-6.01 *	350.7*	2.13 *	1.22 *	1.38 *	.78	8.45*	1.70
		(1.52)	(2.55)	(2.61)	(3.93)	(3.35)	(2.09)			
West North Central	-101.8	-5.01 *	-.31	38.9	1.50 *	.46	-.37	.91	25.7 *	1.99
		(3.89)	(0.26)	(0.57)	(5.06)	(1.23)	(1.11)			
South Atlantic	-36.4	-15.0 *	1.31	-7.73	1.36 *	1.94 *	1.38 +	.83	11.6 *	1.19
		(4.05)	(0.46)	(0.47)	(1.88)	(3.91)	(1.68)			
East South Central	-2884.1	-6.11 *	-15.2 *	907.6*	2.18 *	.63 *	3.94 *	.86	12.2 *	1.65
		(2.76)	(3.98)	(4.05)	(2.49)	(1.77)	(4.43)			
West South Central	851.0	-7.79 *	6.07 *	-279.0*	1.48 *	-.46E-1	-.98 *	.97	78.3 *	2.32
		(5.35)	(4.53)	(3.62)	(4.41)	(0.20)	(2.60)			
Mountain	-65.9	-13.6 *	-.97	45.9	.82 +	.48	-.44	.91	28.3 *	2.13
		(6.57)	(0.44)	(0.36)	(1.46)	(1.26)	(0.69)			
Pacific	-322.0	-9.62 *	-1.21	96.8	.99 *	.26	.92 +	.76	8.24*	1.54
		(5.81)	(0.64)	(0.89)	(2.18)	(0.86)	(1.70)			

¹Per 100,000 population admitted to state prisons²Samples vary

+.10 Level of significance t = 1.31; F = 1.89

*.05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

Table 23

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL IMPRISONMENT RATE¹United States: 1935-1973 by Region²

Without the War 1942-1945

Lag = 0-2 PDL/1

Dependent Variable	Intercept	Dummy Constant 1966-71	Per Capita Income	Unemployment Rate	Inflation Rate	% Male Pop. Ages 15-29	R ²	F-Value	D.W.
TOTAL U.S.	-9.80	-8.42 *	.19E-1 [†] (6.28)	.89 * (4.03)	-.84 * (1.71)	.58 * (1.72)	.79	10.2 *	1.72
Northeast	-15.9	-5.04 * (4.09)	.91E-2 [†] (4.08)	.97 * (5.85)	.31E-1 (0.08)	.67 * (2.73)	.91	24.5 *	1.76
Middle Atlantic	-37.2	-8.20 * (7.67)	.66E-2 [†] (3.00)	-.13 (0.78)	-.80 * (2.22)	1.95 * (7.95)	.90	23.8 *	2.16
East North Central	2.48	-2.75 (1.19)	.10E-1 [†] (2.36)	.72 * (2.08)	-.89 (1.26)	.55 (1.10)	.77	8.00*	1.87
West North Central	37.2	-5.17 * (2.77)	.83E-2 [†] (2.86)	1.43 * (6.57)	-.14 (0.30)	-.78 * (2.46)	.86	15.6 *	1.79
South Atlantic	-25.8	-8.56 + (1.56)	.36E-1 [†] (5.02)	1.86 * (3.42)	.60 (0.53)	.62 (0.77)	.74	6.60*	0.96
East South Central	-36.0	-.88 (0.24)	.28E-2 (0.46)	3.22 * (2.97)	-2.04 + (1.69)	2.37 * (2.52)	.70	4.60*	1.14
West South Central	23.5	-7.71 * (4.05)	.29E-1 [†] (8.51)	3.11 * (12.10)	.57 (1.00)	-1.36 * (3.57)	.95	45.3 *	2.07
Mountain	74.5	-13.8 * (6.71)	-.53E-2 (1.25)	.55 * (1.75)	.55 (0.75)	-.46 (0.95)	.91	28.6 *	2.11
Pacific	-1.37	-10.9 * (6.46)	.14E-1 [†] (4.03)	.80 * (3.03)	-.31 (0.54)	.31 (0.78)	.74	7.67*	1.98

¹Per 100,000 population admitted to state prisons²Samples vary

+.10 Level of significance t = 1.31; F = 1.89

*.05 Level of significance t = 1.71; F = 2.28

.01 Level of significance t = 2.49; F = 3.21

.001 Level of significance t = 3.45; F = 4.71

Table 24

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	10.2	.25E-1 [†] (4.65)	2.45 * (7.15)	3.08 * (4.61)	.93	35.0 *	2.61
0-64	-112.9	.69E-1 [†] (9.11)	5.14 * (10.72)	3.60 * (3.83)	.96	66.7 *	1.29
0-14	-21.8	.14E-1 [†] (12.86)	.75 * (11.06)	.34 * (2.58)	.98	128.1 *	2.19
15-24	-140.4	.10 * (15.03)	5.79 * (13.58)	3.45 * (4.13)	.99	187.2 *	2.77
25-34	-55.6	.67E-1 [†] (6.91)	4.96 * (8.05)	1.85 + (1.53)	.97	74.3 *	1.93
35-44	-19.1	.52E-1 [†] (5.97)	4.13 * (7.51)	4.01 * (3.73)	.95	45.5 *	1.94
45-54	1.10	.38E-1 [†] (3.42)	3.67 * (5.16)	3.91 * (2.81)	.92	28.2 *	2.40
55-64	54.3	.45E-2 (0.56)	3.33 * (6.57)	5.79 * (5.83)	.80	9.72*	1.96
65+	446.7	-.13 * (5.88)	-6.27 * (4.32)	2.27 (0.80)	.87	16.8 *	1.18

¹Per 100,000 population of state and county mental hospitals only.

+ .10 Level of significance t = 1.32; F = 1.93

* .05 Level of significance t = 1.72; F = 2.35

.01 Level of significance t = 2.51; F = 3.35

.001 Level of significance t = 3.51; F = 4.99

Table 25

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Male Population

Without the War 1942-45

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	12.8	.22E-1 [*] (3.72)	2.44 * (6.62)	3.44 * (4.76)	.94	29.3*	2.72
0-64	-105.8	.63E-1 [*] (8.31)	4.86 * (10.38)	4.10 * (4.47)	.97	71.2*	1.68
0-14	-22.4	.14E-1 [*] (11.49)	.78 * (10.38)	.33 * (2.25)	.98	103.3*	2.38
15-24	-140.2	.10 * (12.67)	5.86 * (12.03)	3.60 * (3.78)	.99	147.5*	2.77
25-34	-50.7	.62E-1 [*] (5.78)	4.87 * (7.38)	2.43 * (1.88)	.97	63.0*	2.19
35-44	-12.6	.46E-1 [*] (5.05)	3.95 * (7.12)	4.66 * (4.28)	.95	41.7*	2.36
45-54	2.00	.36E-1 [*] (2.82)	3.79 * (4.88)	4.38 * (2.88)	.91	19.7*	2.56
55-64	63.8	-.27E-2 (0.32)	3.14 * (6.02)	6.48 * (6.34)	.84	10.2*	2.31
65+	434.5	-.13 * (5.32)	-5.35 * (3.62)	2.12 (0.73)	.90	17.4*	1.23

¹Per 100,000 population of state and county mental hospitals only.

+ .10 Level of significance t = 1.33; F = 2.00

* .05 Level of significance t = 1.73; F = 2.46

.01 Level of significance t = 2.55; F = 3.60

.001 Level of significance t = 3.61; F = 5.56

Table 26

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	25.2	.12E-1 [*] (10.92)	1.48 * (4.83)	2.43 * (4.51)	.89	27.1 *	1.61
0-64	-75.1	.25E-1 [*] (18.61)	3.99 * (10.33)	4.72 * (6.92)	.95	6.58*	1.05
0-14	-13.1	.45E-2 [*] (21.93)	.43 * (7.20)	.60 * (5.70)	.97	105.1 *	1.52
15-24	-83.0	.36E-1 [*] (29.26)	3.86 * (10.88)	5.11 * (8.14)	.98	173.9 *	2.07
25-34	-19.6	.29E-1 [*] (15.55)	3.18 * (5.95)	1.33 + (1.41)	.95	62.7 *	1.25
35-44	8.35	.22E-1 [*] (14.19)	2.90 * (6.61)	3.87 * (4.99)	.93	45.2 *	1.32
45-54	22.3	.19E-1 [*] (9.48)	2.15 * (3.66)	2.51 * (2.42)	.88	25.7 *	1.48
55-64	56.0	.77E-2 [*] (4.94)	2.44 * (5.44)	3.67 * (4.64)	.66	6.66*	1.40
65+	378.9	-.37E-1 [*] (9.30)	-6.54 * (5.68)	-4.80 * (2.37)	.83	16.4 *	1.08

¹Per 100,000 population of state and county mental hospitals only.

+ .10 Level of significance t = 1.31; F = 1.98

* .05 Level of significance t = 1.71; F = 2.43

.01 Level of significance t = 2.49; F = 3.50

.001 Level of significance t = 3.47; F = 5.23

Table 27

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	53.9	.70E-2 (0.86)	-.45 (0.88)	-.50 (0.50)	.27	0.97	0.97
0-64	-45.9	.42E-1 [*] (5.50)	1.79 (3.72)	.22 (0.24)	.85	13.6 *	2.33
0-14	-7.98	.57E-2 [*] (4.17)	.25 * (2.93)	.90E-1 (0.53)	.85	14.2 *	2.28
15-24	-96.0	.77E-1 [*] (11.47)	3.58 * (8.39)	1.06 (1.27)	.97	67.6 *	2.77
25-34	-4.33	.49E-1 [*] (5.28)	1.70 * (2.91)	-1.43 (1.25)	.88	17.7 *	1.43
35-44	-8.71	.41E-1 [*] (5.06)	2.79 * (5.42)	1.78 * (1.76)	.85	13.9 *	2.82
45-54	60.5	-.62E-4 (0.01)	1.32 * (2.89)	1.35 + (1.51)	.48	2.23+	1.10
55-64	70.4	-.19E-1 [*] (1.59)	2.02 * (2.63)	4.76 * (3.17)	.58	3.34*	2.84
65+	397.9	-.12 * (3.97)	-7.19 * (3.72)	-1.16 (0.31)	.79	9.11*	0.76

¹Per 100,000 population of state and county mental hospitals only

+ .10 Level of significance t = 1.32; F = 1.93

* .05 Level of significance t = 1.72; F = 2.35

.01 Level of significance t = 2.51; F = 3.35

.001 Level of significance t = 3.51; F = 4.99

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Female Population

Without the War 1942-45

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	58.6	.43 (0.50)	-.49 (0.93)	-.26 (0.25)	.38	1.25	1.11
0-64	-38.5	.38E-1 [*] (4.55)	1.55 * (3.06)	.51 (0.51)	.87	13.3 *	2.60
0-14	-7.18	.52E-2 [*] (3.25)	.24 * (2.42)	.14 (0.72)	.85	11.3 *	2.37
15-24	-92.7	.75E-1 [*] (9.76)	3.50 * (7.35)	1.18 (1.27)	.96	54.9 *	2.88
25-34	-.84	.47E-1 [*] (4.35)	1.55 * (2.35)	-1.37 (1.05)	.85	11.7 *	1.50
35-44	-3.79	.38E-1 [*] (3.96)	2.68 * (4.58)	2.11 * (1.84)	.83	10.1 *	2.91
45-54	66.1	-.40E-2 (0.49)	1.19 * (2.40)	1.71 * (1.75)	.49	1.89	1.13
55-64	76.8	-.24E-1 ⁺ (1.72)	1.86 * (2.19)	5.20 * (3.12)	.55	2.41*	2.92
65+	393.2	-.12 * (3.97)	-6.58 * (3.72)	-1.14 (0.31)	.80	8.10*	.80

¹Per 100,000 population of state and county mental hospitals only.

+ .10 Level of significance t = 1.33; F = 2.00

* .05 Level of significance t = 1.73; F = 2.46

.01 Level of significance t = 2.55; F = 3.60

.001 Level of significance t = 3.61; F = 5.56

Table 29

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
MENTAL HOSPITAL FIRST ADMISSION RATES¹

United States: 1940-1971 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	58.4	0.76E-3 (0.62)	-.38 (1.08)	.19 (0.31)	.26	1.23	0.95
0-64	-24.9	.11E-1 [*] (8.14)	1.96 * (5.01)	2.72 * (3.59)	.78	12.3 *	1.95
0-14	-4.76	0.19E-2 [*] (9.40)	.16 * (2.73)	.22 * (2.14)	.85	19.8 *	2.26
15-24	-46.1	.22E-1 [*] (20.17)	2.19 * (6.97)	3.75 * (6.78)	.96	80.4 *	2.43
25-34	29.6	.12E-1 [*] (8.68)	.68 + (1.66)	.51 (0.70)	.87	22.5 *	1.21
35-44	20.0	.12E-1 [*] (9.25)	1.75 * (4.70)	2.91 * (4.43)	.83	16.9 *	2.56
45-54	63.4	.30E-3 (0.26)	.90 * (2.75)	.94 + (1.62)	.42	2.50*	1.19
55-64	59.2	-.18 (0.09)	1.45 * (2.48)	1.98 * (1.91)	.47	3.01*	2.24
65+	341.1	-.37E-1 [*] (7.60)	-7.36 * (5.19)	-6.45 * (2.58)	.75	10.5 *	0.76

¹Per 100,000 population of state and county mental hospitals only.

