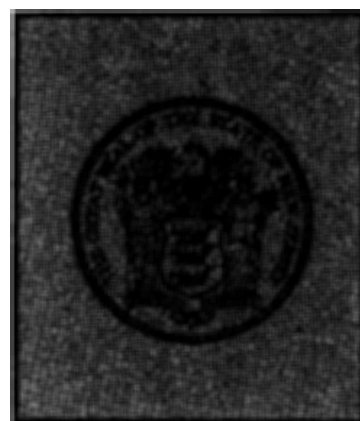
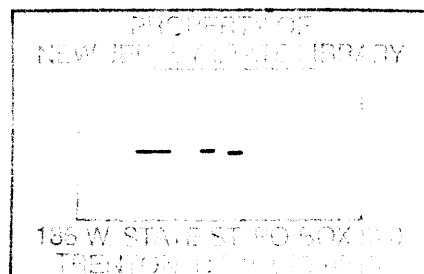




18th Annual Report

Economic Policy Council
and Office of Economic Policy

STATE OF NEW JERSEY

Trenton, 1986

18th Annual Report

Economic Policy Council
and Office of Economic Policy

STATE OF NEW JERSEY

Trenton, 1986

ECONOMIC POLICY COUNCIL

DR. JOSEPH J. SENECA, *Chairman*
Professor of Economics, Rutgers University

DR. WILLIAM C. FREUND, *Member*
New York Stock Exchange Chair Professor of Economics and
International Business, Graduate School of Business, Pace University

DR. DAVID F. BRADFORD, *Member*
Professor of Economics & Public Affairs,
Woodrow Wilson School, Princeton University

OFFICE OF ECONOMIC POLICY

DR. ADAM BRONER, *Director*

DR. LAURENCE FALK, *Economist*

DR. JONG K. YOU, *Economist*

MR. JERZY ZACHARIASZ, *Economist*

CAROL MASLOWSKI, *Secretary*



**STATE OF NEW JERSEY
ECONOMIC POLICY COUNCIL**

ONE WEST STATE STREET

CN 830

TRENTON, NEW JERSEY 08625-0830

DR. JOSEPH J. SENECA
CHAIRMAN

DR. ADAM BRONER
SECRETARY
(609) 292-1890

MEMBERS

DR. WILLIAM C. FREUND
DR. DAVID F. BRADFORD

October 24, 1986

The Honorable Thomas H. Kean
Governor of New Jersey
The State House
Trenton, New Jersey

Dear Governor Kean:

In accordance with Chapter 129 of New Jersey Public Law 1966, the Economic Policy Council is pleased to submit its 18th Annual Report.

In this Annual Report we examine three major economic issues facing New Jersey's economy. Chapter I analyzes the fiscal implications for state and local government of the uneven spatial distribution of economic growth within New Jersey. Our State has several "growth corridors" which have experienced and economic boom over the past several years. Simultaneously, other areas in New Jersey, particularly our urban centers, have continued to lag behind in terms of economic growth. This Chapter estimates the fiscal effects of these disparate economic growth conditions and discusses the inevitable stresses as well as the policy opportunities created by this situation.

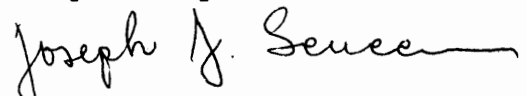
In Chapter II we analyze the effects on earnings in New Jersey caused by the major structural changes in our economy. The shift from manufacturing activity to services employment has been well-documented. However, we find no evidence that this shift has reduced average earnings in the State. We do conclude, as expected, that these changes have created a demand for a more highly educated and skilled labor force.

Finally, in Chapter III we carefully examine the performance of the State's manufacturing sector. We identify those industries within the manufacturing sector that have performed well and those that have declined during the current economic recovery (1982-1986). We measure the economic performance of these industries according to a series of indicators -- employment, investment, labor costs, productivity, etc. We find that the State's performance is largely determined by national and international factors, although low investment rates in New Jersey manufacturing are a continuing source of concern.

Our thanks are due to John Moore, N.J. Department of Transportation, who furnished information and data on the Route One Corridor; to the staff of the State Library; to Arthur O'Neal, Vivien Shapiro, Shirley Goetz, Connie Hughes and the entire staff of the Division of Planning and Research of the N.J. Department of Labor for their continued assistance in the preparation of this Report, and to Carol Maslowski for her diligent preparation of the manuscript for this Report.

The Council and Office appreciate your continued interest in our activities. We look forward to assisting you as you move toward your goal of keeping New Jersey's economy near the top among the fifty states and working to spread the benefits of prosperity to all of New Jersey's citizens.

Respectfully submitted,

A handwritten signature in dark ink, reading "Joseph J. Seneca". The signature is written in a cursive style with a long, horizontal flourish at the end.

Joseph J. Seneca

TABLE OF CONTENTS

	<u>Page</u>
I. MANAGING THE STATE ECONOMY: THE FISCAL IMPLICATIONS OF GROWTH AND DECLINE	3
II. CHANGES IN THE NEW JERSEY INDUSTRIAL COMPOSITION	40
III. MANUFACTURING IN NEW JERSEY: WHAT IS DECLINING AND WHY?	59
IV. STATISTICAL TABLES	85

STATISTICAL TABLES

<u>Table</u>		<u>Page</u>
1.	Population and Employment, New Jersey, 1960-1985	85
2.	Wage and Salary Workers in Nonagricultural Establishments, Major Divisions, New Jersey, 1960-1985	86
3.	Wage and Salary Workers in Manufacturing, Durable Goods, New Jersey, 1960-1985	87
4.	Wage and Salary Workers in Manufacturing, Nondurable Goods, New Jersey, 1960-1985	88
5.	Employment, Hours, and Earnings of Production Workers on Manufacturing Payrolls, New Jersey, 1950-1985	89
6.	Consumer Price Indexes for Urban Wage Earners and Clerical Workers, 1955-1985	90
7.	Personal Income, New Jersey and United States, 1955-1985	91
8.	Production and Trade, New Jersey, 1965-1985	92
9.	Business Activity, New Jersey, 1955-1985	93
10.	Resident Population for New Jersey Counties, 1970, 1980	94

PREFACE

This year's Annual Report is concerned with three critical issues confronting the New Jersey economy. The first deals with the fiscal effect of rapid economic growth or decline of some regions of the State. We concentrate on the effects of these changes on the public sector's finances and its traditional role of providing infrastructure development. The second deals with the assertion that the structural shift from manufacturing toward services inevitably leads to lower average earnings per employee. We prove this assertion to be wrong in New Jersey. The third study concerns the employment decline in the manufacturing sector, both nationally and in New Jersey, and attempts to determine the major causes of that decline.

Chapter I -- Managing the State Economy: The Fiscal Implications of Growth and Decline

Rapid growth of the Route One Corridor municipalities has strained the capacity of the existing infrastructure of the region. Traffic congestion is the most visible result, but local governments have had to cope with a variety of other results as well -- school systems, sewage facilities, refuse disposal, etc. The role of county government in meeting the needs of an entire region has not been well-defined, let alone resolved, satisfactorily. The difficulties are even greater when several adjacent counties have to coordinate their policies in order to solve a common problem. Finally, the

role of the state government is even less clear, and must confront difficulties stemming from the strongly-defended tradition of 'home rule' in New Jersey. The effects of economic growth or decline on the revenues and expenditures of all levels of government have significant implications for the public sector's financial relationship with private sector developers.

Confronted with all these issues, the public sector needs an objective calculus which will show the gains from economic growth and the assistance it needs to extend to the declining areas.

This Chapter is the first attempt to provide estimates of the fiscal implications of economic growth and decline among the various levels of government. It demonstrates that there are positive fiscal effects of rapid economic growth. These growth dividends can be used, in part, to solve the infrastructure problems generated by that growth. However, the State also has an obligation to the less fortunate declining areas where decline has resulted in fiscal deficits. Moreover, from the State's vantage point, it is desirable to redirect some economic growth toward declining urban centers. Such a policy may not only relieve some of the rapid growing municipalities of the pains of this growth, but also reduce existing state expenditures for declining municipalities.

Chapter II -- Changes in the New Jersey Industrial Composition

This Chapter analyzes the State's employment and earning structure over a ten-year period (1973 - 1983) and tests the assertion that employment shifts from manufacturing toward various service industries lead to lower average earnings of the State's labor force. The analysis of over 200 industries in all sectors of New Jersey's economy shows that shifts toward lower-paying jobs are being counteracted by opposite shifts toward higher earnings employment. The result is that, on the average, there is no discernible difference in the level of earnings between 1973 and 1983 due to these composition changes.

The result that average earnings have essentially been neutral with respect to industrial structural changes in the economy does in no way remove the severe economic hardship experienced by many individuals associated with these shifts in the composition of New Jersey's economy. The growth rates of individual industries associated with these changes in composition were, in many instances, negative, indicating a loss of jobs for many employees.

A related issue concerns the occupational composition of the workforce. We examine how changes in the State's industrial profile have affected specific occupations and the level of skills and educational attainment of the labor force. The major finding is that structural changes in the industrial mix of the State's economy have created additional demand for employees with college educations (professionals, managers, etc.) and a significant decline of jobs characterized by less than a college education. The implication for the State's younger generation is unequivocal: in the future there will be more job offerings that require a higher edu-

cation. We also conclude that in order to ease the transition toward jobs demanding higher levels of educational attainment, the State should do its utmost to retain, as much as possible, traditional manufacturing jobs.

Chapter III -- Manufacturing in New Jersey: What is Declining and Why?

This Chapter concentrates on the difficulties experienced by the manufacturing sector of the national and state economies. Only a short and weak manufacturing recovery from the trough of the 1980-82 recession was observed in 1983-84. This was followed by a renewed manufacturing employment decline in 1985-86. It is critically important to understand the reasons for that decline; i.e., whether it is widespread, or concentrated in a limited group of industries, and whether there are local factors that cause the industries in New Jersey to perform differently than their national counterparts. We found that the State's industries' performance is chiefly determined by national and international factors. Nevertheless, the low investment rates observed in New Jersey are likely to cause further erosion of manufacturing jobs in the State unless serious measures are undertaken to reverse that trend. If continued, the low-level of new capital investment that we observe in New Jersey manufacturing will lead to relatively lower productivity and higher costs of production. We analyze a group of New Jersey industries that have grown during the 1982-1986 period. These industries have a superior labor productivity performance compared with the same industries on a national level. They also perform better in comparison with other industries in the State. Higher labor productivity in the group of growing industries represents a comparative advantage for New Jersey. This is also associated with higher earnings for their employees.

I.

MANAGING THE STATE ECONOMY: THE FISCAL IMPLICATIONS OF GROWTH AND DECLINE*

EXECUTIVE SUMMARY

Growth along major transportation arteries has recently raised several policy issues for the State. Foremost among them is how to finance the extraordinary infrastructure expenditures caused by rapid economic growth in a number of relatively small, concentrated areas. A related issue concerns the responsibilities of municipal governments in coordinating economic development in adjacent municipalities and the role of county and state authorities in resolving inter-municipal issues. An even broader concern, from the State's point of view, is how to influence private location decisions to minimize state expenditures.

This Chapter deals only with the fiscal issues of rapid economic growth or decline by estimating state and local revenues and expenditures that will arise as a result of such changes. The methods employed in arriving at our estimates are outlined in section II and in several exhibits at the end of the Chapter. The major numerical results, which should be considered suggestive rather than definitive, are outlined in section III and are briefly recapitulated here.

Rapid economic growth in the Route One Corridor, which includes 13 municipalities situated between New Brunswick and Trenton, will bring significant fiscal surpluses to local governments. The present value (at a 5% discount rate) of these surpluses generated during the 1985-1995 period will amount to \$199 million. These surpluses are estimated by subtracting the hypothetical fiscal balance (revenues less expenditures) which would occur if this area grew at the statewide rate of economic growth from the balance projected to result from their actual rates of growth. Under the same assumptions, the State will have a present value surplus of \$244 million. In the case of the Route One Corridor, the "surpluses" not only cover normal expenditure increases resulting from growth, but they can apparently cover some extraordinary infrastructure expenditures as well.

On the other end of the economic spectrum, many municipalities experience economic decline and the fiscal balances for the municipal governments are negative. We estimate these balances (revenues less expenditures) for eighteen urban centers,

*Prepared by Dr. Joseph J. Seneca, Chairman, Economic Policy Council and Drs. Adam Broner, Laurence Falk and Jong Keun You, Office of Economic Policy.

which in the past have experienced declines in population, employment, and per capita personal income. The present value of those balances for a similar ten year period would be a deficit of \$976 million. This reflects the difference between their economic decline and the assumed statewide rate of economic growth. The most dramatic difference appears at the State level where the present value of the balance is -\$2,318 million.

Clearly, it is the State's obligation to assist the declining areas, which to a partial extent may have declined as a result of economic growth in the competing suburban communities. From the standpoint of the State, strong economic arguments can be made for this view. Growth in the suburbs is not costless to urban areas. On the other hand, a considerable share of urban services are provided to suburban workers and visitors. If it were more costly for firms to locate in the suburbs, more sites in the cities would be considered. One important reason why it may not be too costly for firms to locate in the suburbs, is that they do not now bear the full external costs of development such as additional transportation capital outlays and expenditures needed to mitigate the strains imposed on other infrastructure by increased population, etc.

The State government could redistribute the surpluses generated by rapid-growing areas toward the declining municipalities. However, there is no accepted mechanism to accomplish a similar redistribution of surpluses accruing to local governments. It is not our intention to recommend such redistribution and to take away the incentives local gov-

ernments have in actively pursuing the creation of new jobs in their communities. On the other hand, if these future surpluses are used to lower property tax rates at suburban localities, they will further reduce the attractiveness of business locations in urban centers.

An attractive policy for the State could be to create strong incentives to locate in the cities where excess infrastructure capacity exists and where there are large pockets of unemployed. This Chapter provides a calculation of the positive fiscal effect to the State resulting from shifting a number of jobs from suburban areas to the cities (see pp. 24-25). Since such a shift can be accomplished by creating proper incentives, i.e., the State may consider internalizing some of the infrastructure costs and other expenditures caused by fast growth (so-called externalities) to private developers. This could be done by imposing some fees on developers in suburban areas or by offering additional incentives to developers in urban areas.

The aim of such a policy should not be to prevent growth in suburban areas. Such growth is the main source of financing many local and state programs, including financial aid to declining municipalities. Local governments should also participate in a meaningful way in defraying the extraordinary costs of infrastructure development which traditionally have been more fully financed by the State and Federal governments. The result could be beneficial to the entire State including the rapidly-growing areas, and the procedure far better than any set of regulations designed to yield similar effects.

INTRODUCTION

This Chapter of the Annual Report is devoted to the issue of "growth management." However, for reasons that will be evident later, we do not use this term in our study. Growth management is associated with the notion of regulating, limiting, or even preventing growth, often for the purpose of preserving environmental and quality of life amenities. The tools for achieving growth limitation are the prohibition or significant restriction of development in environmentally-sensitive areas, land use regulation, and regional or statewide planning accompanied by procedures which subordinate the individual or local interest to broader regional and state environmental goals.

It is our view that the State's perspective on economic growth must be a broad one. The State as a whole cannot afford to adopt a no-growth policy, even though in some localities such a policy may be desirable.* For many years New Jersey's elected officials have promoted job creation as their highest priority. A deliberate growth-restriction policy, if successful, may create significant economic hardships. On the other hand, the excessive deterioration of environmental and quality-of-life conditions is also not acceptable. Thus, the State must create conditions to balance economic growth and environmental protection.

From the implicit assumption that one set of goals should not be

sacrificed for the other, it follows that state policy should not impede or prohibit economic growth, but rather accommodate job creation and economic development, minimize environmental deterioration and whenever possible, improve the quality-of-life conditions in New Jersey. It is often and accurately said that not only is economic growth not antagonistic to environmental goals, but also that a clean and healthy environment is a positive factor for economic growth. Hence, the economics of growth should incorporate the preservation of a healthy environment. This view of both accommodating growth and protecting the quality of life must be included in the concept of growth management.

The issue before us is not primarily semantic. There are difficult infrastructure and environmental demands caused by economic growth that must be addressed in an economically efficient way by the private and public sectors. In this study we concentrate mainly on the public sector and its traditional fiscal role of providing the infrastructure for economic development.

New Jersey is currently experiencing a major construction boom. We are interested in this Chapter in the fiscal effects of this rapid economic development. Several specific features characterize this new development. First, it is concentrated in a limited number of areas, mainly around transportation corridors.**

*See Joseph J. Seneca, "Zero Growth -- An Overview at the State Level", 9th Annual Report, Economic Policy Council and Office of Economic Policy, September 1976.

**For a comprehensive treatment, see George Sternlieb and Alex Schwartz, New Jersey Growth Corridors, Center for Urban Policy Research, Rutgers-The State University of New Jersey, New Brunswick, N.J., 1986.

Route One between New Brunswick and Trenton, which is anchored by Rutgers and Princeton with their strong academic and research facilities, is a major area of rapid economic growth. The I-78, I-80, I-287 area where AT&T and other corporate facilities, including the Bell Laboratories, are located is another. In the southern part of New Jersey rapid development is taking place along State Highway 73 leading to the Cherry Hill--Philadelphia area. Starting somewhat earlier, but still developing, is Atlantic City and its surrounding communities. In the northern part of the State, in addition to the still-developing Meadowlands, the Hudson Waterfront is rapidly becoming an area of concentrated economic development.

This type of geographically concentrated development creates extraordinary infrastructure problems. Foremost among them is traffic congestion, often requiring immediate, large road investments and, in places, mass-transit development. Water supply, adequate sewage facilities and solid waste disposal are additional concerns that may also require large capital outlays. Even school construction is necessary in some localities due to a large influx of population, although other localities simultaneously are experiencing excess school capacity.

On the other hand, declining urban centers with disproportionate concentrations of low-income families require continuous state public assistance much beyond what those localities can generate from their own fiscal sources. Over the years many urban centers have been assisted directly by the Federal government in addition to state aid programs. The recent decline in Federal assistance has created added fiscal demands on the State.

These two characteristic features of current economic development in the State -- concentrated growth in a limited number of localities, along with economically-declining urban centers -- create extraordinary demand for public capital outlays and public assistance. In addition, strong awareness of environmental hazards, and the need to improve environmental quality and eradicate past neglect add to public expenditure needs.

Under these circumstances, the traditional arrangement of public responsibilities for infrastructure development and environmental improvement requires a complete review.

One major dimension of the growth management issue encompasses the responsibilities assigned to various levels of government and the adequacy of the revenues available to these governments. Each level of government collects specific taxes and fees, while at the same time it is responsible for delivering certain services. The question is whether the revenues and expenditures on each level of government are in balance or require transfers from one level to another. It is already clear that in many cases municipal governments have insufficient resources of their own to provide the needed services and must be regularly assisted by the State.