+ .10 Level of significance t = 1.31; F = 1.98

* .05 Level of significance t = 1.71; F = 2.43

.01 Level of significance t = 2.49; F = 3.50

.001 Level of significance t = 3.47; F = 5.23

Table 30

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

New York: 1937-1970 White Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1154.8	.86E-1 [*] (2.69)	-1.85 (1.19)	-12.2 * (3.06)	.51	2.81*	2.35
0-24	398.3	-.12 * (7.06)	.50 (0.62)	4.16 * (1.94)	.97	103.5 *	1.96
25-34	92.1	-.28E-1 [*] (1.75)	10.48 * (13.55)	11.7 * (5.92)	.97	89.3 *	1.38
35-44	248.5	-.37E-1 (1.19)	16.8 * (11.02)	20.9 * (5.34)	.97	87.4 *	1.47
45-54	1301.9	-.28 * (5.28)	10.8 * (4.16)	28.9 * (4.33)	.97	101.4 *	2.22
55-64	2961.0	-.45 * (4.79)	13.4 * (2.91)	49.3 * (4.17)	.97	82.6 *	1.99
65+	1341.8	5.67 + (1.58)	72.3 (0.42)	-492.6 (1.10)	.14	0.46	2.35

¹ Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 31

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

New York: 1937-1970 White Female Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	872.0	.48E-1 ⁺ (1.60)	4.13 * (2.87)	-3.19 (0.86)	.85	14.5 *	2.57
0-24	292.1	-.97E-1 ⁺ (6.47)	1.26 * (1.75)	3.85 * (2.08)	.98	115.0 *	1.35
25-34	148.1	-.76E-1 ⁺ (5.85)	6.57 * (10.77)	10.1 * (6.39)	.99	189.3 *	1.58
35-44	872.7	-.65 * (1.91)	8.99 * (4.96)	213.1 * (4.96)	.88	18.9 *	2.12
45-54	663.0	-.18 * (4.50)	17.6 * (9.05)	30.1 * (6.03)	.98	159.8 *	2.16
55-64	2136.0	-.75 * (9.15)	29.2 * (7.34)	77.6 * (7.60)	.99	227.0 *	1.74
65+	7137.9	-.92 * (2.14)	57.3 * (2.75)	18.3 (0.34)	.93	34.0 *	2.36

¹ Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

New York: 1937-1970 Nonwhite Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1171.3	-.20 * (2.47)	27.3 * (6.94)	33.1 * (3.27)	.95	48.8*	2.34
0-24	809.8	-.25 * (3.57)	7.36 * (2.16)	12.5 + (1.43)	.93	35.1*	1.26
25-34	212.1	-.98E-1 ⁺ (1.38)	41.5 * (11.94)	42.8 * (4.78)	.96	58.6*	2.01
35-44	104.8	.21 + (1.31)	58.7 * (7.74)	45.1 * (2.31)	.90	23.5*	1.55
45-54	1237.6	-.14 (0.82)	70.5 * (8.54)	94.6 * (4.45)	.94	43.3*	2.34
55-64	2219.5	.51E-1 (0.14)	90.6 * (5.06)	151.2 * (3.28)	.87	18.4*	2.76
65+	6516.5	-.79 (1.20)	140.3 * (4.37)	192.0 * (2.33)	.85	14.7*	2.90

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 33

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

New York: 1937-1970 Nonwhite Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1166.1	-.32 * (2.47)	14.11 * (6.94)	24.0 * (3.27)	.98	114.0*	2.01
0-24	707.0	-.27 * (3.57)	6.64 * (2.16)	11.7 * (1.93)	.97	75.2*	1.43
25-34	424.8	-.24 * (5.00)	22.54 * (11.94)	33.7 * (4.78)	.98	123.8*	2.13
35-44	693.5	-.20 * (2.38)	21.42 * (7.74)	29.0 * (2.31)	.94	43.4*	2.03
45-54	1612.4	-.55 * (5.85)	38.64 * (8.54)	71.0 * (4.45)	.98	147.1*	1.61
55-64	3855.0	-1.53 * (5.67)	43.91 * (5.06)	150.2 * (3.28)	.96	61.2*	2.35
65+	7849.9	-2.12 * (5.30)	67.62 * (4.37)	99.4 * (2.33)	.95	53.6*	2.98

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 34

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-70 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	.995.6	-.15 * (3.49)	14.1 * (6.73)	25.7 * (4.77)	.97	91.6 *	1.46
Total Male	1214.4	-.21 * (4.04)	14.7 * (5.78)	31.2 * (4.76)	.97	91.7 *	1.44
Total Female	767.7	-.85E-1 [‡] (2.50)	13.1 * (7.84)	19.8 * (4.59)	.97	82.6 *	1.53
0-9	774.7	-.32 * (7.11)	7.78 * (3.54)	20.5 * (3.61)	.98	142.7 *	1.61
10-19	60.7	-.31E-1 [‡] (2.38)	5.42 * (8.33)	9.31 * (5.55)	.97	81.2 *	1.84
20-29	134.9	-.68E-1 [‡] (4.00)	8.68 * (10.21)	17.2 * (7.90)	.98	138.4 *	1.74
30-39	231.8	-.90E-1 [‡] (3.75)	11.6 * (9.89)	17.7 * (5.87)	.98	126.6 *	1.33
40-49	553.2	-.14 * (3.18)	15.3 * (7.10)	28.9 * (5.22)	.97	83.3 *	1.23
50-59	1326.5	-.23 * (3.83)	19.2 * (6.61)	40.5 * (5.41)	.98	112.3 *	1.49
60-69	3178.7	-.63 * (7.00)	26.7 * (6.13)	58.4 * (5.21)	.98	136.9 *	1.74
70+	13024.0	-1.74 * (2.45)	-119.4 * (3.43)	-341.1 * (3.81)	.73	7.9 *	.71

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 35

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 White Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1206.8	-.19 * (3.65)	14.3 * (5.65)	29.5 * (4.53)	.97	85.8 *	1.40
0-9	861.2	-.35 * (6.51)	7.98 * (3.05)	22.9 * (3.40)	.98	127.6 *	1.85
10-19	83.9	-.34E-1 * (2.10)	5.38 * (6.73)	10.4 * (5.05)	.96	64.7 *	2.02
20-29	179.0	-.70E-1 * (3.50)	7.36 * (7.67)	18.2 * (7.39)	.98	116.1 *	1.90
30-39	281.5	-.99E-1 * (3.96)	11.6 * (9.43)	18.3 * (5.76)	.98	130.0 *	1.48
40-49	733.9	-.21 * (3.62)	17.2 * (6.12)	37.8 * (5.23)	.97	79.1 *	1.23
50-59	1845.2	-.31 * (3.88)	15.6 * (4.11)	42.7 * (4.26)	.97	87.6 *	1.38
60-69	4017.6	-.56 * (4.67)	23.4 * (4.04)	44.3 * (2.98)	.96	61.7 *	1.82
70+	12637.2	-.53 (0.74)	-93.3 * (2.65)	-400.9 * (4.42)	.71	6.66*	.76

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.37; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES

California: 1937-1970 White Female Total Population¹

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	738.5	-.54E-1 (1.64)	13.3 * (8.19)	18.6 * (4.46)	.97	76.2 *	1.51
0-9	634.4	-.27 * (7.50)	8.62 * (4.87)	19.2 * (4.21)	.99	180.0 *	1.47
10-19	34.6	-.25E-1 (1.92)	5.03 * (8.11)	7.59 * (4.76)	.96	60.4 *	1.97
20-29	86.3	-.61E-1 (3.39)	8.68 * (10.09)	12.9 * (5.82)	.98	111.7 *	1.69
30-39	179.0	-.75E-1 (3.41)	8.92 * (8.18)	14.2 * (5.08)	.97	101.5 *	1.66
40-49	339.8	-.61E-1 (2.03)	12.3 * (8.39)	17.2 * (4.54)	.97	85.2 *	1.44
50-59	700.3	-.98E-1 (2.23)	21.6 * (10.07)	34.9 * (6.31)	.98	113.0 *	1.50
60-69	2292.1	-.60 * (7.79)	28.6 * (7.68)	61.2 * (6.39)	.99	181.6 *	1.75
70+	12459.3	-2.00 * (2.86)	-135.7 * (3.97)	-317.6 * (3.61)	.71	6.60*	.70

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 37

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 Nonwhite Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1052.2	-.31 * (4.77)	24.3 * (7.65)	45.3 * (5.54)	.97	91.3 *	2.11
0-9	1162.8	-.44 * (4.00)	6.97 + (1.33)	23.9 * (1.77)	.93	36.0 *	1.58
10-19	92.4	-.48E-1 [†] (1.66)	8.49 * (5.98)	11.8 * (3.23)	.96	61.6 *	2.69
20-29	151.6	-.11 * (2.07)	23.3 * (8.99)	46.7 * (7.01)	.96	64.7 *	1.83
30-39	905.2	-.98 (0.62)	116.1 + (1.51)	70.4 (0.36)	.54	3.11*	1.03
40-49	622.2	-.14 (1.27)	34.6 (0.71)	56.3 * (3.95)	.92	29.3 *	1.58
50-59	1826.1	-.37 * (1.85)	34.3 * (3.61)	75.0 * (3.07)	.88	20.1 *	2.19
60-69	3609.0	-.53 * (2.04)	44.3 * (3.49)	78.9 * (2.41)	.90	24.9 *	2.68
70+	14293.9	-4.02 * (3.47)	48.8 (0.89)	-124.6 (0.89)	.85	15.4 *	2.18

¹ Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 38

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 Nonwhite Female Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	776.9	-.26 * (4.00)	19.3 * (2.26)	31.4 * (3.88)	.96	57.0*	1.95
0-9	1053.7	-.45 * (4.78)	4.92 (1.07)	25.9 * (2.19)	.92	12.6*	2.22
10-19	49.7	-.65E-1 * (2.03)	10.6 * (6.73)	15.9 * (3.94)	.95	45.9*	2.35
20-29	190.5	-.16 * (2.81)	18.6 * (6.66)	35.1 * (4.89)	.95	55.6*	1.75
30-39	430.2	-.24 * (2.96)	19.1 * (4.88)	34.4 * (3.41)	.92	32.1*	1.88
40-49	1008.5	-.37 * (2.85)	14.1 * (2.29)	36.6 * (2.32)	.90	23.4*	2.18
50-59	2145.9	-.77 * (4.28)	20.3 * (2.35)	58.8 * (2.64)	.93	35.3*	2.88
60-69	2774.3	-.57 * (2.59)	44.3 * (4.15)	49.4 * (1.80)	.93	37.8*	2.75
70+	11091.3	-3.65 * (4.56)	87.9 * (2.26)	-3.31 (0.03)	.91	26.1*	1.57

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1332.3	-.17 * (2.93)	-.16 (0.06)	7.00 (0.97)	.80	10.6 *	2.44
Total Male	1452.3	-.18 * (2.90)	-2.10 (0.69)	7.54 (0.97)	.72	6.75*	2.46
Total Female	1213.7	-.17 * (3.04)	1.76 (0.65)	6.48 (0.92)	.85	14.7 *	2.39
0-9	726.7	-.27 (0.71)	1.78 (0.97)	10.1 * (2.14)	.98	121.6 *	1.94
10-19	52.2	-.24E-1 * (3.08)	3.66 * (9.63)	4.90 * (5.03)	.97	96.0 *	2.27
20-29	109.6	-.59E-1 * (4.21)	6.83 * (9.76)	11.4 * (6.37)	.97	96.3 *	1.61
30-39	224.6	-.93E-1 * (5.17)	8.67 * (9.63)	14.7 * (6.37)	.98	128.9 *	1.82
40-49	570.6	-.17 * (4.59)	13.9 * (7.79)	26.3 * (5.74)	.97	101.9 *	2.16
50-59	1229.6	-.39 * (5.49)	22.3 * (6.43)	54.5 * (6.16)	.97	102.5 *	2.05
60-69	4120.9	-1.13 * (7.53)	20.4 * (2.87)	71.8 * (3.91)	.96	69.7 *	2.49
70+	10925.3	-1.58 * (2.93)	9.65 (0.37)	6.63 (0.10)	.84	14.0 *	2.45

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 White Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1431.5	-.16 * (2.58)	-1.90 (0.63)	6.98 (0.89)	.67	5.45 *	2.45
0-9	823.4	-.30 * (6.67)	1.31 (0.60)	10.5 * (1.86)	.98	104.8 *	1.93
10-19	71.0	-.30 ⁻¹ * (2.31)	3.90 * (6.00)	5.41 * (3.24)	.93	37.8 *	2.37
20-29	119.6	-.52E-1 [†] (2.74)	6.82 * (7.33)	11.7 * (4.89)	.93	35.0 *	1.67
30-39	265.7	-.98E-1 [†] (4.08)	8.56 * (7.25)	15.3 * (5.06)	.97	78.9 *	1.92
40-49	740.9	-.20 * (4.00)	12.7 * (5.18)	27.8 * (4.41)	.96	62.1 *	1.99
50-59	1758.1	-.31 * (3.26)	15.2 * (3.30)	57.5 * (4.86)	.93	37.1 *	2.21
60-69	4562.2	-.81 * (4.05)	14.6 + (1.52)	43.3 * (1.75)	.83	13.3 *	2.17
70+	10138.0	-.41 (0.66)	31.5 (1.04)	-7.30 (0.10)	.48	2.45 *	2.65

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 41

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 White Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1188.0	-.15 * (2.64)	2.08 (0.77)	5.69 (0.82)	.83	12.9 *	2.39
0-9	547.7	-.21 * (6.17)	4.67 * (2.86)	13.4 * (3.19)	.98	126.5 *	2.16
10-19	32.6	-.16E-1 [†] (2.84)	3.17 * (11.28)	3.74 * (5.17)	.98	134.1 *	2.15
20-29	95.5	-.63E-1 [†] (4.26)	6.63 * (9.15)	10.2 * (5.48)	.98	121.1 *	1.90
30-39	204.5	-.97E-1 [†] (4.97)	7.51 * (7.95)	12.8 * (5.24)	.98	113.3 *	2.22
40-49	456.6	-.17 * (5.67)	12.8 * (8.88)	23.3 * (6.27)	.98	129.1 *	2.38
50-59	1086.3	-.36 * (5.59)	22.1 * (7.00)	52.8 * (6.50)	.98	119.4 *	1.98
60-69	3965.2	-1.27 * (10.11)	30.1 * (4.92)	92.7 * (5.88)	.97	76.5 *	2.15
70+	10889.0	-2.05 * (3.95)	7.94 (0.31)	19.8 (0.30)	.90	24.8 *	2.28

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 42

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 Nonwhite Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	2055.9	-.71 * (5.92)	6.86 (1.22)	50.0 * (3.44)	.96	67.7 *	2.25
0-9	1498.1	-.62 * (3.65)	-.89 (0.11)	37.8 * (1.74)	.82	12.3 *	1.72
10-19	152.5	-.13 + (1.67)	9.85 * (2.60)	27.1 * (2.77)	.74	7.53*	2.96
20-29	137.2	-.18 + (1.64)	28.9 * (5.61)	57.0 * (4.30)	.89	21.1 *	1.95
30-39	387.2	-.31 * (1.72)	43.0 * (4.90)	67.5 * (2.99)	.83	12.7 *	2.27
40-49	62.6	.31 (1.11)	50.9 * (3.73)	65.5 * (1.86)	.78	9.30*	2.68
50-59	3602.4	-1.34 * (3.94)	20.4 (1.21)	113.7 * (2.64)	.89	21.2 *	2.32
60-69	7606.4	-1.56 * (1.88)	-88.1 * (2.18)	-81.0 (0.78)	.72	6.73*	2.19
70+	12554.4	-1.64 (1.20)	18.0 (0.27)	-144.8 (0.84)	.80	10.8 *	2.28

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 43

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 Nonwhite Female Total Population

Log = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1795.8	-.76 * (5.85)	10.9 * (1.77)	65.2 * (4.13)	.95	51.1	2.52
0-9	-10916.8	6.94 * (2.18)	218.5 + (1.41)	10.5 (0.03)	.38	1.65	2.57
10-19	139.5	-.11 + (1.69)	10.2 * (3.21)	17.8 * (2.18)	.88	19.5 *	2.73
20-29	382.2	-.17 + (1.42)	8.05 + (1.37)	26.8 * (1.76)	.86	16.7 *	2.87
30-39	280.8	-.19 (1.27)	30.7 * (4.08)	46.6 * (2.41)	.82	12.2 *	3.20
40-49	573.9	-.16 (0.62)	41.7 * (3.26)	57.1 * (1.73)	.82	11.8 *	2.13
50-59	2284.1	-1.36 * (3.49)	70.3 * (3.67)	195.8 * (3.97)	.88	19.5 *	2.60
60-69	6358.2	-2.64 * (4.33)	16.1 (0.54)	132.5 * (1.73)	.86	15.9 *	2.42
70+	15378.0	-5.37 * (4.44)	-92.5 + (1.58)	215.5 + (1.43)	.85	14.6 *	2.30

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 44

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

New York: 1937-1970 White Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	1157.6	2.08 + (1.49)	2.17 (0.70)	-18.8 (0.61)	.37	1.54	2.25
0-24	458.9	-8.66 * (11.39)	-4.68 * (2.77)	-.54 * (0.32)	.97	76.5 *	1.56
25-34	127.3	-.85 (1.06)	7.11 * (4.02)	5.91 * (3.37)	.95	50.6 *	1.36
35-44	292.7	-2.42 * (1.75)	14.0 * (4.60)	15.7 * (5.20)	.96	66.3 *	1.38
45-54	1398.7	-19.5 * (9.10)	.64 (0.13)	16.1 * (3.42)	.97	92.2 *	1.95
55-64	3130.4	-31.4 * (8.59)	-2.24 (0.28)	26.4 * (3.27)	.97	81.1 *	1.91
65+	-496.7	193.1 + (1.40)	477.1 + (1.55)	31.4 * (3.89)	.13	0.40	2.41

¹ Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 45

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹
New York: 1937-1970 White Female Total Population
Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	879.7	.97 (0.83)	6.22 * (2.33)	2.55 (0.97)	.83	13.0 *	2.54
0-24	341.0	-7.20 * (10.43)	-2.86 * (1.87)	.12 (0.08)	.97	76.8 *	1.17
25-34	173.0	-4.06 * (7.00)	3.16 * (2.47)	3.93 * (3.09)	.98	133.1 *	1.53
35-44	1280.8	-37.8 * (2.62)	-34.3 (1.07)	179.2 * (5.63)	.85	15.3 *	2.18
45-54	735.0	-12.2 * (7.71)	11.1 * (3.18)	20.5 * (5.88)	.98	150.1 *	2.09
55-64	2366.6	-45.4 * (15.29)	-.77 (0.15)	31.3 * (4.77)	.99	252.1 *	1.69
65+	7612.5	-70.0 * (4.64)	19.5 (0.59)	-19.1 (0.57)	.94	40.9 *	2.49

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 46

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

New York: 1937-1970 Nonwhite Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	1283.3	-11.8 * (3.49)	11.1 + (1.48)	18.0 * (2.42)	.94	40.7*	2.10
0-24	958.4	-17.8 * (6.55)	-5.86 (0.97)	102.0 (0.17)	.93	34.0*	1.34
25-34	337.7	-1.72 (0.49)	28.9 * (3.73)	20.3 * (2.64)	.93	35.1*	1.73
35-44	250.8	10.0 + (1.56)	58.1 * (4.07)	48.1 * (3.39)	.88	20.1*	1.61
45-54	1641.0	-12.3 * (1.82)	44.8 * (3.00)	74.9 * (5.04)	.94	40.4*	1.87
55-64	2035.1	.41 (0.03)	116.7 * (3.93)	141.4 * (4.78)	.89	20.8*	2.57
65+	6807.8	-43.6 * (1.76)	107.3 * (1.95)	134.0 * (2.45)	.85	15.5*	2.95

¹Per 100,000 population

+ .01 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 47

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

New York: 1937 1970 Nonwhite Female Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	1203.9	-18.0 * (8.33)	3.62 (0.75)	6.21 (1.30)	.97	90.3*	1.67
0-24	762.3	-16.8 * (8.34)	-1.83 (0.41)	-.48 (0.11)	.96	63.3*	1.20
25-34	457.6	-12.1 * (5.56)	15.0 * (3.10)	14.5 * (3.01)	.97	87.4*	2.01
35-44	671.4	-11.0 * (3.76)	18.7 * (2.87)	20.8 * (3.20)	.95	52.8*	2.17
45-54	1859.5	-35.6 * (9.46)	14.0 + (1.68)	35.0 * (4.22)	.98	135.1*	1.53
55-64	4415.6	-88.4 * (8.08)	-29.9 (1.23)	59.8 * (2.48)	.95	52.9*	1.97
65+	8160.7	-107.9 * (6.32)	-21.2 (0.56)	-22.7 (0.60)	.94	42.4*	2.63

¹ Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 48

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	978.1	-.66E-1 [*] (2.68)	14.4 * (5.39)	20.0 * (3.19)	.97	81.8*	1.40
Total Male	1215.1	-.10 * (3.37)	14.8 * (4.53)	23.6 * (3.09)	.97	82.2*	1.39
Total Female	729.6	-.26 + (1.33)	13.8 * (6.55)	15.9 * (3.23)	.97	75.5*	1.47
0-9	867.8	-.20 * (6.72)	7.33 * (2.31)	18.2 * (2.45)	.97	101.1*	1.40
10-19	37.0	-.28E-2 (0.33)	5.40 * (5.81)	6.46 * (2.95)	.95	55.5*	1.57
20-29	84.7	-.13E-1 (1.05)	9.02 * (6.73)	14.8 * (4.72)	.97	80.1*	1.52
30-39	205.2	-.28E-1 [*] (1.74)	11.5 * (6.59)	12.9 * (3.20)	.97	85.4*	1.34
40-49	507.2	-.42E-1 [†] (1.62)	15.6 * (5.64)	20.0 * (3.11)	.97	75.1*	1.27
50-59	1337.6	-.12 * (3.46)	19.6 * (5.43)	32.8 * (3.91)	.98	108.4*	1.60
60-69	3443.9	.40 * (6.55)	21.8 * (3.35)	48.7 * (3.22)	.97	91.1*	1.57
70+	14496.5	-1.53 * (3.18)	-127.4 * (2.46)	-278.7 * (2.32)	.60	4.01*	0.54

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 49

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 White Male Total Population

Log = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	1203.4	-.89E-1 [*] (3.03)	14.4 [*] (4.54)	21.7 [*] (2.92)	.97	80.6 [*]	1.38
0-9	965.2	-.22 [*] (6.36)	7.78 [*] (2.07)	21.6 [*] (2.45)	.97	91.2 [*]	1.54
10-19	58.0	-.32E-2 (0.31)	5.34 [*] (4.73)	7.24 [*] (2.74)	.94	45.1 [*]	1.76
20-29	120.5	-.15E-1 (1.20)	8.06 [*] (6.06)	18.2 [*] (5.83)	.97	87.1 [*]	1.85
30-39	269.2	-.39E-1 [*] (2.35)	11.3 [*] (6.35)	13.4 [*] (3.22)	.97	89.4 [*]	1.42
40-49	696.6	-.76E-1 [*] (2.33)	17.4 [*] (4.91)	26.9 [*] (3.24)	.96	73.5 [*]	1.30
50-59	1908.3	-.17 [*] (4.28)	15.7 [*] (3.64)	31.2 [*] (3.10)	.97	108.8 [*]	1.55
60-69	4231.1	-.32 [*] (4.65)	17.8 [*] (2.34)	22.9 (1.29)	.95	50.2 [*]	1.69
70+	13537.3	-.73 ⁺ (1.62)	-88.3 [*] (1.78)	-338.8 [*] (2.91)	.60	4.01 [*]	0.59

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 50

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 White Female Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	685.8	-.48E-2 (0.29)	14.1 * (7.13)	14.6 * (3.14)	.96	73.5 *	1.48
0-9	706.5	-.16 * (6.75)	8.17 * (2.92)	17.0 * (2.81)	.98	123.7 *	1.43
10-19	13.4	-.81E-3 (1.10)	5.03 * (6.06)	5.02 * (2.57)	.95	46.9 *	1.74
20-29	54.9	-.13E-1 (1.08)	8.59 * (6.66)	8.82 * (2.93)	.96	71.2 *	1.56
30-39	160.6	-.26E-1 [†] (1.87)	8.85 * (5.98)	10.1 * (2.90)	.97	78.1 *	1.56
40-49	312.9	-.10E-1 (0.62)	12.1 * (6.71)	9.68 * (2.29)	.97	81.6 *	1.46
50-59	654.2	-.30E-1 (1.17)	22.7 * (8.15)	30.6 * (4.70)	.97	95.2 *	1.40
60-69	2529.7	-.38 * (7.52)	24.9 * (4.50)	58.4 * (4.51)	.98	115.5 *	1.49
70+	13924.2	-1.76 * (3.93)	-134.9 * (2.77)	-200.0 * (1.75)	.59	3.56*	.55

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 51

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

California: 1937-1970 Nonwhite Male Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	1024.2	-.14 * (3.37)	24.2 * (5.51)	37.2 * (3.61)	.96	68.1 *	1.69
0-9	1353.7	-.29 * (4.89)	5.21 (0.81)	18.4 (1.23)	.93	34.6 *	1.48
10-19	84.9	-.19E-1 (1.19)	8.51 * (4.81)	9.85 * (2.37)	.95	56.9 *	2.42
20-29	13.1	-.22E-1 (0.01)	23.5 * (6.11)	37.4 * (4.16)	.94	41.0 *	1.40
30-39	1677.6	-.14 (0.15)	44.3 (0.46)	-236.2 (1.05)	.49	2.50*	1.05
40-49	348.5	.61E-1 (0.92)	36.8 * (5.16)	35.1 * (2.05)	.91	26.0 *	1.52
50-59	1931.6	-.19 * (1.72)	29.1 * (2.44)	54.2 * (1.92)	.88	18.8 *	2.08
60-69	3697.8	-.33 * (2.26)	46.7 * (3.02)	84.1 * (2.34)	.90	25.1 *	2.69
70+	16733.0	-2.80 * (4.34)	-9.86 (0.14)	-144.8 (0.91)	.84	14.1 *	2.10

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 52

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹
California: 1937-1970 Nonwhite Female Total Population
Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	804.2	-.13 * (3.07)	18.0 * (4.11)	22.7 * (2.23)	.94	43.1*	1.75
0-9	1187.3	-.26 * (4.62)	1.99 (0.33)	13.7 (0.98)	.91	25.7*	2.04
10-19	2.28	-.90E-2 (0.45)	10.8 * (5.09)	11.9 * (2.41)	.93	36.9*	2.15
20-29	86.0	-.36E-2 (1.00)	20.1 * (7.90)	28.1 * (3.17)	.94	44.0*	1.53
30-39	378.9	-.84E-1 * (1.81)	18.2 * (3.69)	21.7 * (1.89)	.92	29.8*	1.73
40-49	1223.7	-.25 * (3.38)	9.43 (1.20)	25.6 + (1.41)	.89	21.3*	2.18
50-59	2642.8	-.56 * (5.32)	11.3 (1.00)	53.9 * (2.06)	.92	30.8*	2.48
60-69	3092.7	-.44 * (3.54)	44.4 * (3.37)	59.7 * (1.95)	.93	37.0*	2.64
70+	13526.5	-2.58 * (5.06)	34.4 + (1.59)	-6.07 (0.05)	.88	19.2*	1.57