However, there could be cases where the situation is reversed and some local governments' revenues exceed their expenditures. Should a transfer occur? Is there a mechanism which will allow the transfer of part or all of that surplus to the county or the state? A typical response in such cases is for municipalities to lower the property tax rates thereby reducing the surpluses to bring their budgets into balance.

The State's major objective under all these circumstances is to promote overall economic growth and maintain the quality of life while being fiscally prudent. One potential policy strategy consists of the State tilting economic development towards those areas with the least infrastructure and environmental costs per unit of additional growth. The obvious candidate for the least fiscal cost strategy from the State's perspective are the urban centers. This is a hypothesis that will be tested in our study. However, a major question is whether the private sector will follow the public sector's calculus. Economic development experience of the last several decades has shown that suburban locations are preferred over urban centers. Individual industrial and commercial location decisions are based on expected profits, and private firms do not necessarily take into account the cost of infrastructure (and often environmental) outlays and other social costs traditionally borne by the public sector. By internalizing part or all of these costs, i.e., shifting them from the public sector to private developers and their clients, the State can influence the geographic location and intensity of economic development.

Ultimately, this is the issue studied in this Chapter. We attempt to quantify public sector expenditures for individual municipalities and compare them with the revenues generated by economic development. In addition to historical relationships between economic growth (or decline) and growth in expenditures and revenues at the municipal and state level, estimates of extraordinary capital outlays will be determined for each region of intensive economic development. This will generate the basis for an evaluation of the various levels of fiscal gains or losses associated with different rates of economic growth in various municipalities.

Section I briefly outlines the methods applied in the estimation of expenditures and revenues of municipal and state governments under various conditions of economic growth. In Section II we identify a group of rapidly-growing municipalities in the Route One Corridor and 18 declining urban centers. A method of calculating the revenue-expenditure balances is applied to both areas. We also characterize these two groups of municipalities in terms of general demographic and socio-economic indicators. The results of our calculations are summarized and their interpretation is provided in Section III. The final section draws conclusions for state policy, especially in the area of incentives to locate economic development in distressed urban centers.

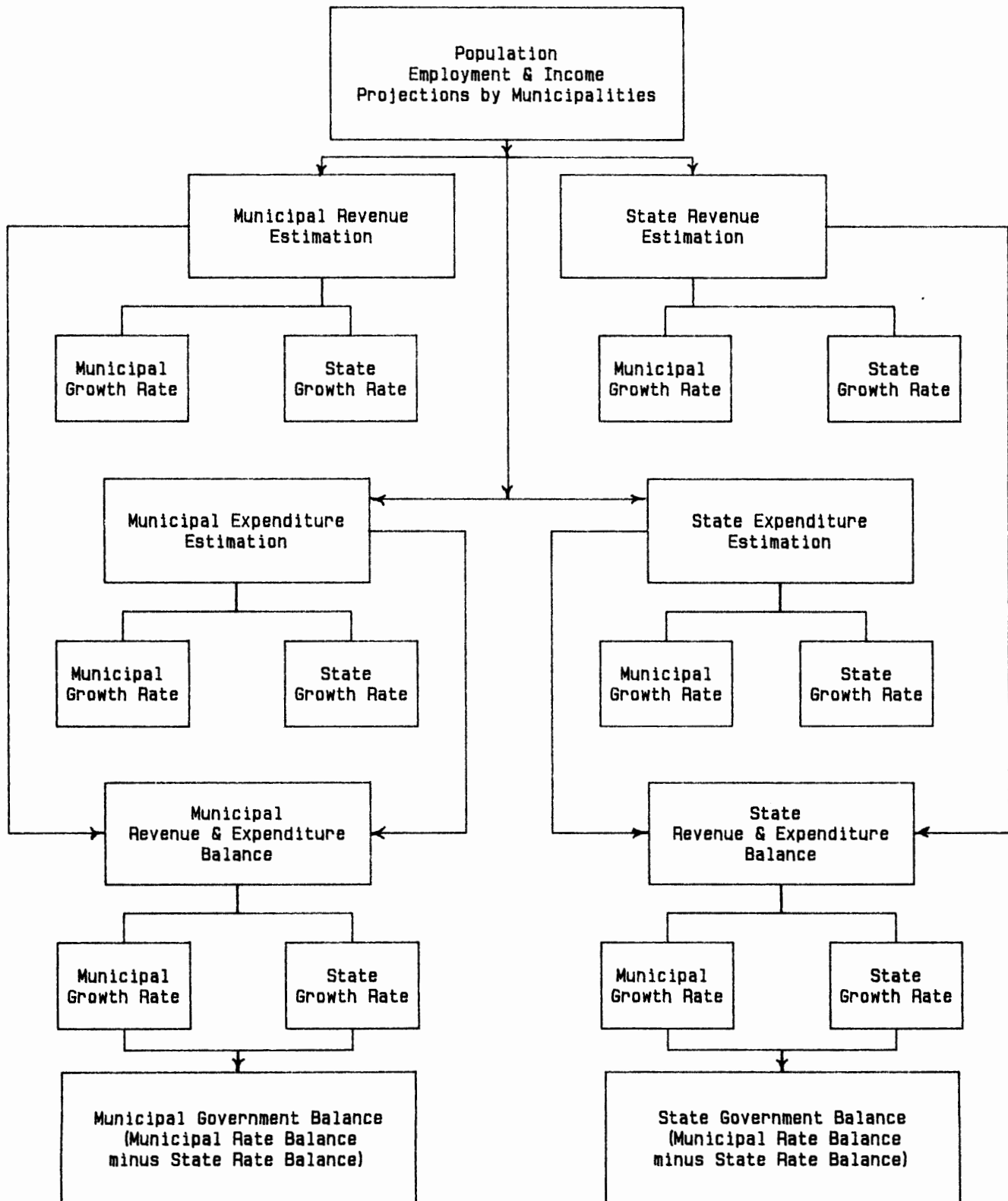
1. THE METHOD OF STUDY-- A GENERAL OUTLINE

The major task before us is to design a method of determining the implication of various degrees of economic growth of municipalities on the budgets of municipal and state governments. Although the focus is on economic growth, we set out to investigate a broad spectrum of municipalities, including those that have experienced economic decline as well as those that have grown. The general approach is to establish a relationship between economic growth (or decline) and its fiscal ramifications over a ten-year period and to simulate these results under alternative future conditions. In addition, we must allocate state expenditures by municipality in order to determine the relation between state fiscal activity and local economic growth.

Public Sector Balance Under Different Growth Rates

In the case of a rapidly-growing region, we intend to determine whether the high rate of growth and the accompanying expenditure needs

Figure 1
Flow-Chart
Method of Study



strains the public sector's resources beyond its capacity to increase revenues from that growth. It is known that in many fast-growing areas, local governments must cope with the pressures of road congestion, additional sewage and school facilities, police and fire protection and a host of other expenditures. The question is whether the additional revenues generated from that rapid growth are sufficient to meet those increased expenditure demands.

Rapid growth, however, needs to be defined for the purposes of our analysis. We have found it convenient to choose the statewide rates of growth as the yardstick against which to measure rapid growth. Consequently, we define rapid growth as a growth rate that surpasses the statewide growth rate. Therefore, all calculations are conducted under two rates of growth: the municipality's own rate of growth and the statewide rate of growth. Expenditures and revenues of local and state governments are determined under those two conditions of growth. The difference between the two calculations determines the balance for the public sector, i.e., whether a surplus or deficit develops as a result of relatively fast economic growth in a particular region.

A general overview of the complex method of estimating those balances is provided in the following flow-chart in Figure 1.

The chart indicates that population, employment and income projections for each municipality drive the estimations of revenues, expenditures and the resultant fiscal balances for the municipal and state governments.

The estimations of revenues and expenditures are carried out in two versions: one which assumes that each municipality grows at the statewide rate and the other at a rate specifically assigned for any given municipality. In the case of the Route One Corridor municipalities, the future (1985-2005) rates of growth of population, employment and income are taken from development plans for this area. The municipal-specific future rates (1985-1995) for the eighteen urban centers assume these areas repeat their actual experience of the past (1973-1983) decade. We emphasize that this assumption is made only for the purposes of revealing the effect of economic decline on the fiscal conditions of municipalities experiencing similar decline. It should not be construed as a projection for their future.

The discussion of the method is continued in this section and focuses on several critical issues. It should assist in understanding the methods applied in this study and in interpreting its major results. Further details of the methods are provided in several exhibits at the end of this Chapter.

Municipal Expenditures and Economic Growth

The growth-expenditure relationship for municipal government was estimated by an econometric equation which related the growth of total municipal expenditures for each of five hundred municipalities (the dependent variable) to the growth of population,* employment and per capita money income (independent variables).** The estimated equation has the following functional form:

*For population, we used the 1975-1983 average annual rate of growth.

**Money income is the estimated amount of total regularly received income, excluding "lump sum" receipts such as capital gains or inheritance. The money income figures are somewhat lower than personal income.

$$(1) S_i = f(X_{1i}, X_{2i}, X_{3i}, e_i)$$

$$i = 1, 500$$

where:

S_i = log of expenditure growth in the i th municipal government, 1973-1983.

X_{1i} = log of covered employment growth, 1973-1983, in municipality i .

X_{2i} = log of money income growth, 1973-1983, in municipality i .

X_{3i} = log of annual rate of population growth, 1975-1983, of municipality i .

e_i = error term.

We hypothesize that each of the independent variables will be positively associated with the growth of municipal expenditures. The data are a cross-section of growth rates and the estimated coefficients for the independent variables express the relationship between the growth of demographic-economic variables and that of total municipal expenditures.

Information about municipal expenditures is available from the New Jersey Department of Community Affairs, while population, employment and income statistics are published by the New Jersey Department of Labor. The municipal expenditures in this study include a major portion of county expenditures (about 60%) in the form of property taxes collected by the municipalities for the counties. Fees and other income received by counties (about \$500 million for all twenty-one counties) were omitted from our calculations.

*In Higher Education the distribution is known only by county residence of enrolled students. We derive approximate municipal allocations based on selected county statistics.

**Actually there are 13 municipalities in the Route One corridor and 18 urban centers selected for their meeting three criteria of decline. However, for technical reasons, data were consolidated into 28 municipalities.

State Expenditures

The distribution of state expenditures among municipalities is a more complex issue. A significant part of state expenditures, which we will call 'overhead cost,' cannot be directly allocated to any particular municipality. Such expenditures can only be allocated to municipalities by adopting some convention; the most obvious one is a per capita distribution which assumes that all state residents are equally served by these expenditures. Although such an allocation method is justified for some expenditures (e.g., cost of overall tax collections or general health care), it clearly does not apply to all state expenditures. School aid to municipalities (school districts) for example is distributed according to a formula which favors lower-income communities. A similar distribution pattern occurs for other state programs, such as welfare assistance, whose recipients are more heavily concentrated in low-income urban centers. The method used here allocates the Education, Human Services and Higher Education Departments' budgets in two stages. First, it apportions all expenditures for which the municipal recipient is known.* The remainder of these departments' budgets are allocated according to the distribution pattern we derived when the municipal recipients was known. We limited the distribution of state expenditures to a sample of 28 municipalities.** Finally, any state expenditures which we could not attribute to individual municipalities were then apportioned on a per capita basis.

After estimating state expenditures in 1985 for the 28 selected municipalities, we estimated the relationship between state expenditures and economic growth according to the following equation (2):

$$(2) S_i = f(P_i, e_i) \quad i = 1, 28$$

where:

S_i = log of per capita state expenditures in municipality i , divided by statewide average per capita state expenditures.

P_i = log of per capita money income in municipality i , divided by statewide average per capita money income.

e_i = error term.

Money income was used as a proxy for economic growth. This implicitly assumes that economic growth leads to higher per capita income.

Equations (1) and (2) allow us to establish the relationships that existed in the past between municipal and state expenditures and economic growth. Future predictions of expenditures based on these equations require estimations of future values for the independent variables.

Estimation of Per Capita Income

One of these independent variables is money income per capita. We have formulated an equation that determines future per capita money income from past per capita income, past population and past employment growth and population density. The density variable allowed us to differentiate between rural and suburban municipalities and larger urban centers. This is also a cross-section equation based on nearly 500 municipalities. The general form of the equation to forecast personal income is:

$$(3) P_{it} = f(P_{it-10}, X_{1i}, X_{3i}, X_{4i}, X_{5i}, e_i) \quad i = 1, 2, \dots, 498$$

where:

P_{it} = log of 1983 per capita money income (at 1985 prices) in municipality i .

P_{it-10} = log of 1973 per capita money income (1985 prices) in municipality i .

X_{1i} = the ratio of 1983 employment to 1973 employment for municipality i .

X_{3i} = average annual rate of population growth, 1975-1983 for municipality i .

X_{4i} = log of population density, 1975 in municipality i .

X_{5i} = the square of X_{4i} , designed to account for nonlinearity.

e_i = error term.

We apply this equation to estimate future per capita income for the municipalities in the Route One Corridor and the eighteen declining urban centers. Future population and employment for these municipalities are derived from outside sources based on economic development projections for particular regions and municipalities. We use the Route One Corridor development projections assembled by the New Jersey Department of Transportation. Projections of direct employment effects of development projects are then used to determine the multiplier effect via our New Jersey Input-Output Model.

The Input-Output Model determines the indirect and induced employment for the entire State and these effects are then apportioned to particular municipalities. Most of the estimated future employment

effects are distributed in proportion to population growth in the selected municipalities which is determined independently.

Revenue Estimation

Based on employment projections (including the multiplier effect), the New Jersey Input-Output Model provides information on wage and salary and other labor incomes. Labor income projections are, in turn, used to determine state and local government revenues by applying revenue/income ratios. Our analysis has shown that these ratios have been relatively stable during the last several years, averaging about 10 percent for state revenues and 10.6 percent for municipal revenues.

Extraordinary Expenditures on Infrastructure

In many instances, fast growth in a small region with limited infrastructure causes large, extraordinary infrastructure expenditure needs. The methodological issue is whether the equations estimated for local and state expenditures incorporate such extraordinary infrastructure expenditures. After all, in the past, there were also instances of fast growth in a limited number of municipalities along with other municipalities with moderate growth (close to the statewide average); and others below that rate. Those rapid-growing areas presumably also required extraordinary infrastructure expenditures. Therefore, unless we can prove that the state or local governments are currently required to cover a larger portion of expenditures hitherto financed by the Federal government, or that there are expenditures beyond those reflected in the equations, we should assume that the expenditures predicted by the equation are sufficient to cover those extraordinary costs. However, if we conclude that the equations are not sufficiently capturing all expenditures, we will

have to consider extraordinary costs in addition to those determined by the equations.

Although this issue has to be considered in each particular region, based on knowledge of additional, large infrastructure expenditures, a more general answer is attempted here. Information on the state of infrastructure services (road congestion, air and water pollution, safety conditions, etc.) should provide the general answer to our question. If deterioration in these conditions occurred during the time period for which the equations were estimated (1973-1983), we can say that the expenditures of the public sector were not sufficient to maintain the status quo. Consequently, we should consider that the extraordinary infrastructure expenditures are necessary in addition to those following from the predictions of our equations. Whether all or only part of those expenditures should be added is an open question.

Application to Growing and Declining Municipalities

The final issue in our calculation is the adequacy of the method outlined above for municipalities that have experienced economic decline. Is the estimated expenditures equation adequate for both growing and declining areas? We have tested the appropriate hypothesis and concluded that the regression coefficients for subsamples of growing-only or declining-only municipalities are statistically identical. The interpretation of these results is that the specified independent variables properly determine the expenditures of growing as well as declining municipalities. This opens the possibility for the application of our method to any group of economically growing or declining areas. In this study, we have chosen to apply the method to the Route One Corridor growth area and to a selection of

urban areas that experienced economic decline in the decade 1973-1983. We now turn to a brief description of the selected areas.

2. DESCRIPTION OF THE ROUTE ONE CORRIDOR DEVELOPMENT AND SELECTED CITIES

A study of all growth areas in the State along with an examination of all areas that are not growing is beyond the scope of this Chapter. To make the study manageable, we have limited it to one growth area and a group of declining municipalities. We have chosen as the growth area the Route One Corridor -- the rapidly-developing area located along U.S. Highway 1 between New Brunswick and Trenton. The Route One Corridor is comprised of two groups of municipalities -- seven municipalities in the "core" area and six municipalities outside the "core."* Together, these thirteen municipalities form a coterminous region with the six "core" municipalities near Trenton and the remainder near New Brunswick.

In contrast, we have selected at the other end of the economic spectrum, eighteen declining municipalities. These do not form a coterminous region. They have been chosen because of the severe economic decline they have experienced in recent years. Only these eighteen

municipalities alone among the 567 localities in the State meet all three requirements we have set for a "declining municipality": a decline in real per capita income, a decline in population, and a decline in employment over the period 1973 to 1983.**

Differences Between Study Groups

Our group of eighteen declining municipalities includes most of the major cities of the State. Thus, overall, these eighteen municipalities have a large population and a high population density compared to the Route One Corridor region.

Table 1 shows the marked differences between the two groups. The Route One Corridor population rose 11.6 percent between 1973 and 1983 for an average annual gain of 1.1 percent. The declining eighteen municipalities lost population at about the same rate (-11.4% total, -1.21% per year). Population density in 1983 was 925 persons per square mile in Route One compared to 10,797 in the declining communities; i.e., density was almost twelve times as high in the declining communities. This difference obviously reflects the urban nature of the declining eighteen municipalities and the suburban profile of the Route One communities.

*Core municipalities are: East Windsor, part of Hamilton, Hightstown, part of Lawrence, Princeton Borough, Princeton Township, and West Windsor. Those outside the core are: Cranbury, North Brunswick, Plainsboro, South Brunswick and part of Franklin and Montgomery.

**The entire group consists of: Camden, Union City, Passaic, New Brunswick, Paterson, Jersey City, Newark, Bridgeton, Elizabeth, Teaneck, Perth Amboy, Phillipsburg, Hillside, Trenton, Plainfield, North Bergen, Kearny and Orange. For an economic review of the State's urban areas, see, "New Jersey's Urban Centers", 16th Annual Report, Economic Policy Council and Office of Economic Policy, 1984.

Table 1
POPULATION AND POPULATION DENSITY
1973 and 1983

	Population		% Change 1973-1983	Average Annual % Change	Area (sq. mi.)	Average Density 1983 (Population per sq. mi.)
	1973	1983				
Route One Corridor	231,925	258,886	+11.62	+1.11	280.01	924.56
18 Declining Municipali- ties	1,592,650	1,410,683	-11.43	-1.21	130.65	10,797.42

Source: Calculated from N.J. Dept. of Community Affairs, Annual Report of the Division of Local Government Services, 1973 and 1983.

The employment figures in Table 2 reflect the contrasting economies. Route One experienced a large employment (61.8%) gain in the 1973-83 decade, which translates to a rapid 4.9 percent average annual gain. In contrast, the declining municipalities lost 23.7 percent of their 1973 employment, or 2.7 percent per year.