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 53

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	1397.4	-.11 * (3.69)	-2.44 (0.86)	-1.71 (0.29)	.82	12.3 *	2.41
Total Male	1506.3	-.11 * (3.24)	-4.17 + (1.33)	-1.21 (0.19)	.73	7.24*	2.36
Total Female	1288.3	-.11 * (3.95)	-.72 (0.27)	-2.12 (0.39)	.87	18.4 *	2.44
0-9	834.9	-.20 * (10.11)	1.30 (0.71)	5.86 + (1.56)	.98	140.1 *	2.16
10-19	62.6	-.16E-1 [†] (3.30)	3.43 * (7.59)	4.02 * (4.31)	.97	75.7 *	1.99
20-29	116.7	-.33E-1 [†] (3.53)	6.51 * (7.61)	9.13 * (5.17)	.96	71.7 *	1.80
30-39	237.9	-.51E-1 [†] (4.17)	8.09 * (7.09)	10.8 * (4.57)	.97	89.7 *	1.91
40-49	608.2	-.10 * (4.68)	12.6 * (6.34)	19.1 * (4.65)	.97	92.2 *	2.14
50-59	1347.8	-.24 * (5.49)	18.4 * (4.60)	36.0 * (4.36)	.97	85.7 *	2.06
60-69	4512.0	-76.6 * (9.26)	12.4 + (1.62)	34.2 * (2.17)	.96	69.0 *	2.36
70+	11729.0	-1.13 * (4.08)	-12.5 (0.49)	-67.7 (1.20)	.86	17.0 *	2.49

¹Per 100,000 population

†.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 54

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Massachusetts: 1937-1970 White Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	1481.3	-.10 * (2.94)	-3.91 (1.24)	-1.34 (0.21)	.69	5.84*	2.36
0-9	964.5	-.23 * (9.83)	.31 (0.14)	5.25 (1.17)	.98	122.0 *	2.11
10-19	87.8	-.21E-1 * (2.72)	3.49 * (4.82)	4.19 * (2.81)	.93	34.4 *	2.20
20-29	128.2	-.29E-1 * (2.53)	6.31 * (6.05)	9.34 * (4.33)	.92	31.4 *	1.97
30-39	283.7	-.57E-1 * (3.70)	7.98 * (5.60)	11.5 * (3.90)	.96	60.5 *	2.04
40-49	780.5	-.12 * (4.19)	11.4 * (4.40)	19.6 * (3.67)	.96	63.3 *	2.04
50-59	1841.7	-.18 * (3.32)	12.2 * (2.41)	42.7 * (4.09)	.93	34.8 *	2.12
60-69	4800.9	-.52 * (4.70)	7.05 (0.70)	10.3 (0.50)	.84	13.6 *	2.18
70+	10334.0	-.21 (0.62)	14.5 (0.46)	-61.9 (0.96)	.51	2.74*	2.66

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 55

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND

TOTAL MORTALITY RATE¹

Massachusetts: 1937-1970 White Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	1258.6	-.10 * (3.55)	-.35 (0.13)	-2.38 (0.44)	.86	16.3 *	2.46
0-9	635.0	-.16 * (9.04)	4.76 * (2.92)	11.7 * (3.48)	.98	144.4 *	2.34
10-19	37.7	-.11E-1 * (3.08)	3.16 * (9.57)	3.44 * (5.05)	.98	109.5 *	2.03
20-29	102.2	-.36E-1 * (3.94)	6.49 * (7.66)	8.14 * (4.65)	.97	100.4 *	2.02
30-39	217.8	-.56E-1 * (4.59)	7.19 * (6.39)	9.50 * (4.09)	.97	90.1 *	2.16
40-49	501.7	-.10 * (5.57)	11.3 * (6.63)	15.9 * (4.50)	.98	104.6 *	2.29
50-59	1258.7	-.26 * (6.86)	18.6 * (5.38)	39.4 * (5.51)	.98	112.2 *	1.98
60-69	3983.4	-.88 * (11.96)	21.4 * (3.17)	52.2 * (3.73)	.98	142.2 *	2.30
70+	12013.2	-1.54 * (6.01)	-17.5 (0.74)	-62.2 (1.27)	.93	32.9 *	2.30

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 56

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND

TOTAL MORTALITY RATE¹

Massachusetts: 1937-1970 Nonwhite Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	2266.4	-.45 * (7.49)	1.21 (0.22)	21.1 * (1.82)	.97	78.0 *	2.40
0-9	1574.4	-.32 * (3.54)	-7.61 (0.90)	1.51 (0.09)	.84	14.1 *	2.03
10-19	105.6	.33E-1 (0.72)	8.14 * (1.91)	15.7 * (1.77)	.71	6.47*	2.97
20-29	197.7	-.98E-1 [†] (1.62)	25.2 * (4.51)	43.6 * (3.77)	.88	20.2 *	2.07
30-39	558.0	-.14 + (1.38)	28.0 * (3.07)	20.9 (1.11)	.83	13.4 *	2.37
40-49	-249.5	.27 * (1.76)	61.0 * (4.37)	87.4 * (3.03)	.79	10.3 *	2.57
50-59	3971.7	-.77 * (4.11)	.77 (0.04)	31.8 (0.89)	.89	22.7 *	2.49
60-69	8216.0	-1.39 * (2.91)	-68.6 + (1.56)	-31.0 (0.34)	.70	6.28*	2.22
70+	14310.9	-1.60 * (2.15)	-4.41 (0.06)	-190.8 + (1.34)	.82	11.8 *	2.32

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 57

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL MORTALITY RATE¹

Massachusetts: 1937-1970 Nonwhite Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	1980.0	-.47 * (6.74)	5.30 (0.82)	34.1 * (2.56)	.95	52.6 *	2.63
0-9	-12451.7	3.74 * (2.08)	361.8 * (2.17)	556.6 + (1.62)	.37	1.58	2.78
10-19	178.2	-.65E-1 [†] (1.85)	8.34 * (2.56)	11.1 + (1.64)	.89	21.3 *	2.78
20-29	414.8	-.12 * (1.81)	9.29 + (1.51)	26.1 * (2.05)	.87	17.5 *	3.04
30-39	253.4	-.67E-1 (0.75)	29.0 * (3.54)	33.9 * (2.00)	.81	11.5 *	3.28
40-49	743.1	-.21 + (1.45)	45.9 * (3.41)	75.3 * (2.71)	.82	12.2 *	2.14
50-59	2435.6	-.66 * (2.80)	51.8 * (2.39)	104.0 * (2.32)	.86	17.0 *	2.64
60-69	6593.0	-1.44 * (4.07)	-.37 (0.01)	15.23 (0.22)	.85	14.7 *	2.32
70+	17149.4	-3.44 * (5.19)	-151.8 * (2.48)	-35.3 (0.29)	.85	15.3 *	2.14

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 58

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL HOMICIDE RATES¹

New York: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-10.0	.63E-2 [*] (9.22)	.41 * (12.36)	.35 * (4.06)	.95	54.9*	0.83
0-24	-6.79	.43E-2 [*] (8.85)	.26 * (11.05)	.26 * (4.21)	.95	50.5*	1.68
25-34	-23.2	.13E-1 [*] (7.62)	.91 * (10.78)	.84 * (3.88)	.95	49.8*	1.04
35-44	-16.2	.12E-1 [*] (6.11)	.56 * (6.14)	.54 * (2.28)	.85	15.7*	0.83
45-54	-8.76	.49E-2 [*] (5.85)	.42 * (10.42)	.48 * (4.56)	.92	34.4*	1.48
55-64	-6.33	.39E-2 [*] (5.60)	.28 * (8.30)	.28 * (3.27)	.91	26.3*	1.78
65+	-5.55	.37E-2 [*] (4.75)	.23 * (5.98)	.12 (1.26)	.80	11.0*	2.53

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 59

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

New York: 1937-1970 Total Population

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	-9.98	.41 * (10.18)	.54 * (6.11)	.46 * (5.17)	.89	21.8 *	0.86
0-24	-7.05	.28 * (11.27)	.37 * (6.67)	.36 * (6.51)	.91	27.0 *	1.29
25-34	-23.0	.92 * (9.22)	1.13 * (5.08)	.93 * (4.22)	.88	20.5 *	0.87
35-44	-13.7	.60 * (7.04)	.77 * (4.09)	.93 * (4.98)	.80	10.8 *	0.83
45-54	-8.94	.38 * (7.54)	.50 * (4.46)	.39 * (3.51)	.82	12.2 *	1.29
55-64	-6.39	.27 * (8.44)	.35 * (4.78)	.35 * (4.81)	.86	16.9 *	1.52
65+	-5.85	.22 * (6.34)	.35 * (4.47)	.22 * (2.87)	.73	7.22 *	2.18

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 60

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

New York: 1937-1970 Total Population

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-5.91	.20E-2 [*] (13.96)	.29 * (7.98)	.45 * (6.09)	.91	38.4*	1.22
0-24	-4.03	.14E-2 [*] (13.93)	.18 * (7.38)	.33 * (6.66)	.91	38.7*	1.71
25-34	-14.7	.47E-2 [*] (12.78)	.61 * (6.62)	.91 * (4.90)	.90	34.9*	1.16
35-44	-8.79	.30E-2 [*] (9.73)	.44 * (5.62)	.99 * (6.28)	.83	18.6*	0.95
45-54	-5.52	.20E-2 [*] (10.83)	.28 * (6.21)	.41 * (4.53)	.86	22.6*	1.53
55-64	-4.11	.14E-2 [*] (11.45)	.20 * (6.50)	.32 * (5.17)	.88	26.5*	1.76
65+	-2.81	.10E-2 [*] (7.24)	.17 * (4.73)	.22 * (3.06)	.74	10.4*	2.38

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.96

* .05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

Table 61

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL HOMICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-3.86	.27E-2 [*] (3.29)	.33 * (8.35)	.56 * (5.40)	.87	17.5 *	1.63
Total Male	-8.40	.50E-2 [*] (3.93)	.58 * (9.37)	.97 * (6.13)	.89	22.1 *	1.53
Total Female	.38	.62E-3 (0.92)	.96E-1 [†] (2.91)	.15 * (1.76)	.51	2.81*	2.49
0-9	-2.23	.16E-2 [*] (2.52)	.12 * (3.97)	.90E-1 (1.14)	.57	3.54*	2.22
10-19	-3.95	.20E-2 [*] (3.19)	.21 * (6.85)	.33 * (4.22)	.87	18.4 *	2.88
20-29	-10.9	.58E-2 [*] (3.17)	.68 * (7.64)	1.16 * (5.08)	.89	20.9 *	2.18
30-39	-6.68	.58E-2 [*] (3.58)	.51 * (6.45)	.63 * (3.13)	.78	9.47*	2.02
40-49	-2.68	.36E-2 [*] (2.47)	.27 * (3.83)	.50 * (2.74)	.78	9.23*	2.06
50-59	1.49	.13E-2 (1.14)	.12 * (2.03)	.17 (1.18)	.61	4.24*	2.45
60-69	-1.86	.12E-2 (0.84)	.31 * (4.54)	.46 * (2.63)	.58	3.66*	2.21
70+	-2.59	.18E-2 (1.12)	.22 * (2.79)	.42 * (2.04)	.44	2.10+	2.14

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.50; F = 3.25

.001 Level of significance t = 3.49; F = 4.80

Table 62

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL HOMICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	-8.88	.36 * (5.53)	.37 * (5.37)	.35 * (2.18)	.73	7.37*	1.08
Total Male	-16.6	.61 * (5.81)	.64 * (5.70)	.66 * (2.53)	.76	8.37*	1.00
Total Female	-1.54	.12 * (2.87)	.11 * (2.45)	.47E-1 (0.46)	.42	1.92+	2.24
0-9	-4.74	.19 * (5.87)	.15 * (4.40)	-.13E-1 (0.16)	.65	4.92*	2.49
10-19	-7.72	.25 * (5.67)	.25 * (5.19)	.28 * (2.50)	.79	10.3 *	2.03
20-29	-22.1	.78 * (5.55)	.75 * (4.99)	.79 * (2.28)	.78	9.67*	1.48
30-39	-13.1	.57 * (5.18)	.57 * (4.86)	.40 + (1.46)	.67	5.42*	1.47
40-49	-8.03	.42 * (4.46)	.33 * (3.26)	.26 (1.12)	.70	6.27*	1.75
50-59	-1.73	.23 * (3.39)	.12 + (1.66)	-.85E-1 (0.51)	.59	3.83*	2.45
60-69	-5.81	.25 * (2.82)	.33 * (3.47)	.22 (1.02)	.46	2.31*	1.84
70+	-5.28	.23 * (2.32)	.22 * (2.10)	.24 (0.96)	.33	1.32	2.08

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.50; F = 3.25

.001 Level of significance t = 3.49; F = 4.80

Table 63

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-1.47	.11E-2 [*] (6.18)	.22 * (4.85)	.44 * (4.80)	.73	10.1 *	1.73
Total Male	-4.04	.20E-2 [*] (6.61)	.38 * (5.10)	.79 * (5.26)	.75	11.1 *	1.69
Total Female	.88	.33E-3 [*] (3.02)	.62E-1 [†] (2.23)	.98E-1 [†] (1.75)	.45	3.07*	2.44
0-9	-.88	.45E-3 [*] (4.18)	.82E-1 [†] (3.01)	.91E-1 [†] (1.80)	.46	3.19*	2.07
10-19	-2.35	.96E-3 [*] (6.91)	.12 * (3.43)	.22 * (3.16)	.74	10.8 *	2.10
20-29	-6.86	.30E-2 [*] (7.55)	.42 * (4.20)	.81 * (4.11)	.78	13.2 *	1.80
30-39	-2.15	.18E-2 [*] (6.05)	.37 * (5.07)	.67 * (4.56)	.70	8.55*	2.01
40-49	.91	.11E-2 [*] (3.79)	.16 * (2.25)	.46 * (3.27)	.66	7.29*	1.90
50-59	2.38	.62E-3 [*] (3.30)	.65E-1 [†] (1.37)	.12 (1.28)	.58	5.16*	2.48
60-69	-.28	.66E-3 [*] (2.64)	.21 * (3.38)	.29 * (2.28)	.45	2.99*	2.17
70+	-.84	.79E-3 [*] (2.88)	.13 * (1.96)	.31 * (2.25)	.34	1.93	2.24

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.96

* .05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

Table 64

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹

Massachusetts: 1937-70 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-4.70	.27E-2 [*] (5.23)	.20 [*] (8.08)	.20 [*] (3.03)	.87	18.3 [*]	1.31
Total Male	-7.75	.42E-2 [*] (4.67)	.33 [*] (7.57)	.34 [*] (3.08)	.87	17.2 [*]	1.03
Total Female	-1.93	.14E-2 [*] (3.22)	.88E-3 [*] (4.28)	.61E-1 (1.16)	.63	4.45 [*]	2.02
0-9	-2.33	.13E-2 [*] (2.01)	.12E-2 [*] (3.68)	.13E-1 [†] (1.63)	.44	2.12 [†]	1.92
10-19	-1.79	.15E-2 [*] (2.39)	.46E-1 [†] (1.47)	-.10E-1 (0.13)	.63	4.52 [*]	1.99
20-29	-9.34	.44E-2 [*] (3.23)	.37 [*] (5.57)	.54 [*] (3.18)	.85	15.1 [*]	1.34
30-39	-10.6	.55E-2 [*] (4.22)	.40 [*] (6.21)	.40 [*] (2.44)	.85	14.7 [*]	2.14
40-49	-3.48	.13E-2 (1.27)	.24 [*] (4.89)	.38 [*] (3.01)	.74	7.65 [*]	1.92
50-59	-5.51	.40E-2 [*] (3.53)	.23 [*] (4.19)	-.70E-1 [†] (0.49)	.63	4.61 [*]	2.41
60-69	-4.54	.30E-2 [*] (2.70)	.18 [*] (3.41)	.16 (1.13)	.50	2.62 [*]	2.90
70+	-2.87	.27E-2 [*] (3.10)	.13 [*] (3.10)	-.16 [†] (1.47)	.67	5.49 [*]	1.96

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 65

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹
Massachusetts: 1937-1971 Total Population
Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	-5.23	.19 * (5.51)	.19 * (6.05)	.22 * (3.30)	.82	12.2 *	1.21
Total Male	-8.46	.28 * (5.03)	.31 * (6.07)	.40 * (3.70)	.83	13.1 *	0.94
Total Female	-2.29	.11 * (4.15)	.80E-1 [†] (3.41)	.52E-1 (1.08)	.57	3.54*	2.02
0-9	-3.09	.12 * (3.23)	.12 * (3.62)	.13 * (1.95)	.47	2.33*	2.19
10-19	-1.51	.78E-1 [†] (2.11)	.38E-1 (1.12)	.22E-1 (0.33)	.60	4.06*	1.97
20-29	-10.3	.34 * (4.09)	.32 * (4.17)	.48 * (3.06)	.83	12.6 *	1.32
30-39	-13.4	.47 * (5.67)	.39 * (5.19)	.42 * (2.67)	.81	11.2 *	1.92
40-49	-3.17	.83E-1 [†] (1.61)	.21 * (4.40)	.35 * (3.60)	.79	10.1 *	2.18
50-59	-6.05	.23 * (3.55)	.25 * (4.17)	.90E-1 (0.71)	.60	4.02*	2.14
60-69	-4.94	.19 * (3.11)	.19 * (3.37)	.23 * (1.99)	.52	2.91*	2.92
70+	-1.95	.94E-1 [†] (1.73)	.14 * (2.81)	-.16E-1 (0.16)	.61	4.12*	2.12

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 66

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL HOMICIDE RATES¹
Massachusetts: 1937-70 Total Population
Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-2.84	.90E-3 [*] (9.03)	.14 * (5.74)	.22 * (4.33)	.80	15.1 *	1.47
Total Male	-5.07	.15E-2 [*] (9.04)	.23 * (5.62)	.36 * (4.33)	.81	15.6 *	1.21
Total Female	-.82	.36E-3 [*] (4.84)	.61E-1 [*] (3.29)	.86E-1 [*] (2.30)	.52	3.96*	1.97
0-9	-1.24	.32E-3 [*] (2.96)	.96E-1 [*] (3.56)	.17 * (3.15)	.39	2.33+	1.96
10-19	.53	.39E-3 [*] (3.63)	.18E-1 (0.66)	.23E-1 (0.43)	.57	4.93*	1.84
20-29	6.93	.20E-2 [*] (8.19)	.23 * (3.65)	.44 * (3.46)	.79	13.8 *	1.26
30-39	-6.98	.20E-2 [*] (8.57)	.27 * (4.56)	.41 * (3.54)	.80	14.6 *	2.16
40-49	-2.64	.93E-3 [*] (4.96)	.15 * (3.24)	.22 * (2.31)	.64	6.47*	1.62
50-59	-2.38	.78E-3 [*] (4.02)	.19 * (3.99)	.12 (1.22)	.55	4.56*	2.15
60-69	-2.42	.60E-3 [*] (3.34)	.17 * (3.71)	.32 * (3.59)	.45	3.07*	2.72
70+	-1.39	.46E-3 [*] (3.07)	.15 * (4.06)	.74E-1 (0.99)	.61	5.87*	2.17

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.96

* .05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

Table 67

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL SUICIDE RATES¹

New York: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	7.43	-.28 E-3 (0.22)	.48 * (7.77)	.30 * (1.87)	.96	58.7*	1.28
0-24	-2.34	.19 E-2 [*] (5.00)	.16 * (8.81)	.87 E-1 [*] (1.84)	.85	14.8*	1.69
25-34	-3.15	.47 E-2 [*] (3.15)	.65 * (8.98)	.14 (0.70)	.90	24.8*	2.02
35-44	5.12	.19 E-2 (0.64)	.62 * (4.27)	1.15 * (3.05)	.90	24.8*	1.53
45-54	15.4	-.58 E-2 [*] (2.57)	1.15 * (10.44)	1.13 * (4.01)	.97	97.4*	2.56
55-64	28.6	-.76 E-2 [*] (1.94)	.77 * (4.03)	.49 (1.00)	.94	40.3*	1.97
65+	34.7	-.80 E-2 [*] (1.92)	.63 * (3.10)	.54 (1.03)	.93	36.9*	2.05

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 68

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND

TOTAL SUICIDE RATES¹

New York: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	7.70	-.13 * (3.02)	.58 * (5.83)	.47 * (4.76)	.96	71.0*	1.49
0-24	-2.52	.94 * (6.29)	.24 * (7.14)	.20 * (6.11)	.84	13.7*	1.78
25-34	-3.10	.20 * (3.12)	.86 * (6.16)	.41 * (2.95)	.88	20.3*	1.96
35-44	6.85	-.20 * (1.88)	.90 * (3.74)	1.59 * (6.69)	.92	28.8*	1.50
45-54	17.7	-.43 * (5.15)	.99 * (5.28)	.80 * (4.28)	.97	102.5*	2.70
55-64	27.2	-.64 * (4.65)	.93 * (3.03)	.42 + (1.38)	.95	48.2*	2.00
65+	39.8	-.84 * (4.72)	.37 (0.94)	.91 * (2.32)	.92	29.0*	1.81

¹ Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 69

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL SUICIDE RATES¹

New York: 1937-1970 Total Population

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	8.42	-.80E-3 (3.76)	.51 * (9.64)	.41 * (3.86)	.95	69.4*	1.19
0-24	-1.23	.43E-3 (6.84)	.15 * (9.64)	.19 * (6.05)	.82	16.8*	1.54
25-34	1.38	.76E-3 (2.72)	.59 * (8.44)	.32 * (2.28)	.86	22.7*	1.78
35-44	9.42	-.13E-2 (2.47)	.68 * (5.17)	1.52 * (5.82)	.88	27.0*	1.28
45-54	14.0	-.20E-2 (5.50)	1.15 * (12.61)	.81 * (4.42)	.97	125.6*	2.54
55-64	27.4	-.38E-2 (6.05)	.89 * (5.65)	.41 + (1.31)	.93	52.4*	2.08
65+	29.8	-.39E-2 (5.56)	.92 * (5.24)	.83 * (2.37)	.92	43.1*	1.86

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.96

*.05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

Table 70

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL SUICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	1.77	.52 E-2 [*] (2.17)	1.10 * (9.34)	.52 * (1.71)	.90	24.8 *	1.85
Total Male	14.1	.13 E-3 (0.03)	1.44 * (8.00)	.91 * (1.97)	.92	28.9 *	1.87
Total Female	-10.8	.11 E-1 [*] (7.57)	.73 * (10.61)	.10 (0.56)	.90	24.7 *	1.89
10-19	-7.49	.42 E-2 [*] (4.81)	.39 * (9.15)	.36 * (3.33)	.88	19.4 *	2.72
20-29	-22.9	.14 E-1 [*] (4.62)	1.60 * (10.91)	1.09 * (2.88)	.89	21.7 *	2.23
30-39	-9.94	.13 E-1 [*] (4.93)	1.49 * (11.25)	.16 (0.48)	.93	33.8 *	1.67
40-49	-.25	.14 E-1 [*] (2.59)	1.58 * (5.83)	-.18 (0.26)	.81	11.5 *	1.51
50-59	12.9	.13 E-1 [*] (2.62)	1.43 * (6.09)	-.73 (1.20)	.87	17.4 *	1.33
60-69	37.0	-.5 E-2 (0.75)	1.19 * (3.21)	.91 (0.96)	.73	7.35*	2.23
70+	80.3	-.16 E-1 [*] (3.07)	-.91 * (3.49)	-1.85 * (2.76)	.72	6.88*	2.38

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.50; F = 3.25

.001 Level of significance t = 3.49; F = 4.80

Table 71

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL SUICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (CA)	Unemployment Rate	Inflation Rate (CA)	R ²	F-Value	D.W.
Total	-3.02	.51 * (3.75)	1.13 * (7.79)	.60E-1 (0.18)	.90	24.5 *	1.68
Total Male	13.2	.14 (0.67)	1.38 * (6.14)	.30 (0.57)	.91	27.7 *	1.75
Total Female	-19.7	.90 * (12.64)	.85 * (11.22)	-.20 (1.12)	.92	30.7 *	1.79
10-19	-12.7	.41 * (6.81)	.46 * (7.18)	.32 * (2.17)	.81	11.7 *	1.89
20-29	-37.0	1.26 * (6.02)	1.76 * (7.87)	.89 * (1.71)	.83	13.0 *	1.53
30-39	-20.1	1.10 * (7.67)	1.63 * (10.56)	-.31 (0.88)	.93	37.5 *	1.75
40-49	-4.08	1.05 * (3.70)	1.54 * (5.06)	-1.34 * (1.90)	.84	14.2 *	1.67
50-59	8.39	.94 * (4.77)	1.45 * (6.87)	-1.76 * (3.60)	.93	34.5 *	2.15
60-69	39.2	-.29 (0.69)	1.07 * (2.34)	.36 (0.34)	.73	7.15*	2.19
70+	91.6	-1.21 * (3.86)	-1.08 * (3.20)	-1.12 * (2.46)	.69	5.86*	2.11

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.50; F = 3.25

.001 Level of significance t = 3.49; F = 4.80

Table 72

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL SUICIDE MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	6.28	.11 E-2 [*] (2.67)	1.03 * (10.26)	.71 * (3.52)	.89	30.1 *	1.75
Total Male	16.0	-.34 E-3 (0.58)	1.39 * (9.42)	.84 * (2.83)	.91	37.9 *	1.83
Total Female	-3.57	.26 E-2 [*] (9.72)	.63 * (9.58)	.57 * (4.33)	.86	22.7 *	1.57
10-19	-4.53	.14 E-2 [*] (8.66)	.29 * (4.99)	.38 * (4.57)	.82	16.8 *	2.35
20-29	-13.8	.48 E-2 [*] (9.00)	1.32 * (9.90)	1.23 * (4.63)	.86	22.8 *	2.09
30-39	-.20	.28 E-2 [*] (5.91)	1.38 * (11.60)	.82 * (3.44)	.91	36.2 *	1.55
40-49	11.4	.18 E-2 [*] (1.98)	1.57 * (6.67)	.83 * (1.77)	.78	13.1 *	1.34
50-59	22.8	.11 E-2 [*] (1.36)	1.49 * (7.21)	.37 (0.90)	.84	19.5 *	.99
60-69	32.8	-.15 E-2 (1.27)	1.26 * (4.25)	.74 (1.24)	.73	10.1 *	2.26
70+	72.7	-.53 E-2 [*] (6.19)	-.76 * (3.54)	-2.47 * (5.77)	.70	8.83*	2.18

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.96

*.05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL SUICIDE RATES¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	7.00	-.17E- ² (1.70)	.44 * (8.80)	.65 * (5.08)	.95	51.7 *	2.03
Total Male	13.4	-.39E- ² (2.79)	.62 * (8.86)	.90 * (4.98)	.96	64.7 *	2.60
Total Female	.83	.49E-3 (0.45)	.28 * (5.19)	.41 * (2.99)	.80	10.7 *	1.59
10-19	-3.10	.19E- ² (2.41)	.16 * (4.10)	.18 * (1.83)	.53	3.06*	2.57
20-29	-4.43	.37E- ² (2.47)	.52 * (7.03)	.58 * (3.07)	.74	7.45*	3.12
30-39	-3.81	.29E-2 (0.91)	.87 * (5.44)	1.18 * (2.91)	.67	5.35	2.66
40-49	6.79	.78E-3 (0.20)	.80 * (4.21)	.55 (1.12)	.77	9.07*	2.17
50-59	16.7	-.60E- ² (1.88)	.98 * (6.13)	1.35 * (3.31)	.92	31.4 *	3.19
60-69	35.6	-.13E- ¹ (3.02)	.25 (1.19)	.70 (1.28)	.88	19.4 *	2.48
70+	27.1	-.88E- ² (1.80)	.46 * (1.92)	.91 + (1.50)	.87	18.4 *	2.52