Real per capita income is perhaps the best indicator of the economic health of a municipality or region. We use money income as our indicator; the more comprehensive personal income per capita concept may be a better measure of economic well-being, but its estimates are unavailable for municipalities.

Table 2
COVERED EMPLOYMENT, 1973-1983

	Employment		% Change 1973-1983	Average Annual % Change
	1973	1983		
Route One Corridor	75,770	122,615	+61.83	+4.93
Eighteen Declining Municipalities	607,002	463,250	-23.68	-2.67

Source: Calculated from Office of Demographic and Economic Analysis, Division of Planning and Research, Department of Labor, New Jersey Covered Employment Trends, 1973 and 1983.

NOTE: Covered employment is defined by the Division of Planning and Research as a "count of full and part-time employees . . . reported quarterly by employees covered by the New Jersey Unemployment Compensation Law."

Table 3
PER CAPITA MONEY INCOME IN 1985 DOLLARS*
1973-1983

	Per Capita Income		% Change 1973-1983	Average Annual % Change
	1973	1983		
Route One Corridor	12,101	13,891	+14.79	1.39
Declining Municipalities	8,493	7,983	-6.00	-0.62
Ratio: Route One/18 Municipalities	1.42	1.74	--	--

Source: Calculated from Office of Demographic and Economic Analysis, Division of Planning and Research, N.J. Department of Labor, Per Capita Money Income for New Jersey, June 1980 & November 1985 and N.J. Department of Community Affairs, Annual Report of the Division of Local Government Services, 1973 and 1983.

Table 3 reflects per capita money income differences in the two groups. In 1973, real per capita income in the Route One area was 1.4 times as large as that in the declining municipalities. By 1983, real per capita income was 14.8 percent higher than in 1973 (1.4% per annum) in the Route One Corridor but

6 percent lower in the eighteen municipalities. As a result, the per capita income ratio increased to 1.7, implying that real per capita income in the Route One region in 1983 was 70 percent higher than that for the declining eighteen municipalities. Total municipal expenditures further depict the differing situations.

Table 4
TOTAL MUNICIPAL EXPENDITURES PER CAPITA IN 1985 DOLLARS*
1973-1983

	Per Capita Expenditures		% Change 1973-1983	Average Annual % Change
	1973	1983		
Route One Corridor	1,202.39	1,114.03	-7.35	-0.76
Declining Municipalities	1,194.03	954.03	-20.10	-2.22
Ratio: Route One/18 Municipalities	1.01	1.17	--	--

Source: Calculated from N.J. Department of Community Affairs, Annual Reports of the Division of Local Government Services, 1973 and 1983.

*Implicit price deflators for government purchases of goods and services were applied to obtain figures in 1985 dollars. (Council of Economic Advisors, Economic Indicators, various dates.)

Table 4 shows real per capita municipal expenditures for both Route One and the eighteen municipalities. The decline in real expenditures over the time period for both areas was largely the result of the constraints of the state municipal expenditures cap law* coupled with high rates of inflation. Apparent increases in expenditures, in money terms, were actually reductions in expenditures when corrected for inflation. However, it should be noted that the Route One municipalities experienced a much smaller decrease in real spending per capita.

In 1973, real per capita expenditures in the Route One Corridor were about the same as those of the eighteen municipalities. In 1983, the Route One/eighteen cities expenditure ratio was almost 1.2, because real per capita spending fell in the declining municipalities far more than in Route One. Again, this is

evidence of deteriorating economic conditions in the declining cities relative to Route One. The main reason for this difference lies in the fact that a developing region is able to maintain higher spending because its new economic development brings new ratables with relatively high assessments and revenues per person.

Finally, an examination of the poverty status of the two groups confirms our other comparisons. Table 5 shows an overall poverty rate for the eighteen declining municipalities of 22.9 percent compared to the 4.1 percent rate of the Route One Corridor. This disparity again illustrates the differences between growing and declining municipalities. The Route One region displays strong economic growth; the eighteen municipalities not only show a relative worsening of their positions, but an absolute economic decline as well.

Table 5
POVERTY STATUS, 1979

	Population 1979**	Persons Under Poverty Level	% of Population Under Poverty Level
Route One Corridor	235,802	10,363	4.1
Eighteen Municipalities	1,388,539	318,038	22.9

Source: New Jersey 1980 Census of Population, income and poverty compilations of State Data Center, Office of Demographic and Economic Analysis, Division of Planning and Research, Department of Labor, June 1983.

*In 1976, an expenditure cap law was enacted which limited increases in municipal government expenditures to 5 percent per year (unlike the State cap which limited spending increases to the rate of increase in nominal per capita personal income). In 1984, the municipal cap laws were changed to allow increases equal to those of the implicit price deflator for state and local government purchases of goods and services.

**These figures are not exactly in line with those given previously, primarily because of the handling of institutional populations. (For example, Rutgers students living in New Brunswick are not included in the figures in this table.)

3. APPLICATION AND RESULTS

Employment and Population Growth

The employment projections for Route One municipalities are based on a study of development plans and a survey of companies which moved into that region between 1980 and 1985, conducted by the New Jersey Department of Transportation. The development plans were used by the Department to project population and direct employment growth up to the year 2005. The results of the survey are presented in Table 6, and the relocation ratios observed in the survey data are applied to the Department's direct employment projections to obtain net direct employment growth adjusted for relocation.

The Survey brought to light several interesting observations about the current businesses in the Route One Corridor. First, almost one-quarter of the total employment increase (24.3%) came from other states; showing the attractiveness of this area to the nation's business community. Second, over 35 percent could be considered new employment for the U.S. and, together with the relocation from other states (24.3%) consists of newly-created jobs in New Jersey. Third, there was a significant amount of relocation within the area (34.6%) and, finally, only 5.6 percent came from other parts of New Jersey.

Table 6
ROUTE ONE CORRIDOR EMPLOYMENT CHANGE SURVEY DATA (1980-1985)

SIC Code*	New Employment	Relocation from:		
		Within Area	Within N.J.	Other States
10 - 19	120	200	0	0
20 - 29	511	159	50	1151
30 - 39	791	335	287	257
40 - 49	149	120	0	40
50 - 59	60	80	110	194
60 - 69	727	941	0	373
70 - 79	1307	1017	158	251
80 - 89	385	1067	36	507
90 - 99	0	33	0	0
Total	4050 (35.5%)	3952 (34.6%)	641 (5.6%)	2773 (24.3%)

SOURCE: Bureau of Statewide Planning, New Jersey Department of Transportation.

*Detailed data by four-digit classification are available upon request.

Table 7
NET EMPLOYMENT GROWTH IN THE ROUTE ONE CORRIDOR, 1980-2005

	Office Research		Industry		Total	
	Net State	Net Area	Net State	Net Area	Net State	Net Area
Total for 13 Municipalities Included in Route One Study Area	79,227	86,664	9,057	9,906	88,284	96,570

Table 7 provides the summary results for net direct employment growth for the 25 year period 1980-2005.

The total net area gain in employment in the Route One Corridor projected between 1980 and 2005 is 96,570 jobs, consisting of 86,664 office and research jobs, and 9,906 industrial jobs.* These employment gains do not include the indirect and induced jobs generated by the direct employment increases shown in Table 7. The application of the New Jersey Input-Output Model allowed us to derive those "multiplier effects". The total employment gains added to the level of employment which existed in 1980 (77,400) are shown in Table 8.

The total employment gain in the Route One Study Area is 122,720 (200,120 - 77,400). Thus, the employment multiplier for the year 2005 is 1.27 (122,720/96,570) which includes the construction multiplier effect.*** For the entire state the employment multiplier is 2.08 (183,513/88,284). Out of the total indirect and induced employment gain of 95,229 (183,513 - 88,284) for New Jersey, the Route One Study Area will receive 26,150, or 27.5%.****

Population changes for the municipalities included in the Route One Study Area were provided by the New Jersey Department of Transportation.

Table 8
EMPLOYMENT IN THE ROUTE ONE CORRIDOR, 1980-2005

	1980	1985	1995	2005	Annual Growth Rate (%)	
					1980-95	1995-2005
Total Route One Study Area**	77,400	107,217	152,433	200,120	4.62	2.76

*For a detailed distribution of this employment gain by municipalities, see Exhibit 1.

**Distribution of employment by municipalities is provided in Exhibit 2.

***Exhibit 3 provides a detailed account of the method of allocating the multiplier effect to the municipalities in the Route One Study Area.

****This results from subtracting the 1980 number of jobs from the 2005 number shown in Table 8 (200,120 - 77,400) less the direct net area increase of 96,570 from Table 7).

Table 9
POPULATION CHANGE IN ROUTE ONE CORRIDOR, 1980-2005

	Population		Change	
	1980	1984	1980-1984	1980-2005
Total for All Municipalities in the Study Area	209,286	223,025	13,739	178,200

In the Route One Study Area population is projected to increase by 178,200 between 1980 and 2005. This population increase is only 45 percent higher than the projected employment gains over the same period. Applying the statewide average population/payroll employment ratio of approximately 2.2:1 to the employment change, it follows that the overall population gain in the region due to employment gains in the Route One Corridor will be approximately 270,000. A large part of the additional population (about 90,000) will live outside the Route One Corridor and approximately 35,000 will commute daily to and from the area. There will also be increased traffic of workers within the Route One Study Area -- in addition to the traffic generated by both the existing and new businesses.

Estimated Revenues

Projected employment gains in the area allowed us to estimate labor income via the New Jersey Input-Output Model and, subsequently, tax revenues to local and state governments by applying a revenue/income ratio. For the state revenues (taxes and fees) as a whole the revenue/income ratio has remained near 10.075 percent in recent years. The statewide ratio for local government revenue is 10.617 percent of money income as a statewide average, and 10.196 percent for the Study Area. Of course, local government revenues are based mainly on property values rather than income. However, in the

long run, property values are related to income and employment. In other words, tax revenues (or revenue-raising capacity) are ultimately determined by income.

The revenue effects for the two groups of municipalities (Route One Corridor and 18 declining cities) are derived by subtracting the revenues generated by the municipalities at their own assumed rates of growth (or decline) and the hypothetical statewide rates of growth. Since the cities experienced declines in employment and income, the revenues at these negative growth rates will be lower than revenues following from the statewide, growing rates. Conversely, the Route One municipalities are projected to grow faster than the statewide average; hence, the revenues generated by their own rates of growth will be larger than at the statewide rates. Table 10 provides the results of these calculations. The results in Table 10 show the fiscal effects that would result from these areas growing faster (in the case of the Route One Area) or slower (in the case of the 18 urban municipalities) than the projected statewide average economic growth rate.

Due to more rapid growth in Route One municipalities than in the State as a whole, additional local revenues of over \$93 million will be generated in the year 1995 and nearly \$224 million in the year 2005. Similarly, over \$92 million of additional state revenues in 1995 and \$221 million in 2005 will be generated in the

Table 10
REVENUE EFFECTS OF GROWING AND DECLINING MUNICIPALITIES

Revenues	Route One Corridor		18 Declining Municipalities
	1995	2005	1995
1. Municipal Taxes & Fees in the Study Area (\$000s)*	\$93,186	\$223,682	-\$452,400
2. State Taxes & Fees in the Study Area*	92,080	221,027	-336,703
3. Municipal Taxes & Fees -- Statewide Impact of Route One	138,494	332,431	n.a.
4. State Taxes & Fees -- Statewide Impact of Route One	131,424	315,461	n.a.

*The ratio of municipal to state revenues is significantly different in the Route One area compared with the cities. In the former, that ratio is almost 1:1, while in the declining cities, it is 1.35:1. This difference is due mainly to the higher local tax burden (taxes & fees per \$1000 of income) in the cities as compared with the Route One municipalities.

Route One municipalities. The amounts in rows 3 and 4 of Table 10 show the revenue impact of rapid Route One development throughout the State. This reflects the multiplier effect of the additional employment and income created outside the Study Area, but caused by the more rapid growth in the Route One municipalities.

(by \$336.7 million). This is only the decline in the eighteen cities. It does not account for the effect of this decline on economic activities in other places. We only estimated the revenue effects to the year 1995 for the 18 urban municipalities.

Expenditure Estimates

For the eighteen cities the results are negative, meaning that due to their decline in employment and income (compared to the statewide growth), revenues will decline both for the local governments (by \$452.4 million) and for the state government

Expenditures by local governments for 1995 and 2005 were derived from a regression equation in which the expenditure change (dependent variable) is determined by growth of population, employment and income (independent variables).**

Table 11
EXPENDITURE EFFECTS OF GROWTH AND DECLINE (\$000)

	Route One Corridor		18 Declining Municipalities
	1995	2005	1995
Expenditures of Municipal Government	42,751	80,922	-204,374
Expenditures of State Government	30,121	62,640	251,984

**The estimated regression coefficients & statistics are provided in Exhibit 4.

Table 12
PER CAPITA EXPENDITURES IN GROWING AND DECLINING MUNICIPALITIES, 1995
(in 1985 dollars)

Type of Expenditures	Route One Corridor		18 Declining Municipalities		Difference Between Own and State Rate of Growth	
	Own Rate	State Rate	Own Rate	State Rate	Route 1	Cities
1. Municipal	\$991.3	\$1,054.0	\$885.3	\$854.6	-\$62.7	\$30.7
2. State	776.8	837.5	2,418.5	1,797.5	-\$60.7	\$621.0

The municipalities in Route One will increase their expenditures in 1995 by \$42.8 million as a result of faster than statewide growth of population, employment and income. Since these variables were assumed to decline in the cities, expenditures of the eighteen declining municipalities are estimated to fall by over \$204 million.

State expenditures in the fast-growing Route One municipalities will increase by over \$30 million in 1995 mainly due to population growth and the increase in average per capita state spending over time. In the cities, despite a projected population decline, expenditures will increase by nearly \$252 million. The equation which determines this outcome implies that the lower a municipality's per capita income in comparison with the statewide per capita income, the larger is the State's per capita expenditure for that municipality.* This reflects the fact that many state assistance programs are directed toward lower income populations, which are heavily concentrated in the cities.

These relationships can be further clarified in Table 12 by presenting the 1995 expenditures of the two different groups of municipalities on a per capita basis.

In the Route One municipalities, local government expenditures per capita decline from \$1,054 to \$991.3, or by \$62.7 due to local economic growth faster than state economic growth. This decline can be explained by economies of scale, i.e., local governments can spend somewhat less than the average per capita expenditures for the increasing population. A similar effect can be seen for the 18 cities. Since their own rate of growth is lower than the state rate, per capita expenditures increase by \$30.7.

State expenditures per capita differ substantially between the suburban municipalities in the Route One Study Area and the cities. That relationship is about 2 to 1 in favor of the cities (1,797.5/837.5) when the state rates of growth in both groups are considered (see Table 12). More importantly, this difference increases to more than 3 to 1 (2,418.5/776.8) when comparisons are made between the declining trend in the cities and the rapidly growing suburbs. In other words, our results show that economic decline causes state expenditures to increase and the quantification of this relation is one of the most important findings of this study. It will be shown later to have significant implications for the location of new economic activities in these two disparate areas.

*For a more rigorous statement, see Exhibit 4.

Table 13
BALANCE OF FISCAL EFFECTS OF GROWTH AND DECLINE FOR THE YEAR 1995

Level of Government	Route One Corridor			18 Declining Municipalities		
	Differences in:			Differences in:		
	Revenues	Expenditures	Balance	Revenues	Expenditures	Balance
Municipal	93,186	42,751	50,435	-452,400	-204,374	-248,026
State	92,000	30,121	61,879	-336,703	251,984	-588.687
Total Public Sector	185,186	72,872	112,314	-789,103	47,610	-836,713

We now bring together in Table 13 the revenue and expenditure differences of differing growth patterns.

For the entire public sector* the Route One municipalities will generate surplus of about \$112 million in 1995, while the hypothetical economic decline in the eighteen cities will cause a deficit of nearly \$837 million. These amounts, confined to only a selection of growing and declining municipalities are not intended to be compared with each other. They are only indicative of the direction of the fiscal implications due to rapid economic growth or rapid decline.

We are also not suggesting that these two opposite economic situations have necessarily a cause-and-effect relationship. Nevertheless,

examples can be given where developments in the suburbs could directly be linked to economic decline in the cities.

The fiscal effects shown in Table 13 are only for the year 1995. Similar calculations have been made for all years between 1985 and 1995 for both groups of municipalities. They, naturally, magnify manyfold the fiscal effects of 1995. Since these balances are generated at different years in the future, they cannot be compared directly without calculating present values. Therefore, the sums of all annual balances (and their components) were recalculated in present values by applying plausible discount rates for the public sector. The results for municipal governments are shown in Table 14, and those for the state government in Table 15.**

*Actually, we omitted about \$500 million revenues and expenditures for all county governments. This omission is equivalent to assuming that county revenues and expenditures for the cities or Route One will balance. Actually this may not be the case. However, since the omitted county revenues account for only about 3.4 percent of the total state and local revenues, the error of omission should not seriously affect the outcome of our study.

**Although we have calculated the balances and present values of the Route One municipalities to the year 2005, the tables provide only results for the 1985-1995 period. The present values for the entire 1985-2005 for the Route One Municipalities lie between \$561 to \$761 million on the municipal level and \$415 to \$735 million at the State level.

Table 14
PRESENT VALUE OF MUNICIPAL FISCAL BALANCES, 1985-1995 (\$000)

Discount Rate	Route One Corridor			18 Declining Municipalities		
	Present Value of Differences in:			Present Value of Differences in:		
	Revenues	Expenditures	Balance	Revenues	Expenditures	Balance
5%	366,908	168,323	198,585	-1,781,270	-804,800	-976,470
6%	344,438	158,014	186,424	-1,672,180	-755,510	-916,670
7%	323,720	148,510	175,210	-1,571,600	-710,070	-861,530
8%	304,595	139,737	164,858	-1,478,760	-668,120	-810,640
10%	270,573	124,128	146,445	-1,313,580	-593,490	-720,090

The present value of the cumulative 'surplus' to municipal governments in 1985 prices lies between \$146 to \$198 million for the 1985-1995 period. The eighteen cities, if they decline in the future as they did in the decade 1973-1983, will generate a 'deficit' between \$720 to \$976 million during the same ten year period. As can be seen, that deficit would have been much higher if the shortfall in revenue was not reduced

by declines in expenditures. However, this reduction in municipal expenditures leads to a decline in quantity and quality of services to the residents of these areas as well as for the daily commuters to these cities for employment and other business.

Even more pronounced are the cumulative balances for the state government as shown in Table 15.