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 74

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
TOTAL SUICIDE MORTALITY RATES¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (MA)	Unemployment Rate	Inflation Rate (MA)	R ²	F-Value	D.W.
Total	7.44	-.11E- ² (1.83)	.45 * (8.07)	.63 * (5.42)	.95	46.3 *	2.17
Total Male	14.4	-.28E- ² (3.14)	.65 * (7.86)	.92 * (5.38)	.95	52.4 *	2.52
Total Female	.66	.58E- ³ (6.95)	.26 * (4.66)	.35 * (3.01)	.81	11.1 *	1.81
10-19	-3.64	.15E- ² (3.16)	.15 * (3.55)	.17 * (1.87)	.49	2.54*	2.48
20-29	-6.15	.30E- ² (3.26)	.53 * (6.20)	.63 * (3.56)	.69	5.85*	2.74
30-39	-7.68	.38E- ² (2.10)	.87 * (5.23)	1.08 * (3.11)	.68	5.54*	2.74
40-49	4.67	.11E- ² (0.50)	.86 * (4.30)	.65 + (1.56)	.78	9.62*	2.25
50-59	17.7	-.41E- ² (2.14)	1.04 * (5.89)	1.38 * (3.77)	.91	28.2 *	2.99
60-69	43.5	-.11E- ¹ (4.48)	.19 (0.85)	.48 (1.04)	.88	19.9 *	2.61
70+	33.5	-.83E- ² (2.97)	.49 * (1.90)	1.01 * (1.91)	.87	17.5 *	2.39

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 75

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL SUICIDE RATES¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Time Trend Squared	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	6.80	$-.47E^{-3}$ (2.89)	.42 * (10.23)	.49 * (5.93)	.95	67.9 *	2.12
Total Male	12.4	$-.12E^{-2}$ (4.91)	.60 * (9.89)	.62 * (5.14)	.95	76.8 *	2.54
Total Female	1.42	$.23E^{-3+}$ (1.33)	.25 * (5.57)	.36 * (4.05)	.79	13.7 *	1.61
10-19	-1.62	$.57E^{-3}$ (4.30)	.12 * (3.58)	.19 * (2.85)	.45	3.05*	2.36
20-29	-1.43	$.14E^{-2}$ (5.20)	.40 * (5.80)	.49 * (3.58)	.64	6.67*	2.58
30-39	-2.30	$.17E^{-2}$ (3.20)	.74 * (5.57)	.99 * (3.74)	.63	6.46*	2.50
40-49	8.19	$-.57E^{-4}$ (0.09)	.77 * (5.00)	.57 * (1.84)	.77	12.6 *	2.15
50-59	15.1	$-.17E^{-2}$ (3.29)	.95 * (7.21)	.90 * (3.43)	.92	40.3 *	3.06
60-69	29.8	$-.44E^{-2}$ (6.86)	.36 * (2.25)	.19 (0.60)	.89	30.2 *	2.62
70+	24.1	$-.34E^{-2}$ (4.51)	.55 * (2.91)	.65 * (1.71)	.87	25.2 *	2.46

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.96

*.05 Level of significance t = 1.71; F = 2.39

.01 Level of significance t = 2.48; F = 3.42

.001 Level of significance t = 3.44; F = 5.07

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL CIRRHOSIS MORTALITY RATES¹

New York: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-9.58	.16E-1 [*] (10.22)	.41 * (5.24)	-.37 * (1.83)	.97	79.0 *	1.30
Total Male	-17.2	.24E-1 [*] (8.44)	.69 * (4.87)	-.59 + (1.60)	.95	55.2 *	1.32
Total Female	-3.17	.92E-2 [*] (9.16)	.15 * (3.13)	-.17 + (1.32)	.96	63.4 *	2.25
0-25	-.12	.20E-3 (1.30)	.22E-1 [*] (3.00)	.15E-2 (0.08)	.59	3.87*	1.00
25-34	-16.6	.12E-1 [*] (8.66)	.47 * (7.17)	.81E-1 (0.48)	.95	49.9 *	2.60
35-44	-29.2	.27E-1 [*] (5.98)	.82 * (3.63)	.73 (1.26)	.91	27.8 *	0.80
45-54	-36.1	.43E-1 [*] (9.68)	1.28 * (5.90)	-.73 (1.30)	.96	68.6 *	1.47
55-64	-27.4	.44E-1 [*] (8.51)	1.45 * (5.76)	-.48 (0.75)	.95	47.6 *	1.34
65+	39.5	.27E-2 (0.51)	.64 * (2.43)	.38E-1 (0.06)	.76	8.46*	1.55

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 77

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL CIRRHOSIS MORTALITY RATES¹

California: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	.28	.11E-1 [*] (5.88)	.42 * (4.63)	.42E-1 (0.18)	.82	12.4 *	1.83
Total Male	-.46	.13E-1 [*] (5.25)	.64 * (5.14)	.24 (0.74)	.81	11.3 *	2.11
Total Female	.54	.86E-2 [*] (6.31)	.19 * (2.87)	-.16 (0.93)	.83	12.9 *	1.46
10-19	.24E-1 ⁻¹	-.72E-4 (0.23)	.28E-1 ⁻¹ (1.88)	.48E-1 (1.25)	.34	1.37	2.56
20-29	2.24	-.74E-3 (0.91)	-.13E-2 (0.03)	.71E-1 (0.69)	.14	0.42	2.28
30-39	5.38	.41E-2 ⁻² (1.45)	-.86E-2 (0.06)	-.18E-1 (0.05)	.42	1.90	2.33
40-49	-.26E-2 ⁻²	.27E-1 ⁻¹ (5.67)	.13E-1 (0.05)	-1.05 * (1.77)	.88	18.9 *	2.61
50-59	-34.9	.58E-1 ⁻¹ (8.10)	.15E-1 ⁻¹ (4.40)	-1.75 * (1.97)	.91	27.2 *	2.33
60-69	-32.6	.48E-1 ⁻¹ (5.78)	2.67 * (6.59)	.13 (0.13)	.86	16.5 *	1.19
70+	70.5	-.10E-1 (1.22)	.39E-1 (0.10)	-.78 (0.75)	.80	11.0 *	2.33

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.50; F = 3.25

.001 Level of significance t = 3.49; F = 4.80

Table 78

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND

TOTAL CIRRHOSIS MORTALITY RATE¹

Massachusetts: 1937-1970 Total Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	3.29	.64E-2 [*] (3.32)	.11 (1.15)	.14 (0.57)	.89	21.3 *	2.46
Total Male	.25	.10E-1 [*] (3.39)	.27 * (1.81)	.31 (0.83)	.87	17.3 *	2.36
Total Female	5.76	.30E-2 [*] (1.86)	-.32E-1 (0.41)	-.22E-1 (0.11)	.83	13.0 *	2.47
10-19	.83	.27E-3 (0.98)	-.13E-1 (0.95)	-.25E-1 (0.73)	.54	3.08*	2.85
20-29	.54	.30E-3 (0.60)	-.35E-2 (0.14)	-.47E-1 (0.75)	.33	1.34	2.63
30-39	5.00	.91E-3 (0.35)	-.49E-1 (0.39)	.31 (0.95)	.66	5.26*	2.63
40-49	2.21	.10E-1 [*] (2.22)	.16 (0.74)	.35 (0.60)	.88	20.0 *	1.96
50-59	-29.9	.36E-1 [*] (5.54)	1.33 * (4.25)	.79 (0.98)	.92	29.2 *	2.77
60-69	11.9	.12E-1 [*] (1.51)	.63 + (1.62)	.76 (0.76)	.65	4.89*	2.27
70+	29.6	-.45E-2 (0.70)	-.17 (0.56)	.48 (0.60)	.44	2.08+	3.13

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 79

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-14.8	.84E-1 [†] (6.60)	2.41 * (2.95)	-3.64 * (1.99)	.80	10.9 *	0.60
1-14	-58.5	.52E-1 [†] (9.97)	1.09 * (3.25)	-2.66 * (3.56)	.93	33.2 *	0.68
15-24	-187.8	.20 * (8.86)	4.48 * (3.04)	-8.32 * (2.54)	.90	25.2 *	0.79
25-34	-172.8	.18 * (8.98)	6.45 * (5.02)	-4.86 + (1.70)	.91	26.3 *	0.39
35-44	-171.0	.15 * (7.83)	8.26 * (6.72)	.62 (0.23)	.85	15.4 *	1.60
45-54	-40.3	.68E-1 [†] (5.51)	5.78 * (7.31)	1.81 (1.02)	.81	11.5 *	1.09
55-64	92.8	.13E-1 (0.89)	3.32 * (3.56)	2.15 (1.03)	.79	9.90*	0.99
65+	787.3	-.16 * (4.44)	-15.4 * (6.85)	-16.6 * (3.31)	.82	11.9 *	1.00

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.91

* .05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 80

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND

MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	-28.2	4.48 * (6.35)	5.39 * (3.70)	2.68 * (1.78)	.78	9.39*	0.58
1-14	-76.1	3.10 * (12.14)	3.38 * (6.42)	.90 + (1.66)	.93	38.2 *	0.77
15-24	-248.7	11.3 * (9.95)	13.0 * (5.25)	5.36 * (9.10)	.90	25.1 *	0.74
25-34	-198.4	10.6 * (9.48)	12.2 * (5.28)	4.36 * (1.83)	.89	22.5 *	0.43
35-44	-174.6	8.58 * (8.13)	12.3 * (5.66)	7.57 * (3.36)	.84	13.5 *	1.60
45-54	-47.8	4.06 * (6.15)	7.84 * (5.78)	5.13 * (3.65)	.80	10.9 *	1.01
55-64	103.8	-.24 (0.32)	3.61 * (2.32)	4.48 * (2.78)	.79	10.0 *	0.93
65+	778.4	-11.8 * (5.36)	-18.9 * (4.19)	-11.9 * (2.55)	.74	7.48*	0.83

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 81

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹
 New York: 1936-1970 Male Population
 Without the War 1941-1945
 Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	2.88	.78E-1 [†] (5.37)	1.45 + (1.43)	-3.81 * (1.87)	.80	8.77*	0.82
1-14	-63.3	.56E-1 [†] (9.48)	1.29 * (3.10)	-3.11 * (3.71)	.93	29.3 *	0.80
15-24	-169.8	.20 * (7.51)	3.32 * (1.77)	-9.32 * (2.47)	.90	19.7 *	1.03
25-34	-135.7	.16 * (7.58)	4.53 * (3.03)	-4.26 + (1.41)	.91	23.0 *	0.90
35-44	-144.0	.14 * (6.26)	6.95 * (4.59)	1.31 (0.43)	.86	13.1 *	1.89
45-54	-22.4	.59E-1 [†] (4.28)	4.85 * (4.99)	2.05 (1.05)	.82	9.97*	1.33
55-64	112.0	.56E-2 (0.34)	2.28 * (1.97)	1.95 (0.83)	.80	8.95*	1.12
65+	815.5	-.16 * (4.01)	-17.1 * (6.07)	-18.4 * (3.25)	.82	9.98*	1.00

¹Per 100,000 population

+ .10 Level of significance t = 1.33; F = 1.96

* .05 Level of significance t = 1.73; F = 2.40

.01 Level of significance t = 2.53; F = 3.45

.001 Level of significance t = 3.55; F = 5.24

Table 82

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Male Population

Without the War 1941-45

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	-38.2	4.64 * (6.44)	5.59 * (3.71)	2.64 * (1.74)	.78	7.91*	0.83
1-14	-76.0	3.11 * (11.12)	3.40 * (5.82)	.86 + (1.46)	.93	30.3 *	0.74
15-24	-264.1	12.2 * (9.64)	13.3 * (5.05)	5.41 * (2.03)	.90	20.3 *	0.95
25-34	-215.2	10.9 * (9.78)	12.4 * (5.35)	4.42 * (1.89)	.90	19.2 *	0.77
35-44	-182.3	8.68 * (8.08)	12.1 * (5.41)	7.53 * (3.32)	.84	12.0 *	1.93
45-54	-53.8	4.13 * (6.03)	7.83 * (5.46)	5.21 * (3.60)	.81	9.23*	1.30
55-64	94.3	-.11 (0.15)	3.61 * (2.33)	4.54 * (2.90)	.83	10.6 *	1.42
65+	765.0	-11.3 * (4.90)	-17.7 * (3.68)	-12.4 * (2.55)	.74	6.28*	0.79

¹Per 100,000 population

+ .10 Level of significance t = 1.33; F = 1.96

*.05 Level of significance t = 1.73; F = 2.40

.01 Level of significance t = 2.53; F = 3.45

.001 Level of significance t = 3.55; F = 5.24

Table 83

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Dummy Time Trend 1964-67	Logged Time Trend	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	-319.0	.40 * (8.06)	100.2 * (8.69)	2.90 * (6.27)	2.84 * (3.63)	.94	46.0 *	2.05
1-14	-328.4	.63E-1 * (1.87)	83.5 * (10.72)	1.52 * (4.86)	.77 * (1.46)	.93	44.6 *	0.74
15-24	-1066.7	.71 * (7.90)	280.8 * (13.49)	5.67 * (6.77)	5.72 * (4.05)	.97	96.6 *	2.75
25-34	-1036.0	.59 * (6.04)	273.1 * (12.14)	7.11 * (7.85)	5.73 * (3.75)	.95	64.4 *	1.05
35-44	-923.4	.38 * (3.05)	238.8 * (8.34)	8.46 * (7.35)	8.00 * (4.12)	.87	20.8 *	2.08
45-54	-350.0	.30 * (4.19)	100.6 * (6.18)	5.67 * (8.65)	5.00 * (4.52)	.87	20.9 *	1.78
55-64	258.5	.34 * (4.39)	-38.8 * (2.16)	2.88 * (3.99)	3.87 * (3.18)	.87	21.2 *	1.79
65+	2298.8	.90 * (3.35)	-450.6 * (7.27)	-14.5 * (5.81)	-13.3 * (3.17)	.77	10.6 *	1.28

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.93

* .05 Level of significance t = 1.71; F = 2.34

.01 Level of significance t = 2.49; F = 3.32

.001 Level of significance t = 3.45; F = 4.91

Table 84

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	96.4	.19E-1 [†] (1.86)	-1.31 * (2.02)	-3.71 * (2.56)	.53	2.96*	0.52
1-14	-32.8	.23E-1 [†] (10.47)	.93 * (6.76)	1.18 (0.04)	.94	41.5 *	1.06
15-24	-42.1	.81E-1 [†] (5.94)	1.36 + (1.56)	-3.02 + (1.55)	.80	10.8 *	0.99
25-34	6.79	.70E-1 [†] (6.22)	.85 (1.17)	-4.62 * (2.87)	.84	15.1 *	0.66
35-44	1.55	.58E-1 [†] (4.34)	2.36 * (2.78)	-1.21 (0.64)	.60	3.98*	0.53
45-54	70.3	.65E-2 (0.55)	2.02 * (2.68)	1.42 (0.84)	.63	4.56*	1.01
55-64	165.9	-.38E-1 [†] (3.55)	.51E-1 (0.07)	1.83 (1.19)	.84	14.0 *	0.85
65+	1139.7	-.20 * (4.66)	-34.2 * (12.29)	-53.3 * (8.61)	.89	20.9 *	1.17

¹Per 100,000 population

†.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND

MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	89.2	.62 (1.09)	-.24 (0.21)	-.60 (0.50)	.46	2.26+	0.46
1-14	-37.5	1.49 * (13.47)	1.66 * (7.28)	.83 * (3.51)	.94	42.3 *	1.15
15-24	-66.9	4.58 * (6.69)	4.99 * (3.53)	2.78 * (1.91)	.81	11.7 *	0.94
25-34	-1.82	3.78 * (6.26)	3.23 * (2.60)	-.35E-1 (0.03)	.84	14.1 *	0.70
35-44	-15.1	3.32 * (4.76)	4.87 * (3.39)	2.41 + (1.62)	.59	3.87*	0.52
45-54	63.4	.38 (0.63)	2.72 * (2.18)	1.83 + (1.42)	.64	4.76*	0.96
55-64	177.2	-2.74 * (5.28)	-1.36 (1.27)	1.12 (1.02)	.86	16.8 *	0.88
65+	1135.2	-16.5 * (4.73)	-38.5 * (5.35)	-41.2 * (5.53)	.73	7.21*	0.64

¹Per 100,000 population

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

Table 86

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
 MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Female Population

Without the War 1941-45

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	106.6	.17E-1+ (1.50)	-1.94 * (2.40)	-4.30 * (2.64)	.56	2.81*	0.62
1-14	-30.1	.21E-1 ⁺ (8.85)	.78 * (4.60)	-.25 (0.01)	.94	37.1 *	1.05
15-24	-35.1	.83E-1 ⁺ (5.37)	.79 (0.73)	-4.17 * (1.91)	.80	8.89*	1.17
25-34	19.6	.67E-1 ⁺ (5.29)	.61E-1 (0.07)	-5.15 * (2.86)	.84	11.9 *	0.84
35-44	18.3	.52E-1 ⁺ (3.47)	1.40 + (1.33)	-1.57 (0.74)	.59	3.25*	0.81
45-54	84.7	.16E-2 (0.12)	1.22 (1.32)	1.12 (0.60)	.66	4.28*	1.17
55-64	175.8	-.41E-1 [*] (3.33)	-.49 (0.58)	1.35 (0.78)	.84	11.7 *	0.79
65+	1104.6	-.18 * (3.77)	-32.4 * (9.89)	-56.1 * (8.48)	.91	22.3 *	1.00

¹Per 100,000 population

+ .10 Level of significance t = 1.33; F = 1.96

* .05 Level of significance t = 1.73; F = 2.40

.01 Level of significance t = 2.53; F = 3.45

.001 Level of significance t = 3.55; F = 5.24

Table 87

RELATIONSHIPS BETWEEN STATE ECONOMIC INDICATORS AND
MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Female Population

Without the War 1941-45

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita Income (NY)	Unemployment Rate	Inflation Rate (NY)	R ²	F-Value	D.W.
Total	84.7	.68 (1.14)	-.20 (0.16)	-.63 (0.50)	.48	2.03+	0.53
1-14	-37.3	1.49 * (12.63)	1.62 * (6.58)	.84 * (3.38)	.94	36.0 *	1.09
15-24	-67.3	4.56 * (6.20)	4.76 * (3.10)	2.85 * (1.84)	.80	9.09*	1.00
25-34	-3.52	3.78 * (5.96)	3.04 * (2.30)	.25 ⁻¹ (0.02)	.82	10.8 *	0.89
35-44	-21.7	3.40 * (4.85)	4.79 * (3.27)	2.50 + (1.69)	.62	3.57*	0.81
45-54	60.8	.39 (0.65)	2.51 * (1.99)	1.86 + (1.46)	.69	4.94*	1.07
55-64	177.2	-2.74 * (4.94)	-1.46 (1.26)	1.03 (0.88)	.86	13.2 *	0.76
65+	1117.2	-15.9 * (4.63)	-36.1 * (5.01)	-42.5 * (5.84)	.79	8.17*	0.54

¹Per 100,000 population

+ .10 Level of significance $t = 1.33$; $F = 1.96$

* .05 Level of significance $t = 1.73$; $F = 2.40$

.01 Level of significance $t = 2.53$; $F = 3.45$

.001 Level of significance $t = 3.55$; $F = 5.24$

Table 88

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
MENTAL HOSPITAL FIRST ADMISSION RATES¹

New York: 1936-1970 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Dummy Time Trend 1964-67	Logged Time Trend	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	174.7	.32 * (7.46)	-16.9 * (1.72)	-1.19 * (3.01)	-.73 (1.09)	.82	14.6 *	1.54
1-14	-169.4	.42E-1 (2.76)	42.1 * (11.95)	.97 * (6.84)	.92 * (3.84)	.94	45.3 *	1.48
15-24	-321.4	.35 * (5.02)	94.2 * (5.94)	1.63 * (2.56)	2.60 * (2.41)	.89	25.9 *	1.68
25-34	-222.7	.33 * (7.19)	78.6 * (7.29)	1.00 * (2.31)	.19 (0.26)	.95	53.9 *	1.96
35-44	-123.6	.43 * (9.31)	49.7 * (4.70)	2.05 * (4.82)	2.26 * (3.15)	.90	27.7 *	2.36
45-54	193.5	.32 * (6.53)	-28.2 * (2.47)	1.39 * (3.03)	1.60 * (2.06)	.86	19.5 *	2.76
55-64	518.2	.23 * (4.01)	-101.8 * (7.60)	-.45 (0.83)	.45 (0.50)	.90	28.5 *	1.19
65+	2848.0	.31 (0.61)	-536.3 * (4.63)	-29.0 * (6.22)	-41.1 * (5.23)	.68	6.60*	0.84

¹Per 100,000 population

+ .10 Level of significance t = 1.31; F = 1.93

* .05 Level of significance t = 1.71; F = 2.34

.01 Level of significance t = 2.49; F = 3.32

.001 Level of significance t = 3.45; F = 4.91

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Table 89

England and Wales: Total Male Population 1946-1972

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita National Income (U.K.)	Unemployment Rate (U.K.)	Inflation Rate (U.K.)	R ²	F-Value	D.W.
Total	13.6	-.28E-2 (0.88)	.26 (0.52)	-.71E-1 (0.87)	.28	0.70	3.05
LT 1	50.2	-.51E-1 [†] (1.82)	9.26 * (2.14)	-3.01 * (4.21)	.95	35.1 *	2.00
1-4	1.86	-.12E-2 (1.30)	.31 * (2.13)	-.14 * (5.95)	.96	39.9 *	1.88
5-9	1.03	-.69E-3 [‡] (2.09)	.15E-1 (0.29)	-.34E-1 [†] (4.07)	.96	48.1 *	2.73
10-14	.62	-.59E-3 [‡] (2.21)	.12 * (2.88)	-.22E-1 [†] (3.19)	.96	41.6 *	2.62
15-19	.83	.12E-2 [†] (1.66)	.30E-1 (0.26)	-.97E-1 [†] (5.16)	.75	5.39*	1.47
20-24	1.78	-.17E-2 [‡] (4.06)	.24 * (3.78)	-.68E-1 [†] (6.57)	.96	43.6 *	2.54
25-29	1.99	-.22E-2 [‡] (3.20)	.30 * (2.84)	-.78E-1 [†] (4.46)	.96	38.7 *	1.82
30-34	2.36	-.31E-2 [‡] (4.12)	.25 * (2.13)	-.11E-1 (0.58)	.96	37.8 *	1.30
35-39	2.97	-.24E-2 [‡] (3.45)	.41 * (3.81)	-.14 * (8.02)	.97	58.9 *	1.94
40-44	3.91	-.15E-2 (0.82)	.47 + (1.59)	-.17 * (3.40)	.82	7.95*	0.70
45-49	5.81	-.26E-2 [‡] (1.97)	.51 * (2.58)	.50E-1 [†] (1.53)	.96	41.5 *	2.16
50-54	13.3	-.12E-1 [†] (4.99)	.36 (1.01)	.14 * (2.31)	.89	15.0 *	2.36
55-59	22.5	-.12E-1 [†] (4.05)	.43 (0.92)	-.28 * (3.63)	.85	10.2 *	2.82
60-64	33.9	-.14E-1 [†] (1.96)	1.63 + (1.43)	-.75 * (4.03)	.63	3.07*	2.27
65-69	47.1	-.10E-1 (0.89)	.37 (0.21)	.39E-1 (0.14)	.39	1.11	2.75
70-74	77.6	-.49E-1 [†] (2.47)	4.48 + (1.46)	.30 (0.60)	.46	1.50	2.88
75-79	126.3	-.85E-1 [†] (2.39)	4.75 (0.86)	.97 (1.06)	.53	2.02	2.97
80+	248.3	-.17 * (2.13)	-.22 (0.02)	2.44 (1.24)	.61	2.80*	2.98

¹ Per 10,000 population

+.10 Level of significance t = 1.34; F = 2.06

*.05 Level of significance t = 1.75; F = 2.54

.01 Level of significance t = 2.58; F = 3.78

.001 Level of significance t = 3.69; F = 5.98

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND
TOTAL MORTALITY RATES¹

Table 90

England and Wales: Total Female Population 1946-1972

Lsg = 0.5 PDL/2

Dependent Variable	Intercept	Per Capita National Income (U.K.)	Unemployment Rate (U.K.)	Inflation Rate (U.K.)	R ²	F-Value	D.W.
Total	-.27E ⁻¹	.24E-2 (0.41)	2.77 * (3.01)	0.56 * (3.72)	.80	7.22*	1.67
LT 1	39.4	-.38E ⁻¹ (1.80)	6.42 * (1.97)	-2.32 * (4.31)	.95	35.7 *	2.04
1-4	1.47	-.14E ⁻² (1.48)	.37 * (2.55)	-.11 * (4.57)	.94	26.9 *	1.67
5-9	.60	-.70E ⁻³ (2.96)	.93E ⁻¹ (2.54)	-.12E ⁻¹ (1.93)	.97	53.5 *	1.61
10-14	.44	-.30E ⁻³ (1.33)	.70E ⁻¹ (1.98)	-.18E ⁻¹ (3.08)	.97	51.7 *	2.75
15-19	.60	-.23E ⁻³ (0.33)	.25 * (2.26)	-.76E ⁻¹ (4.19)	.93	23.5 *	1.27
20-24	1.01	-.97E ⁻³ (1.08)	.42 * (3.02)	-.11 * (4.81)	.97	52.5 *	1.65
25-29	1.63	-.23E ⁻² (2.54)	.43 * (3.14)	-.10 * (4.47)	.97	52.0 *	1.10
30-34	2.09	-.33E ⁻² (3.98)	.36 * (2.77)	-.33E ⁻¹ (1.55)	.96	47.8 *	1.44
35-39	2.46	-.27E ⁻² (3.98)	.46 * (4.38)	-.11 + (6.41)	.98	72.1 *	2.71
40-44	3.40	-.30E ⁻² (2.12)	.36 + (1.66)	-.85E ⁻¹ (2.39)	.86	10.5 *	0.81
45-49	4.02	-.26E ⁻² (2.74)	.47 * (3.19)	.33E ⁻¹ (1.37)	.96	48.1 *	2.27
50-54	6.91	-.45E ⁻² (2.65)	.55 * (2.12)	-.47E ⁻¹ (1.10)	.92	20.1 *	2.16
55-59	10.9	-.71E ⁻² (4.12)	.78 * (2.91)	-.71E ⁻¹ (1.62)	.95	33.3 *	2.83
60-64	19.2	-.16E ⁻¹ (5.80)	1.66 * (3.78)	-.23 * (3.15)	.96	38.7 *	2.72
65-69	33.4	-.31E ⁻¹ (4.54)	2.70 * (2.57)	-.36 * (2.08)	.92	21.3 *	3.13
70-74	60.3	-.59E ⁻¹ (4.56)	3.80 * (1.90)	-.37 (1.12)	.91	17.1 *	3.24
75-79	107.7	-.11 * (4.38)	5.71 + (1.46)	-.29 (0.45)	.87	12.2 *	3.10
80+	1247.0	1.43 + (1.45)	-86.6 (0.58)	-1.39 (0.06)	.42	1.27	2.30