Table 15
PRESENT VALUES OF STATE FISCAL BALANCES, 1985-1995 (\$000's)

Discount Rate	Route One Corridor			18 Declining Municipalities		
	Present Value of Differences in:			Present Value of Differences in:		
	Revenues	Expenditures	Balance	Revenues	Expenditures	Balance
5%	362,554	118,598	243,956	-1,325,730	992,157	-2,318,087
6%	340,350	111,334	229,016	-1,244,530	931,394	-2,175,924
7%	319,878	104,638	215,240	-1,169,680	875,370	-2,045,050
8%	300,981	98,456	202,525	-1,100,580	823,657	-1,924,237
10%	267,363	87,459	179,904	-977,648	731,659	-1,709,307

In the case of the fiscal balance for the state government, we notice a 'surplus' generated from the Route One communities of between \$180 to \$244 million. For the eighteen municipalities, the deficit is very large because the shortfall in revenues (between \$978 to \$1,326 million) is exacerbated by the need for additional state expenditures of between \$732 to \$992 million. Although local expenditures are reduced as a result of rapid economic decline, state expenditures for these municipalities actually increase.

To summarize, we can say that rapid economic growth generates surplus balances for both the State and the affected municipalities, while economic decline generates a fiscal deficit. The state government, facing growth in one place and decline in another, can transfer its surpluses from growing areas to finance the additional expenditures in the declining areas. However, there is no direct mechanism for redistributing local surpluses. Unless some method of redistribution (direct or indirect) is applied, growing municipalities will tend to lower their taxes and/or increase services, while the converse will take place in the declining areas. The result of that process is to make the declining cities less attractive, and the growing municipalities more attractive for business and industry location. But continued rapid economic growth in these areas will cause environmental problems, congestion and adverse quality of life effects, all of which create public expenditure needs and/or significant external costs. For example, in the Route One Corridor area, the Department of Transportation has projected a need of \$750 million in construction just to keep traffic congestion from deteriorating from

its current level.

We now turn to the question of whether or not the State could reap economic benefits by attempting to divert development away from the fast growing corridors to the declining areas (possibly by diverting some fiscal surpluses to declining areas and thereby allowing for property tax reductions and improved services in these areas).

Diversion of Development to Declining Areas

Table 11 suggests that the State's expenditures will be about \$252 million higher if the 18 cities continued to decline at their 1973-1983 trends instead of growing at the statewide trend. This result reflects the fact that the State spends more money per capita on a depressed area than on a prosperous one. This being the case, can the State save money by deflecting economic development away from the prosperous region to the depressed area?

Suppose that the State is successful in deflecting 2,000 jobs from, say, West Windsor and Plainsboro, to Newark or New Brunswick. West Windsor and Plainsboro would have 2,000 fewer jobs than they would have in the absence of the State's intervention, and, according to our model, per capita income there would be slightly lower, and the per capita state expenditures in those municipalities slightly higher. Would the increase in per capita income in Newark or New Brunswick make it possible for the State to reduce the per capita expenditures there sufficiently to offset the increase in state expenditures in West Windsor and Plainsboro? What would be the net change in the State's expenditures?*

*Since the State's tax revenues would not be affected by the location of the same 2,000 jobs, we only need to consider the State's expenditures.

In order to answer these questions, we estimate state expenditures based on a hypothetical scenario in which 2,000 jobs in 1995 are removed from West Windsor and Plainsboro and added to the employment levels of Newark and New Brunswick. We then compare the results in Table 16 with the expenditure estimates for the base line projection. The comparison of these two sets of calculations indicates that the estimated increase in state per capita expenditures in West Windsor and Plainsboro (\$2.81) is smaller than the estimated decrease in Newark (\$3.54) or in New Brunswick (\$15.93). The reason for these disproportionate changes in per capita expenditures is that the same 2,000 jobs constitute a small addi-

tion to Newark (2.1%), whereas they represent a much higher percentage (13.2%) in New Brunswick. Multiplying the changes in per capita state expenditures by the 1995 population, we obtain estimates for the key comparison -- the total fiscal change. The estimated increase in total state expenditures for West Windsor and Plainsboro (\$91,665) is small in comparison to the estimated decrease in state expenditures in Newark (\$907,350) and in New Brunswick (\$604,035). However, we must again caution that this should not be taken to be an argument in favor of a policy that would stop economic development in the suburbs, for, in the final analysis, it is development in the suburbs that help finance programs in the cities.

Table 16
State Expenditure Consequence of Relocating 2,000 Jobs

	West Windsor & Plainsboro	Newark	New Brunswick
Population 1985	19,250	316,808	39,904
Population 1995*	32,660	256,081	37,920
Covered Employment 1985	12,993	124,813	19,389
Covered Employment 1995*	23,302	93,555	15,166
Per Capita Income 1985	\$18,608.70	\$6,341.45	\$8,135.11
Per Capita Income 1995*	\$23,403.00	\$6,251.36	\$8,460.48
New Covered Employment 1995	21,302	95,555	17,166
New Per Capita Income 1995	\$23,301.00	\$6,257.72	\$8,517.91
Change in Per Capita Income	-\$102.00	\$6.36	\$57.43
Per Capita State Expenditures 1995	\$498.71	\$2,716.20	\$1,841.70
New Per Capita State Expenditures 1995	\$501.52	\$2,712.66	\$1,825.77
Change in Per Capita State Expenditures	\$2.81	-\$3.54	-\$15.93
Change in Total State Expenditures	\$91,665.00	-\$907,350.00	-\$604,035.00

*Projections for West Windsor and Plainsboro for 1995 are based on the Input-Output analysis and those for Newark and New Brunswick are extrapolations of the 1973-1983 trends. The latter are hypothetical and do not constitute forecasts.

4. SUMMARY AND CONCLUSIONS

New Jersey has experienced growing concern about the uneven spatial distribution of its economic development. Decline and stagnation in urban New Jersey has been persistent, while an economic boom has simultaneously occurred in many of the State's suburban areas. Two major state commissions -- the State Planning Commission, and the Revenue and Expenditure Commission -- have been established and charged, in part, with making recommendations on the economic and fiscal ramifications of these diverging economic growth patterns. This unevenness of the State's economic development and its social and economic implications have become the public policy issue of the decade for New Jersey.

This study has been ambitious; perhaps overly so. We have attempted to assess the fiscal balance of revenues and expenditures -- for both state and local governments -- of the disparate economic growth patterns that are occurring within New Jersey. In order to reach any conclusions on so broad a topic, we have had to make several important assumptions. Accordingly, our conclusions must be tempered with caution and our numerical results must be viewed as suggestive rather than definitive.

We find that there is a fiscal dividend in fast-growing areas for both municipal and state governments. Rapid economic growth generates a surplus of revenues over expenditures and we estimate the size of this surplus for the Route One corridor area for different time periods and discount rates. Also, and not surprisingly, there is a fiscal deficit in declining areas, and we estimate its size for both local and state governments for 18 urban areas in New Jersey. These conclusions raise a series of policy questions that are critical to the future economic well-being of the State.

First, the sizeable fiscal surplus generated for the state and local governments in high growth regions is an obvious source of revenues to finance necessary improvements in infrastructure in these areas. It is true that our estimates already embody the growth in government expenditures caused by accelerated economic development. However, there is evidence that the observed increase in public expenditures has been insufficient to maintain the quality of the infrastructure in high-growth areas. For example, a Department of Transportation study estimates that an additional \$750 million is required for transportation needs in the Route One corridor area. Thus, while economic development has led to increased public expenditures to service this growth, these expenditures have often been insufficient. There has been a deterioration in the quality of the transportation network and other public infrastructure in high economic growth areas. Restoration of this quality of the infrastructure would appear to have a legitimate first claim on the local and state fiscal surpluses generated by high growth economic development.

A second policy issue raised by our results concerns the redistribution of revenues from high-growth to declining areas. Our results confirm the intuitive observation that areas of economic decline are a major fiscal drain on both local and state government. The reduction of services in these areas can be minimized by transferring resources from the surpluses of high-growth municipalities to areas of economic decline. The development of a mechanism for such a transfer is a serious issue, with the state government as the appropriate vehicle for executing any fiscal transfer. Major political constraints are certainly present, but the State is already heavily involved in such redistribution programs. The question here is whether

and how the State can obtain a part of local government fiscal dividend that high economic growth generates.

This issue of redistribution leads to the next policy concern -- namely, what should be the State's strategy, if any, in promoting economic development differentially within its boundaries. It is clear that the fast-growing suburban areas generate a substantial fiscal benefit. It is equally clear that the best investment, from the public sector's perspective, in economic development is in the State's cities. Our results show that bringing economic growth in these declining municipalities would improve the overall fiscal position of local and state governments.

Thus, increased economic growth in urban New Jersey could significantly reduce the fiscal burden these areas have placed on both local and state government. This suggests that state economic development policy should be tilted in favor of urban New Jersey. The State has already embarked on such a strategy in several major ways -- Urban Enterprise Zones, the urban targeting of Economic Development Authority loans, Fox-Lance abatement, urban aid, and the school aid formula. However, it is far from certain that such incentives are sufficiently powerful to steer economic growth significantly toward the cities and away from the now fast-growing areas. The competitive disadvantages of urban New Jersey relative to the suburbs are considerable indeed. Nevertheless, our

results suggest that a comprehensive economic development program aimed at stimulating economic growth in urban New Jersey is warranted.*

Finally, there is the issue of whether to "manage" or "control" economic growth in the State's fast-growing areas. Development charges, building moratoria, and various other growth restrictions have been used elsewhere in the United States in an effort to restrict the rate of economic development and to internalize more fully the costs of economic development.** Certainly, a strong case can be made for a policy that charges developers for part of the public sector's costs created by development. Though this would tend to inhibit growth in the developing area, accepting such a loss can be justified. Growth in the rapidly developing areas is not costless to the declining cities and hence to the State. Firms that locate in a growth corridor might have located in a declining city if the economic conditions had been attractive. Moreover, a major cost of development in the growth corridor is the cost of providing new infrastructure. But the cost of development in declining cities should be less because past economic decline has generally created excess infrastructure capacity. So a policy of charging developers in rapidly growing areas and subsidizing growth in the declining cities could bring a net fiscal benefit to the State.

None of this is to say that we should, by regulation, taxation or

*For a general urban policy discussion, see the entire 11th Annual Report, Economic Policy Council and Office of Economic Policy; and of particular interest would be: Chapter I: "Activities of the Economic Policy Council and Elements of an Urban Recovery Strategy" prepared by Joseph J. Seneca, which contains specific recommendations, Trenton, 1978.

**For a useful review, see "Growth Management and Land Use Controls: The San Francisco Bay Area Experience," K.T. Rosen and L.F. Katz, AREUEA Journal, Vol. 9, p. 321, 1981

other means, eliminate or even substantially reduce economic development in the growth corridors. It is this development which provides the fiscal means of bringing economic independence to the cities. Surpluses generated in growth areas can be put to use to provide better conditions for economic development in the cities. Great care must be taken to see that economic growth in the State's corridors is not reduced to the point of eliminating the potential solution to the fiscal problems of the declining cities.

Economic growth in New Jersey, both in the growth corridors as well

as in the cities, is to be pursued aggressively: for the jobs, income and economic security that it brings, and for the fiscal relief that it can provide for local and state governments. Certainly, growth in the rapidly-developing corridors of the State can and should occur in a policy framework that protects the quality of life, environment and infrastructure that initially provided the attraction for economic development. Without strong economic growth in N.J., the financial assistance to urban N.J. that is necessary for these areas to attain sustainable economic independence will be extremely difficult, if not impossible, to achieve.

* * * * *

EXHIBIT 1
INITIAL EMPLOYMENT CHANGES, 1980-2005
(Net of Intrastate and/or Intraregion Relocation)

Municipality	Office Research		Industry		Total	
	Net State	Net Area	Net State	Net Area	Net State	Net Area
East Windsor	6005	6569	934	1022	6939	7591
Hamilton*	751	822	229	250	980	1072
Hightstown**	0	0	0	0	0	0
Lawrence*	8659	9472	279	305	8938	9777
Princeton Bor. and Township	1302	1424	0	0	1302	1424
West Windsor	19579	21417	38	41	19617	21458
Cranbury	0	0	1623	1775	1623	1775
North Brunswick	4659	5096	1711	1872	6370	6968
Plainsboro	18019	19711	436	477	18455	20188
South Brunswick	15965	17463	3807	4164	19772	21627
Franklin***	0	0	0	0	0	0
Montgomery	4288	4690	0	0	4288	4690
Totals	79227	86664	9057	9906	88284	96570

*Part of Township is included in the Study Area.

**No employment growth is projected for this municipality in captioned categories.

***Part of township included in the study area. No employment growth is projected for this portion.

EXHIBIT 2

TOTAL EMPLOYMENT PROJECTION BY MUNICIPALITY
1995 and 2005

Township	Employment				Annual Growth (%)	
	1980	1985	1995*	2005	1980-95	1995-2005
E. Windsor	6902	9262	12355	16481	3.95	2.91
Hamilton**	1957	2308	2761	3302	2.31	1.80
Hightstown	2562	2562	2562	2562	0	0
Lawrence**	9737	12116	17305	22494	3.91	2.66
Princeton Bor. & Township	15582	14905	16237	17569	0.28	0.79
West Windsor	7819	11516	22629	33742	7.35	4.08
Mercer	44559	53094	73849	96150	3.43	2.67
Cranbury	2776	3651	4524	5605	3.30	2.15
North Brunswick	7528	10039	13407	16775	3.93	2.27
Plainsboro	6285	16025	23255	30484	9.12	2.75
South Brunswick	9657	15825	26346	36866	6.92	3.42
Middlesex	26246	45540	67532	89730	6.51	2.89
Franklin**	777	1189	1619	2205	5.00	3.11
Montgomery	5818	7394	9433	12035	3.26	2.45
Somerset	6965	8583	11052	14240	3.12	2.55
Total	77400	107217	152433	200120	4.62	2.76

*The 1995 figures for the core area are linear interpolations between 1985 and 2005. Exponential interpolation was used between 1985 and 2005 for the non-core area.

**Parts of these municipalities are included in the Study Area and, thus, employment figures do not represent those for the entire jurisdictions.

EXHIBIT 3

INPUT/OUTPUT ANALYSIS AND ALLOCATION OF THE MULTIPLIER EFFECT

The input/output analysis of the Route One Corridor development uses the New Jersey Department of Transportation's survey data (Table A-1). The survey data report employment by SIC code and specify whether the reported employment is the result of new job creation or relocation from elsewhere. Relocation data are classified by origin (within the Route One Study Area, elsewhere in the State, and other states). However, the NJDOT indicates that the survey data cover only about 90 percent of the development since 1980. To adjust for this under-reporting, the survey data have been multiplied by 100/90 before being used in the New Jersey Input/Output Model.

Table A-1
ROUTE ONE CORRIDOR EMPLOYMENT SURVEY DATA (1985)

SIC Code*	New Employment	Relocation from		
		within Area	within NJ	other states
10 - 19	120	200	0	0
20 - 29	511	159	50	1151
30 - 39	791	335	287	257
40 - 49	149	120	0	40
50 - 59	60	80	110	194
60 - 69	727	941	0	373
70 - 79	1307	1017	158	251
80 - 89	385	1067	36	507
90 - 99	0	33	0	0
Total	4050 (35.5%)	3952 (34.6%)	641 (5.6%)	2773 (24.3%)

Source: Bureau of Statewide Planning, New Jersey Department of Transportation.

*Detailed data by four-digit classification are available upon request.

The New Jersey Input/Output Model calculates the multiplier effects of economic changes in the State economy. The model does not differentiate geographically the subregions of the State. However, this study needs to separate the economic effects of the Route One Corridor development within this area from that on the rest of the State.

For this purpose, the results of the I/O analysis are allocated according to the following procedure: indirect and induced employment increases are grouped into "Retail Sales" and "All Others." Then, employment increases in "All Others" are allocated according to the distribution of population changes. This procedure may somewhat understate the Study Area share of employment gains since it is more likely for local businesses to look for nearby suppliers, thus concentrate more of their purchase increases in the

Exhibit 3 (continued)

area. The "Retail Sales" employment increases are then allocated according to the distribution of the total multiplier effect for the non-"Retail Sales" portion.

The survey data show that 35 percent of the gross employment figure represents relocation from within the Study Area, and 40 percent represents relocation within the State with no net gain to the State. Therefore, the net employment increase for the State is only 6823 (= 4050 + 2773), and 7464 (= 6823 + 641) for the Study Area.

The employment increase from 1980 to 1985 in the Route One Corridor, after adjusting for under-reporting, is 8293 (= 7464/0.9), and the same figure for the entire State is 7581 (= 6823/.9). The latter figure fed into the New Jersey Input/Output Model yields indirect and induced employment as a result of the multiplier effect of an additional 7998 jobs for the State as a whole. This additional employment (except in retail sales) is allocated to the Study Area according to its share of the population changes (Table A-2).

Table A-2
STUDY AREA POPULATION CHANGE, 1980-1984

Municipalities	Population		Change	
	1980	1984	1980-1984	1980-2005
East Windsor	21041	22263	1222	12900
Hamilton*	82801	84611	1810	1700
Hightstown	4581	4500	-81**	0
Lawrence*	19724	21381	1657	23400
Princetons	25718	26733	1015	5500
West Windsor	8542	9293	751	17900
Cranbury	1927	2119	192	12500
North Brunswick	22220	24885	2665	19200
Plainsboro	5605	8784	3179	13800
South Brunswick	17127	18456	1329	35500
Franklin*	31358	33583	2225	23000
Montgomery	7360	7759	399	12800
Corridor Total			16444	178200
State	7,365,011	7,515,000	+150,000	1,306,700

*Part of Township included in the Study Area.

**This negative figure was treated as zero, since the change is small and the long term projection is for no change.

Source: Population Estimates for New Jersey, July 1, 1985, New Jersey Department of Labor and "Route One Demographic Projection" and "Route One Corridor Study Area Development Profile," New Jersey Department of Transportation.

Exhibit 3 (continued)

As an illustration, the Study Area's share of population change between 1980-1984 is 10.96 percent. Thus, 10.96 percent of the additional employment (7998) generated by the multiplier effect of the 1980-1985 development, minus the retail sales employment (1975), is allocated to the Area (Table A-3, col. 1, row 1). This (660), together with the initial change (8293), constitute 65.8 percent (8953/13604) of the total multiplier effect except retail sales. The retail sales employment change is then allocated according to this proportion (Table A-3, col. 1, row 3). As a result, the Area's share of the direct, indirect, and induced employment (including Retail Sales) is 10,253 out of 15,579. Adding the multiplier effect of construction (for projection of construction activity and its multiplier effect in the Area, see Table A-4) which is similarly allocated (Table A-3, col. 1, row 4), gives total employment change in the Area (11,052 out of 17,036).

Table A-3
ALLOCATION OF THE MULTIPLIER EFFECT (1985)*

		Study Area	Rest of the State	Total State
Share of the Mult. Effect Less Retail	(1)	$0.1096(7998-1975)$ = 660	$(7998-1975)-660$ = 5363	$7998-1975$ = 6023
Total Emp. Less Retail	(2)	$8293+660$ = 8953	5363	$7581+6023$ = 13604
Share of Retail Employment	(3)	$1975 \times (8953/13604)$ = 1300	$1975-1300$ = 675	1975
Share of the Construc. Mult. Effect	(4)	799	658	1457
Grand Total	(5)	11052	6696	17036**

*Row (2) = Initial employment change plus Row (1); Row (5) = Row (2) + Row (3) + Row (4).

**Total employment change for the Study Area and for the rest of the State exceed the State total because of relocation into the Study Area from elsewhere in the state. This excess (712) is clearly a net gain to the Study Area but not to the State.

Exhibit 3 (continued)

Table A-4
CONSTRUCTION IMPACT

Year	Initial Employment	Indirect & Induced Employment	Total Multiplier Effect
1985	585	872	1457
86	464	691	1155
87	511	762	1274
88	565	843	1408
89	625	931	1556
1990	692	1032	1724
91	384	573	957
92	405	605	1010
93	428	638	1066
94	452	673	1125
95	477	710	1187
96	504	751	1255
97	533	794	1327
98	564	840	1404
99	596	888	1484
2000	630	940	1570
01	667	995	1662
02	706	1054	1760
03	747	1116	1863
04	791	1182	1973
05	838	1251	2089

Source: Input/Output analysis using the NJDOT projections of construction values.

Once the Area's share of the multiplier effect is established, it is allocated by municipality according to the same procedure as above (see Table A-5). For example, column 1 row 1 of Table A-3 shows that the Study Area's share of the multiplier effect (except retail sales) is 660. This figure is allocated among the 12 localities in the Study Area (Table A-5, column 3) according to the distribution of population changes (Table A-5, column 2). Retail sales employment (1300 in the Study Area) is then allocated according to the local shares of initial employment change (column 1) plus the allocated multiplier effect except retail sales (column 3). The subtotal of these three columns is then used to allocate the construction employment (799 for the Study Area total) among the 12 municipalities (column 6). Total employment allocated to each municipality (Exhibit 3 - continued) (column 7) is the sum of columns (5) and (6).

The multiplier effect by the year 2005 is also computed by using the New Jersey Input/Output Model. According to the NJDOT projection, the Office/Research and Industry employment in the Route One Corridor is expected to increase by 96,570 by the year 2005 which, according to the I/O analysis result, will generate additional employment of 99,853. However, a portion of the employment increase in the Route One Corridor represents relocation from elsewhere in the state. The net initial increase in the state's employment is

Exhibit 3 (continued)

therefore, reduced to 88,284 and its multiplier effect will generate an additional 93,140 jobs. The multiplier effect is then allocated to the Study Area (see Table A-6) and its municipalities (Table A-7) by the same procedure as before.

Table A-5
ALLOCATION OF EMPLOYMENT CHANGE BY MUNICIPALITY (1985)*

Township	Initial Employ. Change	Share of Popula. Change	Share of Mult. Effect Less Retail	Share of Retail	Sub- total	Share of Const. Effect	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
E. Windsor	0	0.0743	49	7	56	4	60
Hamilton	0	0.1101	73	11	84	7	91
Hightstown	0	0	0	0	0	0	0
Lawrence	437	0.1007	66	73	576	45	621
Princetons	0	0.0617	41	6	47	4	51
W. Windsor	2994	0.0457	30	439	3463	270	3733
Mercer	3431	0.3925	259	536	4226	330	4556
Cranbury	0	0.0117	8	1	9	1	10
No. Bruns.	0	0.1621	107	16	123	9	132
Plainsboro	2467	0.1933	128	377	2972	232	3204
So. Bruns.	2395	0.0808	53	355	2803	218	3021
Middlesex	4862	0.4479	296	749	5907	460	6367
Franklin	0	0.1353	89	13	102	8	110
Montgomery	0	0.0243	16	2	18	1	19
Somerset	0	0.1596	105	15	120	9	129
Grand Total	8293	1.000	660	1300	10253	799	11052

*Column (3) = column (2) times 660 (the Study Area's share of the multiplier effect, except retail sales)

Column (4) = column (1) plus column (3) multiplied by 1300/8953 (=8293 + 660)

Column (5) = column (1) + column (3) + column (4)

Column (6) = 799 times column (5) divided by 10253 (= 8953 + 1300)

Column (7) = column (5) + column (6)

Exhibit 3 (continued)

Table A-6
ALLOCATION OF THE MULTIPLIER EFFECT FOR THE YEAR 2005

		Study Area	Rest of the State	Total State
Share of the Mult. Effect Less Retail	(1)	$0.1364(93140-23006)$ = 9564	$(93140-23006)$ -9564 = 60570	$93140-23006$ = 70134
Total Employment Change Less Retail	(2)	$96570+9564$ = 106134	60570	$88284+70134$ = 158418
Share of Retail Employment	(3)	$23006(106134/158418)$ = 15413	$23006-15413$ = 7593	23006
Share of the Construction Mult. Effect	(4)	1173	916	2089
Grand Total	(5)	122720	69079	183513

The 1985 employment figures are derived by extrapolating the 1980-1984 historic trends. The 1995 employment levels are interpolations between the 1985 and 2005 values. Linear interpolation is used for the seven municipalities of the Core Area and exponential interpolation is used for the other localities because the Core Area's development is expected to spread to the neighboring areas with a time lag.

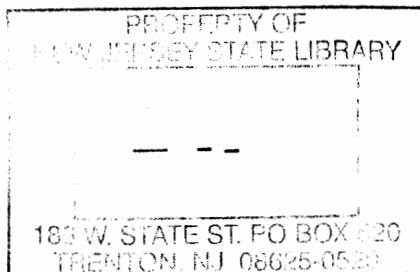


Exhibit 3 (continued)

Table A-7 shows projected employment growth to 2005 allocated to the various municipalities.

Table A-7
ALLOCATION OF PROJECTED EMPLOYMENT GROWTH BY MUNICIPALITY (2005)*

Township	Initial Emp.	Share of Pop.	Share of Mult. Effect Less Retail	Share of Retail	Sub- total	Share of Const. Effect	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
E. Windsor	7591	0.0724	692	1204	9487	92	9579
Hamilton	1072	0.0095	91	169	1332	13	1345
Hightstown	0	0	0	0	0	0	0
Lawrence	9777	0.1313	1256	1602	12635	122	12757
Princetons	1424	0.0309	295	249	1968	19	1987
W. Windsor	21458	0.1004	961	3256	25675	248	25923
Mercer	41322	0.3446	3295	6480	51097	494	51591
Cranbury	1775	0.0701	671	356	2802	27	2829
No. Bruns.	6968	0.1077	1030	1161	9159	88	9247
Plainsboro	20188	0.0774	741	3039	23968	231	24199
So. Bruns.	21627	0.1992	1905	3417	26949	260	27209
Middlesex	50558	0.4545	4347	7973	62878	606	63484
Franklin	0	0.1291	1235	179	1414	14	1428
Montgomery	4690	0.0718	687	781	6158	59	6217
Somerset	4690	0.2009	1922	960	7572	73	7645
Grand Total	96570	1.000	9564	15413	121547	1173	122720

*Column (3) = column (2) times 9564 (the Study Area's share of the multiplier effect less retail sales employment)

Column (4) = column (1) plus column (3) multiplied by 15413/106134 (=96570 + 9564).

Column (5) = column (1) + column (3) + column (4)

Column (6) = 1173 times column (5) divided by 121547 (=106134 + 15413)

Column (7) = column (5) + column (6).

The result of this analysis shows that total employment in the Study Area (10 municipalities and parts of three municipalities) will increase from 77,400 in 1980 to 200,120 in 2005, i.e., an increase of 122,720 (Table A-7). We anticipate that the proportion of relocation within the Area will decline somewhat over time. We also expect that the present pace of development will not continue even if transportation needs are adequately met.

EXHIBIT 4

Regression Analysis of Expenditures

The regression equation for municipal expenditures is given by:

Dependent Variable (S)		
Independent Variable	Estimated Coefficient	t-Statistic
Constant	-0.102792	-12.107
X ₁	0.03864	3.3524
X ₂	0.16188	3.6994
X ₃	0.582751	23.217
F(3,488) = 253.11		R ² = 0.6088

where: S = log (1983 expenditures*/1973 expenditures*)

X₁ = log (1983 employment/1973 employment)

X₂ = log (1983 per capita money income*/1973 per capita money income*)

X₃ = annual rate of population growth 1975-83

*in real (1985) dollars.

To obtain the 1995 and 2005 estimates, it was necessary to have population, employment and per capita income figures. Department of Transportation estimates were taken for population and direct employment, which were subsequently used in our input-output model to generate multiplier effects. Per capita money income was estimated by another regression model with the per capita figure in 1985 dollars as the dependent variable. The regression equation is given below:

Exhibit 4 (continued)

Dependent Variable (P_t)		
Independent Variable	Estimated Coefficient	t-statistic
Constant	-0.776861	-3.0907
P_{t-10}	1.054340	39.546
X_1	0.049202	3.8234
X_3	0.582828	1.8444
X_4	0.129672	3.8234
X_5	-0.010190	-4.2026

$F(5,486) = 369.995$	$R^2 = .7906$	

where: P_t = log (1983 per capita money income*)
 P_{t-10} = log (1973 per capita money income*)
 X_1 = log (1983 employment/1973 employment)
 X_3 = average annual growth rate of population, 1975-83
 X_4 = log (population density 1975)
 X_5 = the square of X_4 , designed to account for nonlinearity of the equation

State Expenditures Estimates

State expenditures on particular municipalities are explained by:

Dependent Variable (S_i)		
Independent Variable	Estimated Coefficient	t-Statistic
constant	-0.138272	-3.8524
$\text{Log}(P_i)$	-1.28400	-12.9618

$F(1,26) = 168.009$	$R^2 = 0.8660$	

where: S_i = log (per capita state expenditures in the particular municipality/average per capita state expenditure)
 P_i = log (per capita money income in the particular municipality in \$1985/average per capita state money income in \$1985)

(Exhibit 4 - continued)

It should be noted that this regression differs from those previously presented. S_i , the dependent variable is expressed as a fraction of average state per capita spending. The regression equation implies:

$$\begin{aligned} &\text{Per Capita State Spending in Municipality} \\ &= (\text{average State Spending}) e^{-0.138272 P_i - 1.284} \end{aligned}$$

The right side of the equation includes an absolute term, average state spending, explaining the increase or decrease in expenditures due to overall economic growth or decline. It also includes a relative term P_i which is per capita income in the particular municipality relative to per capita income in the State.

The equation implies that State expenditures for municipality i are proportional to the total State expenditures for all municipalities multiplied by the municipality's share of the State's population given the relative per capita income. Thus, whether a given municipality receives more or less State expenditures than its share of population depends on its relative per capita income. The break-even level of relative per capita income is 0.8979, i.e., a municipality with its per capita income higher than about 90 percent of the State average will receive less State expenditures than its population share, and vice-versa. The fact that the break-even level of relative income is about 0.9 rather than 1.0 implies that low-income municipalities receive State expenditures that are more than inverse in proportion to relative income.

II.

CHANGES IN THE NEW JERSEY INDUSTRIAL COMPOSITION:*

Effects on Earnings and Occupational Profile

EXECUTIVE SUMMARY

New Jersey experienced a dramatic shift in the sectoral composition of its employment during the period 1973-1983. Our analysis examines how shifts in intra-sectoral industry composition, as well as inter-sectoral shifts have affected the earnings and occupational profile of the New Jersey economy. A calculation based on standardized earnings applied to a detailed disaggregated analysis of industrial composition of over 200 industries of all sectors reveals no significant effect of composition changes on average earnings. This result stems partially from the fact that within sectors the growth of low-paid industries was, in many instances, also accompanied by rapid growth in high-paid industries.

In the service sector, for example, industries where annual earnings exceeded \$23,000 increased by over 90 percent, or by 42,000. Manufacturing industries where annual earnings were above \$26,000 increased employment by over 24,000, while industries with earnings below \$12,000 declined by about 20,000. When all industries of the manufacturing sector are considered, the changes in the industrial mix within that sector resulted in an increase of average manufac-

turing wages. When all changes are considered, the result is that the average earnings of the State's workforce have essentially been neutral with respect to structural changes. However, this in no way removes the severe economic hardship experienced by many individuals associated with changes in the composition of New Jersey's economy over this time. The growth rates of individual industries that led to the changes in composition were, in many instances, negative, resulting in a loss of jobs for many employees.

We also analyzed the effect of the industrial changes on occupational makeup. The employment share of professional occupation group increased from 6.99% in 1973 to 8.10 in 1983 as a result of change in industrial mix. Due to this change, 26,800 additional professional jobs were created. Finally, changes in the State's industrial mix, resulted in an increase of 39,000 employees with full or partial college education, and the number of employees with no college education declined by the same amount. Thus, a shift in the industrial composition has created a requirement for a labor force of greater educational attainment.

*Prepared by Jerzy Zachariasz, Office of Economic Policy.

Introduction

The average earnings (wages & salaries) of a state's workforce measure the well-being of a large segment of its population. Since earnings represent the predominant share of personal income, they determine the overall spending power of the population and also represent a major source of a state's tax revenue. In this paper we concentrate on one timely and important question concerning average earnings: namely, how have the changes in the industrial composition of the New Jersey economy affected average earnings? A related issue concerns the occupational composition of the work force and how changes in the state's industrial profile have affected specific occupations and the level of skills and educational attainment of the workforce.

Section I analyzes the effect of changes in New Jersey's industrial composition on average earnings in the period 1973-83.* To quantify that effect, standardized earnings were applied to disaggregated employment data. Disaggregation is necessary because broad sectoral aggregates -- manufacturing, services and other -- are highly heterogeneous. In Section II we analyze earnings data of high technology industries.

Section III examines the effect of industrial composition changes on the growth in employment of eight major occupational groups. The importance of the changes in industrial mix is demonstrated by presenting data on individual occupational categories. An analysis of forty industries demonstrates the effect of the industrial shift New Jersey has experienced on the occupational profile of the State's workforce and its educational attainment.

Section I. Earnings and Composition

The employment composition of the New Jersey economy changed significantly during the period 1973-83. Table 1 illustrates changes in the share of sectoral employment.** A review of these data confirms the well-known fact that the largest changes affected two sectors: manufacturing and services.*** The share of manufacturing employment declined by 9.0 percentage points (from a share of 36.8% to 27.8%), while the share of services increased by 7.9 percentage points (from 17.6% to 25.5%). In 1973, the share of manufacturing was more than double that of the services sector. By 1983, manufacturing's share was only about 10 percent higher than the service sector's share.

*The most recent data available were for 1983. We compare these with 1973, a non-recessionary year (as was 1983), and this enables us to analyze changes over a ten-year period.

**The source of all data in this section is the County Business Patterns (see Appendix 4).

***Throughout this section 'services' (row I in Table 1) are defined in the narrow sense, i.e., personal, business services, hotels, health services, amusement and recreation. Trade, finance, real estate and insurance appear separately in Table 1.

Table 1
NEW JERSEY SECTORAL EMPLOYMENT COMPOSITION (in percent), 1973 and 1983
(Government Sector Excluded)

Sectors	1973	1983	Change (1983 - 1973)
Total	100.0	100.0	0.0
A. Forestry & Fisheries	0.2	0.3	0.1
B. Mining	0.1	0.1	0.0
C. Construction	5.0	3.9	-1.1
D. Manufacturing	36.8	27.8	-9.0
E. T.P.U.*	7.1	7.3	0.2
F. Wholesale Trade	7.7	8.8	1.1
G. Retail Sales	18.7	19.0	0.3
H. F.I.R.E.**	6.0	6.7	0.7
I. Services	17.6	25.5	7.9
Unclassified	0.8	0.6	-0.2
Total Employment (000)	2,245.6	2,582.1	15.0%

*Transportation, Communication, and Public Utilities.

**Finance, Insurance, and Real Estate.

That change in the proportion of manufacturing is often a source of concern.* Since the average earnings in the manufacturing sector are substantially higher than the average earnings in the service sector, it is sometimes argued that the overall state average earnings were lowered by this change in the economy's industrial mix.

To determine the effect of changes in the employment mix on average earnings, we rely on the procedure of standardized earnings. The standard was defined as 1983 annualized payroll per employee. By applying the

1983 per employee earnings to both the 1973 and 1983 industrial compositions, we obtained a standardized average earnings at the 1973 composition, and at the 1983 composition. Since both 1973 and 1983 averages are based on the same earnings per employee for individual industries, any differences in average earnings reflect the effect of changes only in the employment mix of the State's economy.** The standardized earnings procedure can be used on different levels of data aggregation. The broadest level of aggregation is represented by sectoral (division) data such as shown in Table 1.

*"Many view the growing share of employment in services and the decreasing share in manufacturing with alarm." Lynn E. Browne, "Taking In Each Others Laundry -- The Service Economy," New England Economic Review, July/August 1986.

**It is important to note that changes due to inflation and any growth in real earnings are not involved here. The analysis isolates the pure effect of composition changes on earnings.

Table 2
NEW JERSEY MANUFACTURING INDUSTRIES BY AVERAGE ANNUAL EARNINGS

Earnings of More Than \$26,000				
	Earnings 1983	Employment 1973 1984		Employment Change
Petroleum Refining (291)	36,784	3,923	4,066	143
Administr. & Auxil.	33,853	74,235	97,367	23,132
Organic Chemicals (286)(2818)	29,875	12,061	13,631	1,570
Communication Equipment (366)	27,585	33,666	35,151	1,485
Beverages (208)	26,172	8,389	6,111	-2,272
		132,274	156,326	24,058
Earnings of Less Than \$12,000				
Mens Suits (231)	10,808	6,102	2,859	-3,243
Mens Furnishings (232)	10,756	6,522	2,719	-3,808
Women's Outerwear (233)	9,908	28,738	21,141	-7,597
Women's Undergarments (234)	11,882	4,408	3,505	-903
Hats (235)	8,916	473	585	112
Children's Outerwear (236)	10,139	5,774	2,387	-3,387
Misc. Apparel (238)	10,044	3,924	2,502	-1,422
Music Instruments (393)	11,888	293	143	-150
		56,234	35,841	-20,398

However, an analysis on such a broad sectoral level as Table 1 would be meaningful only if the sectors are essentially homogeneous in terms of average earnings within each sector, or, if there were identical employment changes in all the industries included in an individual sector. Since neither of these conditions are likely to hold, a sectoral level of analysis is not appropriate. The manufacturing sector, for example, is an aggregate of 100 (three digit SIC codes) industries and the average earnings of individual industries within this sector are highly differentiated, ranging from \$8,916 to \$37,784 in 1983. It is also true that these 100 industries experienced considerably different employment

changes over this time. Thus, while some manufacturing industries experienced a decline others registered increases in employment.*

Table 2 indicates that there were five manufacturing industries where annual earnings per employee exceeded \$26,000. These industries employed a total of 132,274 persons in 1973 and 156,326 in 1983, an increase of over 24,000, although the State's manufacturing sector as a whole experienced a decline. On the other hand, there were eight manufacturing industries with average annual earnings below \$12,000, and employment in these industries declined by over 20,000.