¹ Per 10,000 population

+.10 Level of significance t = 1.34; F = 2.06

*.05 Level of significance t = 1.75; F = 2.54

.01 Level of significance t = 2.58; F = 3.78

.001 Level of significance t = 3.69; F = 5.98

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND TOTAL MORTALITY RATES¹

Table 91

Sweden: 1940-1973 Male Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita GDP ²	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	7.47	.27E-2 [*] (7.77)	.22 * (4.83)	-.44E-1 (0.76)	.82	12.4 *	2.44
LT 1	27.3	-.15E-1 [†] (8.75)	1.62 * (7.25)	.15 (0.52)	.98	139.0 *	1.90
0-4	5.39	-.36E-2 [‡] (7.01)	.61 * (8.91)	.14 + (1.59)	.98	152.2 *	2.25
5-9	.71	-.36E-3 [§] (3.77)	.43E-1 [†] (3.46)	.12E-1 (0.79)	.95	54.1 *	2.05
10-14	.46	-.26E-3 [§] (3.13)	.44 * (4.04)	.19E-1 [†] (1.37)	.95	44.7 *	2.52
15-19	.58	.72E-4 (0.57)	.11 * (6.37)	.15E-1 (0.73)	.95	54.0 *	2.26
20-24	.52	-.90E-4 (0.42)	.21 * (7.60)	.44E-1 (1.26)	.97	79.4 *	2.33
25-29	.86	.35E-4 (0.24)	.19 * (10.00)	-.29E-1 (1.25)	.98	106.0 *	2.09
30-34	1.18	.17E-3 (1.06)	.15 * (6.94)	-.39E-1 [†] (1.46)	.95	55.4 *	1.90
35-39	1.29	.10E-3 (0.71)	.18 * (9.72)	-.46E-3 (0.02)	.97	78.5 *	1.81
40-44	1.80	.65E-3 [§] (3.48)	.19 * (7.68)	-.21E-1 (0.68)	.95	54.7 *	1.84
45-49	3.41	.46E-3 [§] (1.47)	.21 * (5.26)	-.86E-2 (0.17)	.91	28.6 *	1.19
50-54	6.57	.17E-4 (0.04)	.26 * (4.40)	-.93E-1 (1.27)	.88	20.2 *	1.35
55-59	11.8	-.88E-3 [§] (1.64)	.17 * (2.47)	-.15E-1 (0.17)	.86	16.0 *	1.91
60-64	19.1	-.96E-3 (1.11)	.28 * (2.41)	-.15 (1.06)	.68	5.56*	2.16
65-69	29.8	.31E-3 (0.30)	.32 * (2.39)	-.26 + (1.57)	.58	3.71*	2.50
70-74	48.7	.18E-3 (0.08)	.75 * (2.84)	-.42 (1.27)	.54	3.13*	2.46
75-79	81.9	-.42E-2 [‡] (1.32)	.85 * (2.04)	-.72E-1 (0.14)	.68	5.77*	2.49
80+	189.1	-.30E-1 [*] (3.85)	-1.08 (1.06)	1.34 (1.05)	.74	7.69*	2.32

¹ Per 100,000 population² Gross Domestic Product

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

RELATIONSHIPS BETWEEN NATIONAL ECONOMIC INDICATORS AND Table 92

TOTAL MORTALITY RATES¹

Sweden: 1940-1973 Female Population

Lag = 0-5 PDL/2

Dependent Variable	Intercept	Per Capita GDP ²	Unemployment Rate	Inflation Rate	R ²	F-Value	D.W.
Total	8.78	.18E-3 (0.49)	.18 * (3.82)	-.26E-1 (0.44)	.86	14.9 *	2.38
LT 1	20.5	-.12E-1 [*] (8.97)	1.31 * (7.67)	.19 (0.89)	.98	153.8 *	2.08
0-4	4.13	-.29E-2 [*] (8.84)	.47 * (10.93)	.12 * (2.22)	.99	238.5 *	2.52
5-9	.25	-.11E-3 ⁺ (1.46)	.63E-1 [*] (6.42)	.77E-2 (0.63)	.95	50.7 *	2.38
10-14	.23	-.92E-4 ⁺ (1.52)	.45E-1 [*] (5.65)	.63E-2 (0.63)	.96	64.0 *	2.27
15-19	-.54E-1 ⁺	.16E-3 ⁺ (1.46)	.12 * (8.34)	.12E-1 (0.68)	.97	98.4 *	2.78
20-24	.96E-1 ⁺	-.51E-4 (0.36)	.16 * (8.36)	.16E-1 (0.68)	.98	111.0 *	1.90
25-29	.41	-.21E-3 ⁺ (1.35)	.16 * (7.51)	.12E-1 (0.47)	.97	94.2 *	2.49
30-34	.73	-.29E-3 [*] (2.04)	.16 * (8.50)	.14E-2 (0.06)	.98	107.6 *	1.06
35-39	1.36	-.29E-3 ⁺ (1.51)	.15 * (5.86)	-.36E-1 (1.14)	.95	56.2 *	0.85
40-44	2.09	-.55E-3 [*] (2.44)	.18 * (5.99)	-.16E-1 (0.43)	.96	58.2 *	1.51
45-49	3.66	-.11E-2 [*] (3.87)	.16 * (4.36)	.10E-3 (0.02)	.95	52.2 *	1.33
50-54	6.34	-.22E-2 [*] (5.14)	.15 * (2.61)	.29E-1 (0.41)	.94	43.1 *	0.66
55-59	10.5	-.40E-2 [*] (6.38)	.12 + (1.48)	.54E-1 (0.53)	.94	42.5 *	0.85
60-64	18.1	-.66E-2 [*] (7.45)	.15 + (1.32)	-.26E-1 (0.18)	.95	48.7 *	0.76
65-69	32.1	-.12E-1 ⁺ (10.44)	.29E-1 (0.19)	.84E-1 (0.43)	.96	65.1 *	1.42
70-74	58.5	-.22E-1 [*] (9.46)	.13 (0.42)	-.14 (0.36)	.94	43.2 *	1.54
75-79	96.0	-.33E-1 [*] (10.21)	-.18E-1 (0.04)	.19 (0.36)	.95	47.0 *	1.81
80+	210.0	-.65E-1 [*] (7.26)	-1.20 (1.02)	.58 (0.39)	.87	17.7 *	2.01

¹Per 100,000 population²Gross Domestic Product

+.10 Level of significance t = 1.31; F = 1.91

*.05 Level of significance t = 1.71; F = 2.30

.01 Level of significance t = 2.49; F = 3.25

.001 Level of significance t = 3.47; F = 4.80

TABLE 93

RELATIONSHIPS BETWEEN PER CAPITA INCOME AND
TOTAL MORTALITY RATES
United States: 1940-74 and Intermediate Periods
Lag = 0-5 PDL/2
Expressed in regression coefficients uncontrolled for
the effects of other economic or non-economic variables

	1940-74	1940-74 without 1942-45	1940-59	1940-59 without 1942-45	1960-74
< 1	-.24 * (14.12)	-.23 * (10.95)	-.41 * (11.39)	-.41 * (10.0)	-.12 * (18.75)
1-4	-.13E-1 * (10.83)	-.12E-1 * (3.57)	-.27E-1 * (14.21)	-.27E-1 * (18.0)	-.52E-2 (13.0)
5-14	-.37E-2 * (4.93)	-.35E-2 * (3.61)	-.80E-2 * (9.16)	-.83E-2 * (10.0)	-.18E-2 (.64)
15-24	-.56E-2 * (5.96)	-.43E-2 * (3.91)	-.15E-1 * (9.37)	-.15E-1 * (11.54)	.24E-2 * (4.14)
25-34	-.95E-2 * (7.31)	-.8E-2 * (5.0)	-.24E-1 * (11.43)	-.24E-1 * (14.12)	.91E-4
35-44	-.14E-1 * (3.23)	-.12E-1 * (5.71)	-.32E-1 * (10.32)	-.32E-1 * (13.91)	-.29E-2 * (4.75)
45-54	-.25E-1 * (10.42)	-.21E-1 * (7.5)	-.49E-1 * (9.8)	-.48E-1 * (12.97)	-.92E-2 * (8.36)
55-64	-.42E-1 * (12.0)	-.36E-1 * (8.78)	-.71E-1 * (8.16)	-.70E-1 * (10.77)	-.2E-1 * (7.69)
65-74	-.79E-1 * (12.95)	-.75E-1 * (9.74)	-.14 * (10.77)	-.14 * (12.73)	-.68E-1 * (12.14)
75-84	-.21 * (14.0)	-.18 * (10.59)	-.33 * (9.70)	-.33 * (13.75)	-.84E-1 * (4.94)
85+	-.32 * (7.27)	-.32 * (5.71)	-.58 * (5.27)	-.57 * (6.0)	-.50 * (6.58)

* significant at .05 level of confidence.

TABLE 94

RELATIONSHIPS BETWEEN THE RATE OF UNEMPLOYMENT AND
TOTAL MORTALITY RATES

United States: 1940-74 and Intermediate Periods

Lag = 0-5 PDL/2

Expressed in regression coefficients uncontrolled for
the effects of other economic or non-economic variables

	1940-74 Without <u>1942-45</u>	1940-74	1940-59 Without <u>1942-45</u>	1940-59	1960-74
1	19.23 * (3.41)	19.36 * (3.84)	15.16 * (3.63)	17.30 * (5.07)	39.95 * (2.98)
1-4	1.22 * (4.52)	1.18 * (4.92)	1.03 * (4.29)	1.08 * (6.00)	1.97 * (3.13)
5-14	.26 * (1.86)	1.50 * (12.5)	.30 * (3.26)	.31 * (4.37)	-.86 (.67)
15-24	.59 * (4.21)	n.c.	n.c.	n.c.	n.c.
25-34	1.00 * (5.0)	n.c.	n.c.	n.c.	n.c.
35-44	1.26 * (3.94)	1.24 * (4.28)	1.14 * (3.08)	1.17 * (4.18)	-.84E-1 (.27)
45-54	1.93 * (3.11)	1.86 * (3.38)	1.62 * (2.61)	1.67 * (3.55)	2.39 * (2.37)
55-64	2.77 * (2.54)	2.63 * (2.71)	2.29 * (2.29)	2.29 * (3.01)	5.43 * (2.39)
65-74	6.28 * (3.32)	6.20 * (3.73)	6.16 * (4.0)	5.79 * (4.86)	19.06 * (2.93)
75-84	17.53 * (3.46)	15.71 * (3.46)	14.27 * (3.97)	13.47 * (4.78)	38.53 * (2.9)
85+	26.28 * (2.52)	26.33 * (2.84)	30.70 * (3.43)	25.38 * (3.37)	186.35 * (3.67)

n.c. - Coefficients not comparable between 1940-59 and 1960-74.
* significant at .05 level of confidence.

TABLE 95

RELATIONSHIPS BETWEEN THE RATE OF UNEMPLOYMENT AND
MORTALITY RATES

United States: 1940-74 and Intermediate Periods

Leg = 0-5 PDL/2

Expressed in regression coefficients uncontrolled for
the effects of other economic or non-economic variables

	WHITE TOTAL MORTALITY RATES			NONWHITE TOTAL MORTALITY RATES		
	1940-74 Without 1942-45	1940-59	1960-74	1940-74 Without 1942-45	1940-59	1960-74
1	17.21 * (3.32)	15.59 * (4.61)	34.82 * (2.85)	31.68 * (3.70)	27.77 * (7.29)	71.52 * (3.21)
1-4	1.07 * (4.46)	.95 * (5.59)	1.77 * (3.05)	2.14 * (4.37)	1.84 * (6.81)	3.24 * (3.21)
5-14	.21 (1.4)	.29 * (4.26)	-1.06 (.72)	.54 * (3.6)	.48 * (4.9)	.43 * (2.26)
15-24	.39 (.41)	n.c.	n.c.	2.05 * (4.27)	n.c.	n.c.
25-34	.78 * (5.2)	n.c.	n.c.	2.82 * (4.95)	n.c.	n.c.
35-44	1.04 * (3.85)	.95 * (3.96)	-.53E-1 (.20)	3.51 (.40)	3.38 * (4.33)	-.39 (.36)
45-54	1.58 * (3.29)	1.37 * (3.6)	2.30 * (2.61)	5.07 * (2.73)	4.41 * (3.34)	3.12 (1.31)
55-64	2.70 * (2.67)	2.23 * (2.93)	4.07 * (2.18)	3.50 (1.63)	2.84 * (2.58)	19.20 * (2.83)
65-74	6.42 * (3.24)	5.64 * (4.78)	19.31 * (3.07)	4.48 (1.53)	7.79 * (4.78)	15.78 (1.22)
75-84	17.6 * (3.35)	13.43 * (4.66)	40.90 * (2.97)	16.56 * (5.83)	13.95 * (5.58)	6.94 (.55)
85+	25.22 * (2.35)	25.27 * (3.25)	182.61 * (3.46)	40.37 * (4.08)	26.82 * (4.74)	235.92 * (7.1)

n.c. - Coefficients not comparable between 1940-59 and 1960-74.

* significant at .05 level of confidence.