*See, "The Performance of the New Jersey Manufacturing Sector," Chapter II, 17th Annual Report of the Economic Policy Council and Office of Economic Policy, 1985, for a detailed analysis of employment changes in the State's manufacturing industries.

Table 3
MANUFACTURING EARNINGS EFFECTS OF COMPOSITION CHANGES

Earnings at Composition of		Difference 1983-1973	
1973	1983	\$	%
\$21,116	\$22,197	1081	5.1

Data on high- and low-earning industries are presented in Table 2 to illustrate the magnitude of earnings differentials within the manufacturing sector. It is, however, of interest to note that if only these two groups of industries are considered, changes in employment would have resulted in an increase in the average earnings (a larger employment increase of the high earnings group compared to the employment decline of low earnings segment). However, the manufacturing industries in Table 2 represent only about one quarter of the total manufacturing sector's employment and therefore are not necessarily indicative of the changes in the entire manufacturing sector. Our point is that the effect of industrial composition changes within the manufacturing sector on the average earnings of this sector must be based on a complete analysis of all industries.

The result of a calculation based on the standardized method, involving all 100 manufacturing industries that comprise the sector appears in Table 3. It shows that at 1983 earnings and the State's 1973 composition, the average earnings in the manufacturing sector would have been \$21,116. Since the average earnings at the actual 1983 composi-

tion are \$22,197, the results indicate that the average actual earnings are 5.1% higher than they would have been had the 1973 composition not changed. Thus, the change within the manufacturing sector that New Jersey experienced between 1973 and 1983 caused average manufacturing earnings to increase.

The service sector is also extremely heterogenous with respect to both the level of average earnings and rates of growth of its component industries. The service sector consists of 45 industries and the disparity in average earnings in the service sector is illustrated in Table 4, with annual average earnings varying from \$7,561 to \$31,770. Table 4 also shows that there was rapid growth in low paid service industries (i.e., those service industries with earnings less than \$10,000). Employment in such industries increased by over 36,000 (31%). At the same time, however, service industries where earnings exceeded \$23,000, almost doubled employment, with an increase of over 42,000 (96%) jobs. This suggests that for each one thousand additional jobs created in low paid service industries, there were 1,170 additional jobs created in high-paid service industries.

TABLE 4
NEW JERSEY SERVICE INDUSTRIES AVERAGE ANNUAL EARNINGS MORE THAN \$23,000

Industry	Earnings 1983	Employment		Employment Change
		1973	1983	
Office of Physicians (801)	31,770	15,327	26,221	10,894
Office of Osteopathic (803)	25,952	407	1,451	1,044
Legal Services (81)	23,073	12,440	22,350	9,910
Engineering & Architects (891)	28,803	13,404	22,769	9,365
Adminis. & Auxiliary	28,160	2,521	13,734	11,213
Total		44,099	86,525	42,426
Earnings Less Than \$10,000				
Personal Services (72)	8,025	30,607	33,418	2,811
Service to Buildings (734)	7,561	15,415	22,569	7,181
Detective Service (7393)	9,093	7,533	15,776	8,243
Automotive Services (754)*	8,432	2,257	2,028	-229
Health & Allied n.e.c. (804,5,9)	9,585	20,734	42,104	21,370
Museums (84)	8,929	274	491	217
Membership Organizations (86)	8,548	38,711	35,365	-3,346
Motion Pictures (78)	9,104	3,591	3,633	42
Total		119,122	155,384	36,289

*Except repairs.

Here again our judgment cannot be based on partial data, and Table 4 only illustrates our basic point that there is significant heterogeneity in earnings and growth rates within the service sector, as there is in the manufacturing sector. Table 5 provides results of calculations for the entire 45 individual industries that comprise the service sector. It reveals that the average 1983 earnings at the 1973 composition would have been \$14,331, while the actual 1983 average is \$14,968, or 4.4 percent higher.

The analyses above attempted to determine the effect of detailed industrial composition changes on average earnings in manufacturing and services. They clearly indicate that a disaggregated approach is critical. This is true not only for the manufacturing and services sectors, but for the other major sectors of the economy as well. A review of data suggests that considerable earnings differentials and growth disparities exist in all major sectors (see Appendix 1 and 2).

Table 5
SERVICES EARNINGS OF COMPOSITION CHANGES

Earnings at Composition of		Difference 1983 - 1973	
1973	1983	\$	%
\$14,331	\$14,968	637	4.4

Table 6
ALL INDUSTRIES EARNINGS EFFECT ON COMPOSITION CHANGES

Earnings at Composition of		Difference 1983 - 1973	
1973	1983	\$	%
\$17,790	\$17,832	\$42	0.2

To arrive at more complete results, we performed an analysis of over 200 industries in all sectors that make up the entire New Jersey private economy. Those 200 industries represent 100 percent of total private non-farm employment in New Jersey. The employment share and 1983 earnings of each of these 200 industries was determined and average earnings calculated at both 1973 and 1983 compositions (see Table 6). The results reveal that at the 1973 industrial composition, the overall average earnings for these 200 industries would have been \$17,790, compared to actual earnings of \$17,832 at the 1983 composition. In relative terms, actual average earnings are thus two-tenths of one percent higher than what the 1973 industrial mix would have produced in 1983 had there been no change in the industrial composition of the New Jersey economy between 1973 and 1983. Thus, we find no evidence that the change in the industrial profile of the State's economy has reduced average earnings in New Jersey.

On the other hand, our investigation did not find any significant increase in average earnings that could be attributed to changes in the industrial mix. This result is less favorable than suggested by a review of data on high versus low earnings industries.

In that context, we should also mention that the positive effect of employment growth of high-earning industries (over \$26,000) was, to some degree, neutralized by declines in industries where earnings, although below \$26,000, were substantially higher than the average. This is especially true for many manufacturing industries. A list of manufacturing industries where earnings were below \$26,000 but exceeded \$20,000 and experienced substantial losses of employment are: Misc. Food, loss of 2,024 jobs; textile finishing, loss of 3,270 jobs; cutlery and hand tools, loss of 2,561 jobs; construction machinery, loss of 2,911 jobs; metalworking machines, loss of 2,462; refrigeration equipment, loss of 3,601; motor vehicles, loss of 6,095 aircraft and parts, loss of 4,109.

Table 3 and Table 5 indicate that the average earnings in service industries is significantly lower than that in manufacturing industries. Thus, a shift in employment from manufacturing to services, unaccompanied by shifts within sectors would lower the average earnings of all employees. What we have shown in Table 6, therefore, is the net effect of intrasectoral shifts and intersectoral shifts. In other words, the negative effect of intersectoral shifts has been completely offset by the positive intrasectoral shifts in New Jersey.

The movement of average earnings is an important indicator of average well being of a large segment of the New Jersey population. However, it should be kept in mind that we are examining averages. Therefore, the fact that the changes in the mix seem to be essentially neutral for the average earnings, does in no way remove the severe economic hardships experienced by many individuals associated with changes in the composition of New Jersey's economy. As shown above, the growth rates of individual industries that lead to the changes in the composition were, in many instances, negative and indicate a loss of jobs for many employees. While that loss was offset by new jobs created in other industries, the dislocations experienced by a large number of individuals were extremely severe.

The creation of conditions for retention and growth of higher paid industries, especially in manufacturing, must remain an important objective of state economic policy.

Section II. High Technology Industries

Since earnings in high technology industries are generally higher than the average earnings of all other industries, an increase in the share of high technology industries could be a significant factor in increasing overall State average earnings. Table 7 presents data on employment and earnings of 28 four-digit high technology manufacturing and service producing industries. These industries were defined as high

technology industries in our previous Annual Reports.*

Table 7 indicates that the average annual earnings of high technology manufacturing industries in 1983 were \$25,194. The average for the entire manufacturing sector was \$22,197. Similarly, high technology services industries had average earnings of \$24,071 in 1983, in contrast to an average earnings of \$15,948 in service producing industries in general.

The average earnings of all high technology industries -- manufacturing and services -- was \$24,711, while the overall average for all industries in these sectors was \$17,776. These figures show the attractiveness of high technology industries for the State. The higher income in these industries that we demonstrate here is an additional rationale for policies that facilitate the development of high technology industries.

Section III. Occupational Status and Composition

In the preceding sections we investigated the effect of changes in the industrial composition on average earnings. A related question is also of interest; namely, how did the changes in industrial composition affect the occupational profile of New Jersey employment? For example: did the share of occupations that are characterized by a relatively high level of education decline or increase as a result of changes in the State's industrial composition?

*See, Joseph J. Seneca and Adam Broner, "The Performance of High Technology Manufacturing Industry in New Jersey," 15th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton 1983 and "The Performance of High Technology Service Industries in New Jersey," 17th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1985.

Table 7
EARNINGS IN HIGH TECHNOLOGY INDUSTRIES

A. Manufacturing Industries:			
SIC	Industry	Employment (1983)	Earnings (1983)
---	-----	-----	-----
2831	Biological Products	2,917	28,500
2833	Medicinal and Botanicals	4,195	26,901
2834	Pharmaceutical Preparations	24,294	25,334
2843	Surface Active Agents	721	24,766
3555	Printing Trade Machinery	2,536	22,197
3569	General Industry Machinery	3,691	21,362
3573	Electronic Components Equipment	4,751	23,130
3589	Service Industry Machinery	1,010	26,329
366	Radio and TV Communications	35,151	27,857
3674	Semiconductors	3,421	15,601
3812	Engin. & Scientific Instruments	3,109	23,998
3823	Process Control Instruments	1,163	21,152
3825	Instruments to Measure Electricity	4,699	25,309
3829	Measuring & Constr. Devices	1,401	21,336
3841	Surgical and Medical Instruments	2,793	21,293
2731	Book Publishing	6,100	21,293
2819	Industrial Inorganic Chemicals	3,284	27,177
3291	Abrasive Products	487	15,450
3296	Mineral Wool	2,272	24,732
3535	Conveyors	1,511	22,118
	TOTAL	109,506	25,194
B. Service Producing Industries			
7372	Computer Programming	5,228	30,890
7374	Data Processing	9,966	15,876
7379	Computer Related Services	4,166	28,892
7391	R&D Laboratories	1,666	25,782
7397	Testing Laboratories	1,691	20,177
7332	Blueprinting	474	13,654
7395	Photofinishing	2,439	13,509
48	Communication Services	57,024	25,130
	TOTAL	82,654	24,071

The most recent data on New Jersey employment by occupation are from the 1980 Population Census.* The occupational employment profile is available in census data for approximately forty industries of the New Jersey economy. These 40 industries are given in Appendix 5, and represent approximately 90 percent of private non-agricultural employment in New Jersey. The occupational profile, in a broad classification, consists of eight occupational groups:

Professional Specialty Occupations
(Professionals)

Executive, Administrative and Managerial Occupations (Managers)

Technical and Related Support Occupations (Technical)

Sales Occupations (Sales)

Administrative Support Occupations
including Clerical
(Clerical and Administrative)

Service Occupations (Service)

Precision Production, Craft and Repair Occupations (Craftsmen)

Operators, Fabricators and Laborers
(Operators)

On the basis of 1980 census data, we first calculated the employment share of each occupational group in each of the forty industries. By applying the census shares of occupational groups to Business Pattern employment data, we estimated the employment of each occupational group in the forty industries for both 1973 and 1983.

By aggregating employment of individual occupational groups across the forty industries, we arrived at total employment of each group in 1973 and 1983 and these data are given in Table 8.

The derived number of employees in each of the broad occupational groups in 1973 and 1983 appear in columns (1) and (2), respectively. Columns (3) and (4) show the occupational composition (percentage shares) of employment in 1973 and 1983 derived from columns (1) and (2). Since an identical occupational composition was applied to employment in each industry in 1973 and 1983, the differences in the aggregate occupational composition shown in columns (3) and (4) reflect changes in the industrial mix only.

The operatives occupational category registered a dramatic decline (4.11 percentage points) of its share in total employment. Another occupational category that shows a share decline is the craftsmen group. These declines are balanced by an increase in importance of all other groups. The increases vary from 0.26 percentage points for the technical group to 2.61 percentage points for the service group. While changes in the occupational composition discussed above are indicative, it is of interest to analyze changes in the number of employees that follow these changes in composition. Employment numbers shown in columns (1) and (2) of Table 8 cannot be used for that purpose because differences between the number of employees, in columns (1) and (2) in Table 8, reflect not only differences in the industrial mix but also differences in the level of total employment in the two reference years.

*For an analysis of the New Jersey occupational profile, 1960-1970, see Adam Broner, George Nagle and Peter Bearse, "The Quality of New Jersey Labor Force, 8th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1975.

Table 8
ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONAL GROUPS

	1973* (000)	1983* (000)	Composition (%)		Difference Percentage Point (4)-(3)
			1973	1983	
	(1)	(2)	(3)	(4)	(5)
Professional	151.3	195.9	6.99	8.10	1.11
Technical	64.1	78.0	2.96	3.22	0.26
Managers	270.1	313.7	12.48	12.97	0.49
Service	184.3	269.2	8.52	11.13	2.61
Sales	266.2	306.5	12.30	12.67	0.37
Clerical & Administrative	393.5	462.5	18.18	19.12	0.94
Operatives	529.4	492.4	24.46	20.35	-4.11
Craftsmen	305.3	301.0	14.11	12.44	-1.67
Total	2164.2	2419.2	100.00	100.00	0.0

*Derived by applying 1980 Census occupational composition of forty individual industries to both 1973 and 1983 employment of those industries.

We adjust for changes in total employment between 1973 and 1983 in Table 9. The 1973 industrial mix is applied to the 1983 level of employment to derive estimates of what employment, by occupational category, would have been in 1983 had the 1973 industrial composition not changed (column 1). The employment levels in 1983 by occupational category are shown in column (2). Thus, the difference between columns (2) and (1) measures the change in employment by occupational category between 1973 and 1983 attributable to changes in the industrial composition of the State. Finally, column (5) lists the percent of employees in each occupational category that has four or more years of college.

Column (3) of Table 9 shows that six occupational groups experienced a total increase of 140,000 due to

changes in the industrial mix and two groups (Operators and Craftsmen) declined by the same amount. The six groups where employment increased, represent, in most cases, relatively high educational attainment (see column 5). An important exception is the service occupational category where the educational level is low (only 4.7% of employees in this group have four or more years of college).^{*} The two occupational groups where employment declined -- Operators and Craftsmen -- due to industrial composition changes, also have relative low educational attainment levels.

The Professional occupational group is of special interest because of its high educational status. Over 70 percent of employees of this group had, in 1980, four or more years of college and an additional 16 percent had one to three years of college.

^{*}Note this is the service occupational category. Many individuals employed in service industries are included in the professional, technical and manager occupational classifications. The Service occupational category includes: guards, cooks, nursing aides, cleaning and building services.

Table 9
EFFECTS OF CHANGES IN THE INDUSTRIAL MIX ON EMPLOYMENT OF OCCUPATIONAL GROUPS
1973-1983

	1973* (000)	1983* (000)	Difference		Percent of Four or More Years of College
			(000)	Percent	
	(1)	(2)	(3)	(4)	(5)
Professionals	169.1	195.9	26.8	15.8	71.7
Technical	71.6	78.0	6.4	8.9	26.7
Managers	301.9	313.7	11.8	3.9	45.8
Service	206.0	269.2	63.2	30.7	4.7
Sales	297.6	306.5	8.9	3.0	20.4
Clerical	439.9	462.5	22.6	5.1	9.6
Operators	591.8	492.4	-99.4	-16.8	2.7
Craftsmen	341.3	301.0	-40.3	-11.8	5.7
Total	2419.2	2419.2	0.0		

*Using 1983 level of employment and 1973 industrial mix.

**Using 1983 level of employment and 1983 industrial mix.

The group includes architects, engineers, natural scientists, physicians, mathematical and computer scientists, technical and related support occupations.

Professional occupational employment increased by 26,800 persons, or 15.8 percent due to changes in the industrial mix only. This caused an increase in the share of this group from 6.99 percent in 1973 to 8.10 percent in 1983 (see Table 8, columns 3 and 4).

Shares of professional employment in total employment differ from industry to industry and so do rates of employment growth. In industries where professionals' share in employment was more than 30 percent, aggregate employment increased by over 30 percent, or by 89,356 (See Appendix 3). Industries where professionals accounted for more than 10 percent, but less than 20 percent, experienced an increase in employment of 18.4 percent, or 67,000. Industries where the percentage of professional specialty occupations accounted for

three percent or less, increased employment by 11.4 percent, or by 91,414. Thus, industries with a large share of professional workers in their labor force experienced a relatively high growth of employment.

Another group with a relatively high educational level is the managerial occupational group. About 46 percent of employees in that category had four or more years of college and an additional 21 percent had from one to three years of college. This group includes executives, financial managers, accountants and auditors, inspectors and compliance officers, and labor relation specialists. Changes in the industrial mix are responsible for an increase in employment in that group by 11,800, or 3.9 percent (cols.3 & 4, Table 9).

On the other hand, changes in the industrial mix resulted in a sharp decline in employment of the Operators occupational group which is characterized by a relatively low level of educational attainment. Only 2.7 percent of operative

Table 10
EFFECTS OF CHANGES IN INDUSTRIAL COMPOSITION ON EDUCATIONAL ATTAINMENT
OF THE NEW JERSEY WORKFORCE (Thousand Persons)

	1973 Composit. 1983 level	1983 Composit. & Level	Difference	
			(2) - (1)	Percent
	(1)	(2)	(3)	(4)
a. 4+ Years of College	426.7	455.0	28.3	6.6
b. 1-3 Years of College	390.5	401.5	11.0	2.8
c. 4 Years of High School	985.0	973.2	-11.8	-1.2
d. Less Than 4 Years of High School	617.0	589.5	-27.5	-4.5
Total	2,419.2	2,419.2	0.0	

employees had four years of college education, and 8.5 percent had one or more years of college. This category includes operators, fabricators and such workers as machine operators, transportation and material movers, handlers, equipment cleaners, helpers and laborers. The number of employees in the operators category declined by 99,400 persons, or by 16.8 percent, as a result of changes in the industrial composition. The share of this group in total employment declined from 24.46 percent to 20.35 percent (see col. 4, Table 8).

Another occupational group that registered a decline due to changes in the industrial mix is the Craftsman category. The education level here is also relatively low. According to Census data, only 4.7 percent of employees in that category had four years of college and 13.2 percent had one to three years of college. This group includes: mechanics and repairers, carpenters, electricians, painters, precision metalworkers. The share of this group declined from 14.1 percent in 1973 to 12.4 percent in 1983, following a loss of 40,300 employees.

All remaining occupational groups show an increase of employment caused

by the shifts in the industrial mix. These other occupational groups -- Technical, Sales and Clerical -- are characterized by different levels of higher education (Table 9, column 5).

In order to obtain a complete assessment of changes in educational attainment of the N.J. workforce, we performed several additional calculations; and the results are shown in Table 10.

On the basis of Census data, the importance of individual educational categories in each professional group was determined. Data on importance of one category, namely -- four years of college -- was shown in Table 9, column 5. Other educational categories are: one to three years of college; four years of high school; less than four years of high school.

The total number of employees in an individual educational category (Table 10, col. 1) was determined by applying the respective percentages to occupational employment of the 1973 industrial composition. The numbers of employees in column 2 of Table 10 are determined in the same way, but using occupational employment at 1983 industrial composition. Since occupational employment in both

years is a function of the respective industrial compositions, the number of employees in each educational category in column (1) reflects the 1973 industrial mix, while the numbers in column (2) represent the 1983 mix. The difference, therefore, is the change in the number of employees in each educational category that resulted from the shift in the industrial composition only, i.e., assuming the same level of 1973 overall employment as in 1983. A review of Table 10 reveals that due to changes in the industrial mix, the number of employees with full college educations, or with "some college" (1-3 years), increased by over 39,000. The number of employees with education below a college education declined by about the same amount. Thus, we conclude that the shift in industrial composition that the State has experienced since 1973 -- both within the manufacturing sector and between manufacturing to services, as well as other changes -- has created a requirement for a labor force of greater educational attainment.

Summary and Conclusions

New Jersey experienced a dramatic shift in the sectoral composition of its employment during the period 1973-1983. Our analysis examines how shifts in intra-sectoral industry composition, as well as inter-sectoral shifts have affected the earnings and occupational profile of the New Jersey economy. A calculation based on standardized earnings applied to a detailed disaggregated analysis of industrial composition of over 200 industries reveals no significant effect of composition changes on average earnings. This result stems partially from the fact that within sectors the growth of low-paid industries was, in many instances, also accompanied by rapid growth in high-paid industries. The result is that average earnings have essentially been neutral with respect to structural changes. However, this

in no way removes the severe economic hardship experienced by many individuals associated with changes in the composition of New Jersey's economy over this time. The growth rates of individual industries that led to the changes in composition were, in many instances, negative, resulting in a loss of jobs for many employees.

We also analyzed the effect of the industrial changes on occupational makeup. The employment share of the professional occupation group increased from 6.99 percent in 1973 to 8.10 percent in 1983 as a result of changes in the industrial mix. Due to this change, 26,800 additional professional jobs were created. Finally, changes in the State's industrial mix resulted in an increase of 39,000 employees with a full or partial college education, and the number of employees with no college education declined by the same amount. Thus, a shift in the industrial composition has created a requirement for a labor force of greater educational attainment.

The implications of this study for State economic policy and economic development efforts can be summarized as follows: First, policy should continue to focus on retaining manufacturing jobs. A large segment of the State's workforce remains employed in the manufacturing sector. Whenever such changes are unavoidable, the State should support efforts by management and labor to mitigate the negative effects. Retraining, relocation assistance and/or reemployment of abandoned facilities should be vigorously pursued.

On the other end of the occupational ladder, the State should increase its efforts to attract the location of high-technology facilities both in the manufacturing and various services sectors since these industries have a favorable effect on

average earnings and are the most rapid-growing in terms of employment.

Finally, in order to meet the growing requirements for a labor force of greater educational attainment, continuous attention to higher

education is critical. Our results indicate that the expansion and improvement of higher education in our State remains a top priority from the self-interested perspective of future economic development and growth.

* * * * *

Appendix 1
New Jersey Industries Where Earnings Exceeded \$26,000 in 1983

Sector	Industry	Earnings 1983 (\$)	Employment (#)		Change (#)
			1973	1983	
Mfg.	Petroleum Refining (291)	36,784	3,923	4,066	143
"	Adminis. & Auxiliary	33,853	74,235	97,367	23,132
TPU	Elec. & Gas (491,2)	31,084	20,811	14,635	-6,191
Serv.	Office of Physicians (801)	31,770	15,327	26,221	10,894
TPU	Adminis. & Auxiliary	32,045	2,034	11,005	8,971
"	Telephone (481)	31,246	33,992	45,611	11,619
Mining	Mining	30,694	2,693	3,061	368
Mfg.	Organic Chemicals (286)	29,875	12,061	13,631	1,570
Serv.	Engin. & Architect (891)	28,803	13,404	22,769	9,365
FIRE	Adminis. & Auxiliary	28,630	950	4,175	3,225
Serv.	Adminis. & Auxiliary	28,160	2,521	13,734	11,213
Trade	Petrol. Wholesale (517)	27,876	5,556	5,099	-457
Mfg.	Communica. Equip. (366)	27,857	33,666	35,151	1,485
TPU	Sea Transportation (441)	27,830	922	4,279	3,357
Trade	Chemical Wholesale (516)	27,354	11,752	9,300	-2,452
"	Metal Wholesale (505)	27,029	6,767	5,991	-776
FIRE	Holding Offices (67)	26,426	2,073	4,770	2,697
Trade	Beer Wholesale (518)	26,416	4,557	4,028	-529
Mfg.	Beverages (208)	26,172	8,383	6,111	-2,272
Trade	Whl, Adminis. & Auxil.	26,052	12,739	17,113	4,374
Total Listed			270,025	352,492	82,467

Appendix 2
New Jersey Industries Where Earnings in 1983 Were Below \$12,000

Sector	Industry	Wages 1983	Employment 1973	Employment 1983	Change (000)
	Agricul. Services (07)	9,927	4,751	8,820	4,069
Mfg.	Mens Suits (231)	10,808	6,102	2,859	-3,243
"	Mens Furnishings (232)	10,756	6,522	2,719	-3,803
"	Women's Outwear (233)	9,908	28,738	21,141	-7,597
"	Women's Undergarments (234)	11,882	4,408	3,505	-903
"	Hats (235)	8,916	473	585	112
"	Children's Outerwear (236)	10,139	5,774	2,387	-3,387
"	Misc. Apparel (238)	10,044	3,924	2,502	-1,422
"	Musical Instruments (393)	11,888	293	143	-150
TPU	Taxicabs (412)	7,440	2,604	1,738	-866
"	School Buses (415)	7,375	3,777	5,838	2,061
Trade	General Merchandise (53)	7,964	84,687	57,781	-26,906
"	Food Stores (54)	10,141	68,892	86,240	17,348
"	Gasoline Ser. (554)	8,473	19,299	19,584	285
"	Apparel (56)	8,051	32,929	37,053	4,124
"	Eating & Drinking (58)	6,101	88,353	127,220	38,867
"	Misc. Retail (59)	10,027	47,426	68,994	21,568
Serv.	Personal Services (72)	8,025	30,607	33,418	2,811
"	Service to Buildings (734)	7,561	15,415	22,569	7,154
"	Detectives (7393)	9,093	7,533	15,776	8,243
"	Parking (752)	10,769	1,010	1,216	206
"	Other Automotive Services (754)	8,431	2,257	2,028	-229
"	Motion Pictures (78)	9,104	3,591	3,633	42
"	Nursing (804,5,9)	9,585	20,734	42,104	21,370
"	Elemen & Second. Schools (821)	11,099	15,272	12,857	-2,415
"	Museums (84)	8,928	274	491	217
"	Member Organiz. (86)	8,547	38,711	35,365	-3,346
"	Nonclassified	10,638	18,787	13,199	-5,558
	Total Listed		563,143	631,759	68,616

Appendix 3
Professional Specialty Occupations

Industry	Percent of Employed	Employment		Change 1973-1983
-----	-----	1973	1983	-----
(0-3 Percent)				
Textile Mills	2.3	29,386	15,117	-14,269
Apparel	1.7	68,832	47,282	-21,550
Rubber	3.0	32,406	35,527	3,121
Furniture	1.0	10,891	10,582	-309
Stone and Glass	2.9	37,057	25,876	-11,181
Trucking & Warehousing	0.3	57,275	54,264	-3,011
Wholesale Trade	2.5	171,903	227,643	55,740
General Merchandise Stores	1.4	84,687	57,781	-26,906
Food Stores	0.5	68,892	86,240	17,348
Automotive Services	2.8	49,817	49,707	-110
Eating & Drinking	0.6	88,353	127,220	38,867
Finance & Real Estate	2.0	83,877	107,151	23,274
Hotels	1.4	18,594	48,994	30,400
TOTAL		801,970	893,384	91,414
Percent Change				11.4%
(10-20 Percent)				
Printing and Publishing	12.1	40,767	52,562	11,795
Chemicals	10.8	102,546	89,295	-13,251
Electrical Machinery	11.3	96,897	79,094	-17,803
Aircraft	16.7	7,723	3,614	-4,109
Communication Services	11.3	37,865	57,024	19,159
Business Services	15.7	79,208	150,512	71,304
TOTAL		365,006	432,101	67,095
Percent Change				18.4%
(30 Percent and Over)				
Hospitals	35.9	67,490	101,638	34,148
Health Services	32.6	47,169	93,270	46,101
Educational Ser. Private	52.7	31,816	40,923	9,107
TOTAL		524,489	685,558	89,356
Percent Change				30.7%

Appendix 4 SOURCE OF DATA

Our calculations of average earnings are based on County Business Patterns Statistics which provides data on the number of employees for the week including March 12 and first quarter payroll for the same year. This information is given by sectors, and industries within each sector. Individual industries (two digit) are broken down further to three digit and most three digit industries are broken down to four digit industries. The 1973 edition includes essentially the same information. The number of employees is given here for mid-March and taxable payrolls of the Jan.-March period.

County Business Patterns data are tabulated from universal (complete) files and are not subject to sampling errors. Non-sampling errors can be attributed to such sources as: inability to obtain information about all cases in the universe, definition or classification difficulties, errors in recording and others. The 1983 County Business Patterns data are tabulated on an establishment basis. An establishment is a single physical location where business is conducted, or where services or industrial operations are performed.

Administrative offices and auxiliary establishments are not included in the detailed industry breakdown but are incorporated in figures for each sector. A central administrative office is an establishment primarily engaged in management and general administrative functions performed centrally for other establishments of the same company. An auxiliary establishment is one primarily engaged in performing supporting services for other establishments of the same company rather than for general public or other business firms.

The total first quarter 1983 payroll is the combined amount of wages paid, tips reported and other compensation including salaries, vacation allowances, bonuses, commissions, sick leave pay, and the value of payments in kind (such as free meals and lodging). All forms of compensation are included whether or not subject to income tax.

To arrive at earnings per employees, we divided the 1983 first quarter payroll by the number of employees of mid-March. To make the results more descriptive, we placed them on an annual basis (four times quarterly data). In that context, it should be noted that the results of our calculation depend on the relative not absolute level of earnings. The industry breakdown of employment and payroll is based on 1972 SIC classification codes in both 1973 and 1983 County Business Patterns. However the 1983 issue incorporates 1977 (limited) changes. Where the 1973 classification differed from that of 1983, the best effort has been made to arrive at comparable employment figures.

The manufacturing, service and wholesale sectors, that account for over 60% of total employment, were disaggregated to the three-digit level. Forestry and fisheries and mining, which account for less than one-half of one percent, were not disaggregated, and other sectors were disaggregated to the two-digit level.

Appendix 5
FORTY INDUSTRIES INCLUDED IN THE OCCUPATIONAL PROFILE ANALYSIS

Forestry, Fisheries, Agricultural Services
Mining
Construction
Food and Kindred Products
Textile Mills Products
Apparel and Other Textile
Paper and Allied Products
Printing and Publishing
Chemicals and Allied Products
Rubber and Miscellaneous Plastic
Furniture
Stone, Clay, And Glass Products
Primary Metal Industries
Fabricated Metal Industries
Machinery, Except Electrical
Electric and Electronic Equipment
Motor Vehicles and Equipment
Aircraft and Parts
Ship and Boat Building
Other Manufacturing
Trucking and Warehousing
Other Transportation
Electric, Gas, Sanitary Services
Communication
Wholesale Trade
General Merchandise Stores
Food Stores
Automotive Dealers and Service Stations
Eating and Drinking Places
Other Retail
Insurance Carriers and Agents
Finance and Real Estate
Business Services
Hotels and Other Lodging Places
Repairs
Personal Services
Amusement and Recreation Services
Hospitals
Other Health Services
Private Educational Services

III.

MANUFACTURING IN NEW JERSEY: WHAT IS DECLINING AND WHY?*

EXECUTIVE SUMMARY

Recent declines of manufacturing employment in the United States and New Jersey are cause for serious concern. This study undertaken by the Office of Economic Policy reviews in detail the performance of more than sixty New Jersey manufacturing industries in terms of labor productivity, unit labor costs, investment rates per employee or unit of output and the percentage of overseas exports in total industry shipment.

These indicators based on the latest Census of Manufactures (1982) are compared for both New Jersey and the U.S. manufacturing industries and subsequently linked with the employment change in each industry between 1982 and 1986. A further analysis examines a group of growing industries and a group that has declined. Each growing and declining industry is analyzed in terms of the eight economic performance indicators. The summary statistics for these two distinct groups of industries are presented and analyzed in this Chapter. We isolate the change in the economic indicators inherent to each industry from the effect that is due to industrial composition differences. Using employment growth in each industry during 1982-86 and the 1982 economic characteristics of these industries, we are able to detect several important causes of rapid growth or decline.

Among the major findings of this study are:

-- New Jersey manufacturing industries invested much less than the nation's manufacturing businesses in 1982. Although this finding is not new, it underscores the continuation of a trend we have now observed for a long period of time. If continued, it can only lead to further contraction of manufacturing in the future.

-- Since New Jersey was concentrating more on industries with relatively higher labor productivity, the entire manufacturing sector showed higher labor productivity in New Jersey compared with the U.S.

-- A similar situation was observed in unit labor cost. Higher intrinsic unit labor cost was accompanied by a concentration on industries with lower cost and resulted in a lower unit labor cost for N.J.'s manufacturing sector as a whole.

-- New Jersey is concentrating on less material-intensive industries and, by implication, on more skilled labor-intensive industries.

-- The dependency on exports is lower in N.J. than in the nation as a whole. This is a factor that has helped the State's economy at a time of high dollar exchange rates, but is a source of concern in the long-run.

*Prepared by Dr. Adam Broner, Office of Economic Policy with the assistance of Jonathan Waldman, graduate student of Rutgers University.

The New Jersey industries that were growing during the 1982-86 period exhibited superior economic indicators in comparison with declining industries.

-- Labor productivity was higher in growing than in declining industries.

-- Higher earnings per employee in growing industries was more than compensated by even higher labor productivity leading to lower unit labor cost (and higher profitability).

-- Investment indicators were generally higher in growing industries.

-- Material intensity and export dependence were much lower in growing industries.

-- With the exception of investments and exports, New Jersey's growing manufacturing industries had superior indicators when compared with the equivalent United States industries.

-- This was not the case when declining industries in New Jersey were compared with the identical industries in the nation. Without exception, the economic indicators for New Jersey's declining manufacturing industries were worse than for the same industries in the U.S.

-- Although the entire group of growing industries in New Jersey exhibited superior performance characteristics it was mainly the result of a different industry composition. At an identical industrial composition, New Jersey's indicators were below the nation's industries. A similar statement can be made for the declining industries with the exception of earnings and material intensity.

-- There could be more pronounced changes in the manufacturing indicators analyzed in this study between 1982 and later years. However, this cannot be ascertained yet due to lack of information. Therefore, the reader should be cautioned not to extrapolate the analysis, which is valid for 1982, into later years.

The analysis of determinants of employment growth and decline in manufacturing industries in New Jersey revealed the following:

-- Growing industries were associated with lower material intensity. This implies that the industries that were growing in the State were more labor intensive. The latter is indirectly confirmed by the positive association of employment growth with higher payroll per unit of value added (see Table 8, Equation 2A). The State's better performance in these industries seems economically difficult to explain. It suggests that supply factors (especially unit labor cost) played a lesser role in the growth of these industries.

-- Growing industries were negatively associated with low export dependent industries. This phenomenon can be explained by the reduced export of U.S. manufacturers in the last several years. Accordingly, a lower export dependency was less of a factor in impeding growth of these industries.

-- For the declining industries, the most significant factors were associated with labor cost. The higher the earnings, and the higher unit labor cost, the more those industries declined in employment.

-- In comparison with the U.S., the growing industries had a positive association with labor productivity. A similar positive relationship exists

ted between the N.J./U.S. employment change and the productivity ratio in the declining industries. In both cases it signifies that higher growth is accompanied by higher productivity ratios, or faster employment decline with lower productivity ratios. In the growing industries, labor productivity was New Jersey's comparative advantage; in the declining industries -- a comparative disadvantage.

-- The other variable that showed a statistically significant coefficient was the NJ-U.S. export dependency ratio in the declining industries.*

The most important policy implications following from this study are measures necessary to reverse the trend of insufficient new investment in New Jersey manufacturing industries. State and local governments have a role to play in assisting small and medium-size companies in meeting their needs for expansion and in modernizing their facilities. A stronger business retention program should be adopted which will include assistance in solving operating difficulties whether generated by lack of sufficient capital, organization and management problems, or indifference by local government to the needs of manufacturing companies. The State should be doubly attentive

to the declining trend of manufacturing industries by avoiding new tax levies or by creating comparatively more hospitable conditions for operating or locating in New Jersey.

Introduction

The difficulties experienced recently in many manufacturing industries in the United States and in New Jersey are of major concern to labor, management and state and national governments.

In New Jersey a resolution by Assemblyman Robert Franks has been introduced to establish a commission to study the decline of the manufacturing sector and recommend public policies to retain manufacturing employment in the State. The analysis of this Chapter is motivated by the same concern and represents a continuation of our past studies on the manufacturing sector.** In this Chapter we attempt to explain the meaning of a declining manufacturing sector, analyze where that decline took place, and examine the complex characteristics of both growing and declining industries within the manufacturing sector.

It is important to distinguish between declining employment in manufacturing industries and declining

*Higher growth was associated with lower export ratios in the growing industries -- meaning lower export dependency was a positive factor for employment growth in the 1982-86 period. In the declining industries, the relationship between employment and export ratio was positive. It means that faster employment declines were associated with lower export dependencies in New Jersey than in the United States. In this case, higher export dependency was a positive factor, contrary to the result obtained for the growing industries.

**See Adam Broner, "New Jersey's Manufacturing Industries: A Long-Run Overview," 8th Annual Report, Economic Policy Council and Office of Economic Policy, 1975; Adam Broner, "Labor Productivity in New Jersey Manufacturing", 13th Annual Report, Economic Policy Council and Office of Economic Policy, 1980; Jerzy Zachariasz, "The Performance of the New Jersey Manufacturing Sector," 17th Annual Report, Economic Policy Council and Office of Economic Policy, 1985.

output. The two do not necessarily accompany one another. The intervening factor of labor productivity may allow a decline in employment to be simultaneously accompanied by an increase in output.

During the last three years (1982-1985) U.S. manufacturing output increased by 19 percent while employment rose only 2.88 percent. Moreover, between the third quarter of 1984 and the fourth quarter of 1985, output expanded at a 1.5 percent annual rate while employment declined by 0.5 percent annually. During that same period, employment in New Jersey manufacturing also slowed (from 726.8 thousand to 721.0) after a short period of cyclical recovery in the aftermath of the 1980-1982 recessions.

A frequently cited measure of employment decline in manufacturing is the decline of relative share of manufacturing in total nonagricultural employment. The phenomenon of a declining manufacturing share in New Jersey (and nationally as well) is not new and, by itself, does not indicate a weak economic performance. For the last several decades in the U.S. and many other industrialized nations, employment in service industries has grown much faster than manufacturing employment. New Jersey has historically had a large share of manufacturing employment and a relatively less-developed service sector. This relative imbalance has been significantly reduced, and by 1985 the share of manufacturing and ser-

vice employment in New Jersey was approximately equal to what it was nationally.

The real concern is not caused by the relative decline but by the absolute decline in manufacturing employment which has been observed in New Jersey since 1969 with several interruptions at times of cyclical rebounds. This Chapter concentrates on the recent absolute employment decline experienced in New Jersey. Its aim is to determine in what industries the changes in employment took place and whether these changes are unique or different in New Jersey compared to the nation.

Section I characterizes the New Jersey manufacturing sector in terms of a number of measures such as labor productivity, export rates, earnings per employee, investment intensity and raw material input per unit of output. These indicators are calculated for 1982 -- the year of the last Census of Manufactures.* The characteristics for manufacturing industries in New Jersey are compared with the identical indicators at the national level in order to determine the relative position of New Jersey industries vis-à-vis their national counterparts.

By comparing those indicators for identical industries and composition in New Jersey and the U.S., we attempt to reveal the "intrinsic" strengths or weaknesses of the State's manufacturing industries.** On the other hand, a comparison of

*Only the Census of Manufactures, which is conducted at five-year intervals, or the Annual Survey of Manufactures, contain the information needed to calculate these indicators. The Census data, however, are more reliable. The latest Annual Survey of Manufactures (1983) had not yet been published when this study was undertaken.

**The term intrinsic, whose general meaning is 'belonging to the essential nature or constitution of a thing' is used here to focus on the true value of the indicator as it appears within each industry without being influenced by aggregation and, therefore, by varying composition of the aggregate in New Jersey compared to the U.S.

the entire manufacturing sector without regard to industry composition sheds additional light on structural differences and their effect on the above-mentioned characteristics for the entire manufacturing sector.

Section II analyzes employment changes between 1982 and the first half of 1986. The analysis is on the three-digit level of the Standard Industrial Classification of manufacturing industries (SIC codes) and compares industries which experienced employment growth or decline in New Jersey and in the U.S. The growing and declining industries are characterized in terms of the economic performance indicators of Section I. It illuminates, for example, the levels of labor productivity of the growing and declining industries in New Jersey and the U.S.

Section III combines the analysis of the intrinsic and composition components with the growing and declining industries (on a detailed three-digit SIC code level). It also investigates the influence of composition changes between 1982 and 1986 on the various economic characteristics examined in Section I. One major question addressed is, what is the effect of changes in employment composition on the level of productivity in the entire sector?

We also ascertain the effect of composition changes on other economic indicators. A comparison of New Jersey and United States composition effects allow us to infer whether the direction and magnitude of manufacturing changes observed in the State are unique or are simply following national developments.*

Section IV attempts to determine the causes of employment changes and evaluates the relationships between employment changes and the various economic indicators applied throughout this study. It also tries to ascertain whether the relationships observed for New Jersey industries are similar to those in the U.S.

Section I: General Characteristics of New Jersey Manufacturing

Over the last two decades the structure of New Jersey's manufacturing sector has changed considerably. Compared with previous decades, an increasing degree of concentration in a limited number of industries has occurred. These structural changes have been reported previously.**

This section concentrates on describing the manufacturing sector in terms of several indicators characterizing the relative performance of New Jersey industries vis-à-vis their national counterparts. These comparisons are made for individual industries, mostly on the three-digit level of the Standard Industrial Classification and aggregated for the entire sector. The aggregation is done by applying the diverse industrial compositions in New Jersey and in the United States as well as a unified (standardized) composition.

Table 1 provides information about the structure of the New Jersey and United States manufacturing sector by the twenty (two-digit) industries that comprise the manufacturing sector. The aim of this Table is to portray the differences in the indus-

*See footnote on page 75.

**See citations in footnote on page 61. Generally, these studies were based on information published in Censuses of Manufactures. The Census of 1982 is utilized in the current Report. In a later section of this Chapter, the Census information is updated by employment data pertaining to the 1982-1986 period.

Table 1
COMPOSITION OF NEW JERSEY AND UNITED STATES MANUFACTURING INDUSTRIES,* 1982
(Percent of Total)

Industry	Employment		Value Added		Total Shipment		Investment		Average of All Four Indicators	
	N.J.	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.	U.S.
20 Food & Kindred Products	6.00	8.35	10.32	10.73	11.42	14.31	7.67	9.02	8.85	10.60
22 Textile Mill Products	2.61	4.03	1.46	2.25	1.50	2.42	1.11	2.12	1.67	2.71
23 Apparel & Other Products	7.79	6.67	3.77	3.16	3.59	2.72	2.67	0.88	3.66	3.36
24 Lumber & Wood Products	0.86	3.23	0.52	1.87	0.43	0.57	1.67	1.80	0.87	1.87
25 Furniture & Fixtures	1.50	2.45	0.95	1.56	0.79	1.23	0.48	0.76	0.93	1.50
26 Paper & Allied Products	4.12	3.40	3.84	4.05	3.87	4.08	4.73	6.84	4.14	4.59
27 Printing & Publishing	8.25	7.25	6.73	6.60	4.67	4.38	7.94	4.31	6.90	5.64
28 Chemicals & Allied Prod.	14.13	4.90	24.51	9.38	20.95	8.71	27.99	12.19	21.90	8.80
29 Petroleum Refining	1.12	0.85	1.86	2.68	10.92	10.66	3.88	8.82	4.44	8.86
30 Rubber & Misc. Plastic Prod.	5.35	3.83	3.91	3.30	3.69	2.83	4.06	2.95	4.25	3.23
32 Stone, Clay, Glass & Concrete	4.07	2.98	3.41	2.79	2.92	2.30	4.83	3.10	3.81	2.79
33 Primary Metal Industries	3.21	4.79	2.67	4.04	3.50	5.34	3.76	6.26	3.29	5.11
34 Fabricated Metal Products	8.12	8.19	6.69	7.15	6.10	6.09	5.28	4.94	6.55	6.59
35 Machinery, Except Electrical	9.08	12.28	7.71	12.41	6.36	9.59	6.76	11.45	7.48	11.43
36 Electrical & Electronic Mach.	12.42	10.74	10.30	10.27	7.69	7.55	8.57	10.12	9.75	9.67
37 Transportation Equipment	2.72	8.96	4.03	10.31	5.44	10.27	2.33	9.68	3.63	9.81
38 Measuring Instruments	4.44	3.50	4.05	4.09	3.22	2.64	3.35	2.82	3.77	3.26
39 Misc. Manufacturing Indus.	3.67	2.15	2.94	1.71	2.62	1.37	1.94	0.85	2.79	1.52
Others	0.69	1.45	0.32	1.67	0.34	2.94	0.96	1.11	0.58	1.79

*Industry 21 (Tobacco Products) and 31 (Leather & Leather Products) are not shown explicitly for technical reasons -- they are very small in New Jersey and were added together in the last row under the name 'others.'

trial compositions between the State and the U.S. manufacturing sectors. Industrial composition is presented in terms of several measures: employment, output (value added and total shipment), and capital expenditures, all in 1982.

The data in Table 1 show that the following industries have generally higher shares in New Jersey than in the United States: chemicals, electrical and electronic equipment, printing and publishing, apparel, rubber and plastics, stone, clay and glass, instruments, and miscellaneous. The industries which have relatively lower shares in New Jersey are: transportation equipment, machinery except electrical, primary metals, furniture, lumber, textiles and food. The shares of the

remaining industries are close to the national levels.

Simplifying this complex picture, one can say that in comparison with the U.S., New Jersey specializes in chemicals, and has less representation in the metals industry (primary metals, general machinery and transportation equipment). Our preliminary conclusion is that there are significant structural differences between the state and national manufacturing sectors and these must be accounted for in any subsequent analysis.

Table 2 provides the results of an analysis of industries for which three-digit SIC data are available. It selects eight measures which characterize various aspects of industry performance:

Measure		Performance Characteristic
1. Value Added per Employee	--	labor productivity
2. Payroll per Employee	--	labor earnings
3. Payroll per Value Added	--	unit labor cost (and indirectly, profitability)
4. Investment per Employee	--	proxy for capital modernization
5. Investment per Value Added	--	new investment per unit of output
6. Investment per Value of Shipment	--	new investment per unit of output
7. Value of Material Input per Shipment	--	material intensity of output
8. Exports per Shipment	--	exportability of output

Table 2
INDUSTRY PERFORMANCE CHARACTERISTICS, NEW JERSEY AND UNITED STATES, 1982

Indicator	Value in 1982 at:			Differences due to:		Total Difference (Col.1 - Col.2)	Percent of Difference In Intrinsic Rate (Col.4/Col.1)
	N.J. Rates and Composition	U.S. Rates and Composition	U.S.Rates and N.J. Composition	Intrinsic Rates (Col.1 - Col.3)	Composition (Col.6 - Col.4)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Labor Productivity (\$/employee)	48,610	46,252	51,419	-2.809	5,167	2,358	-5.78%
2. Labor Earnings (\$/employee)	19,385	19,161	19,130	255	-31	224	1.32%
3. Unit Labor Costs (cents per dollars of V.A.)	39.88	41.43	37.97	1.91	-3.46	-1.55	4.79%
4. Capital Modernization (dollars per employee)	3,170	4,185	4,536	-1.366	351	-1,015	-43.09%
5. Investment per Value Added (cents per dollar of V.A.)	6.52	9.05	8.42	-1.90	-0.63	-2.53	-29.14%
6. Investment per Shipment (cents per dollar of shipment)	2.93	3.80	3.84	-0.91	0.04	-.87	-31.06%
7. Material Intensity (cents per dollar of shipment)	55.05	57.96	55.51	-0.46	-2.45	-2.91	-0.84%
8. Exportability (percent of shipment)	6.30	8.38	7.56	-1.26	-0.82	-2.08	-20.00%

Columns (1) and (2) in Table 2 show the indicators for the entire manufacturing sector in N.J. (col. 1) and in the U.S. (col. 2). They are the sum of products of each three-digit industry's individual rate multiplied by its share in the total. Thus, for example, New Jersey's labor productivity (output per employee) for the entire manufacturing sector, which amounts to \$48,610 is the sum of the products of individual labor productivity values in each three-digit industry multiplied by the share of the individual industry's employment in total manufacturing employment.*

The same method is applied in the calculations for U.S. labor productivity of \$46,250 where U.S. individual rates and shares are utilized. A comparison between New Jersey (col. 1) and U.S. indicators (col. 2) shows that overall labor productivity for the entire sector is higher in New Jersey. Higher labor productivity is accompanied by higher earnings, but the resultant unit labor costs (row 3) are still lower in New Jersey. New capital investment measures were significantly lower in New Jersey than in the U.S. Material input per unit of output and exportability were also lower in New Jersey. All these comparisons are made for the entire manufacturing sector and reflect not only different performance results for individual industries within the sector (what we call intrinsic rates), but also different structural composition between the State and the U.S.

The total difference between New Jersey and U.S. performance characteristics appears in column 6. However, this total difference is the result of two factors; one represents

the difference of those indicators without the influence of varying industry composition in N.J. vs. the U.S., and the other, the effect of composition differences. We estimated each of these components by recalculating the U.S. individual indicators at the New Jersey industry composition and summing those products for the entire sector. The results of this calculation are shown in column (3). This column shows the average level of the U.S. indicators after eliminating the industrial composition differences between the U.S. and N.J. Therefore, since column (1) and column (3) are calculated for the same industry composition, they indicate the "intrinsic" levels of the indicators, after holding industrial composition constant. Consequently, the difference between columns (1) and (3) is due only to differences in this intrinsic performance of the manufacturing sector and is shown in column (4). Again, it is most important to understand that our measure of the "intrinsic" represents the difference in each indicator of manufacturing performance in N.J. vs. the U.S., holding industrial composition constant.

By subtracting the intrinsic rate differences from the total difference (column 6 minus column 4), the influence of the industrial composition is determined (column 5). The calculations in columns (1) to (6) are in terms of the measurement units of each indicator. These absolute measures and their differences are easy to compare for a given indicator. We thought it useful to add column (7) at the end of Table 2 which shows the intrinsic difference in percentages and allows us to compare performance across the different indicators. This is done by expres-

 *The following weights were applied: for productivity, earnings and capital modernization -- employment; for unit labor cost and investment per value added -- value added; for investment per shipment, material intensity and exportability -- total value of shipment.

sing the difference in intrinsic rates from column (4) in terms of a percent of column (1), i.e., the New Jersey indicator level. Thus, we can say that the intrinsic average rate of labor productivity in the New Jersey manufacturing sector was 5.78 percent lower than in the U.S. Similarly, on the average, the State's unit labor cost was 4.79 percent higher than in the nation's manufacturing industries, and so on. Naturally, one has to determine whether a plus or minus sign for any given indicator means an advantage or disadvantage to the State.

The interpretation of these results is now straightforward. Column (4) shows the difference between the N.J. and U.S. performance characteristics without the influence of divergent industry compositions. Thus, one has to determine only whether there is a higher or lower value in New Jersey than in the U.S. (i.e., + or - sign in column 4). If a positive sign means an advantage, we can easily interpret results in column (4) and, by extension, also in column (5).

Following this method, one can infer that New Jersey's labor productivity was in 1982, on the average, lower than in the United States by \$2.809 per employee. However, the industry composition difference between the State and the U.S. added \$5.167 to the overall productivity level in 1982 and, therefore, the final difference in labor productivity was in the State's favor.

The average labor earnings, however, cannot be unequivocally interpreted. If higher average earnings are accompanied by even larger labor productivity advantages, then higher earnings should not be considered a disadvantage since the industry would still have lower unit labor costs. Without relatively higher labor productivity, however, higher labor earnings will translate into higher

unit labor cost -- a clear competitive disadvantage.

After adjusting for industrial composition differences, New Jersey's average earnings per employee was slightly higher (1.32%) than in the U.S. (see column 7).

Unit labor cost was nearly five percent higher in New Jersey than in the U.S. (4.79% in column 7).

Capital investments per employee, or per unit of output, are significantly lower in N.J. than in the U.S. (by 30-40%, see column 7). While adjustment for industry composition differences improves the comparison for investment per employee (+351 in column 5), it does not indicate a similar improvement of the investment per value added (-.63 in column 5).

The amount of material input (raw materials and intermediate inputs) per dollar of the value of shipment does not deviate much when identical industry compositions are compared (-.84% in column 7). This suggests that the technological requirement of identical industries do not leave much leeway for changing the amount of raw material or of intermediate inputs per unit of output in N.J. vs. the nation. In general, however, New Jersey's unit material input seems to be slightly lower which, probably, reflects the tendency to economize due to the fact that the State is not well-endowed in raw materials. Also helpful in this regard is the industry composition, indicating N.J.'s specialization in less material-intensive industries (-2.45 in column 5). The low representation in the metals industries in New Jersey is reflected in this indicator.

Finally, the exportability characteristic of the State's manufacturing industries is also lower than in the U.S. This is due more to the intrinsic rate differentials (-1.26% of total shipment in column 4) than

to the fact that the State is less involved in industries that have higher national export rates.

Let us now summarize the situation in the manufacturing sector as it existed in 1982:

Clearly, the most troublesome condition was the situation in capital expenditures. Given the same industry mix, the State's manufacturers invested at a rate more than forty percent lower per employee than their national counterparts; over 29 percent lower when investment is measured per unit of value added, and 31 percent lower per unit of shipment. If we recognize that the lower the ratio of total payroll over value added (row 3 of Table 2), the higher is gross profitability; it would follow that lower profitability may cause industries not to invest sufficiently in New Jersey.* In addition, there might have been many other reasons for the very low investment ratios in New Jersey.

Lower investment ratios have been observed in New Jersey for some time. The difference between this new observation and our previous ones is that in our earlier study,** we had some evidence that New Jersey maintained its competitive edge in labor productivity due to the scrapping of obsolete plants or equipment without sufficient replacement with more modern units. Although this allowed the average level of labor productivity to rise in many industries, it did not bode well for the future. Since the present study

establishes that the productivity levels in individual industries were in 1982 relatively lower in N.J. than in the U.S., further closing of obsolete plants is insufficient to maintain, let alone to raise, relative productivity levels in the State. We believe that the lower levels of investment observed over an extended period of time are now exerting their serious negative influence on New Jersey's manufacturing sector.

Section II

This section combines the 1982 characteristics of individual manufacturing industries established in the preceding section with employment changes between 1982 and the first half of 1986. However, before we proceed to analyze those results, Table 3 presents a list of industries ranked according to absolute changes in employment between 1982 and the first half of 1986. Column 2 of Table 3 shows the percentage change in New Jersey employment during that period and column (3) does the same for the U.S. industries. It is important to realize that we classified as growing or declining only the New Jersey industries, while we show the N.J. and U.S. industries side by side irrespective of whether they were growing or declining in the U.S. as well. There were 25 growing and 36 declining industries in New Jersey. The growing industries increased their employment in N.J. by 9.27 percent, while the same U.S. industries increased their employment by 6.86 percent. The declining indus-

*To put it differently, the higher the labor cost per unit of value added, the lower the profitability since the price of output is generally determined in the national or even international market.

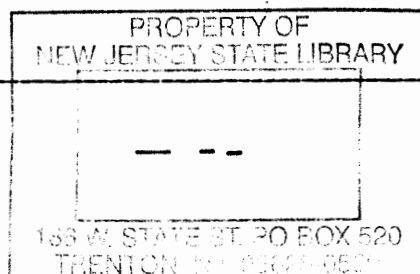
**See Adam Broner, op. cit., 8th Annual Report; op. cit., 13th Annual Report; Jong Keun You, "Capital Formation and Business Taxes," 14th Annual Report, Economic Policy Council and Office of Economic Policy, Trenton, 1981; Jerzy Zachariasz, op. cit., 17th Annual Report.

Table 3
EMPLOYMENT IN MANUFACTURING INDUSTRIES OF NEW JERSEY AND THE UNITED STATES
1982-1986

SIC Code	Growing Industries	New Jersey Employment 1982 (000's)	1982-1986 Employment Change New Jersey (Percent)	1982-1986 Employment Change United States (Percent)
		(1)	(2)	(3)
366	Communication Equipment	39.7	17.1	19.4
25	Furniture and Fixtures	9.9	36.8	12.0
27R	Other in Printing, Publishing & Allied Industries	25.4	13.3	16.5
275	Commercial Printing	16.6	19.3	22.3
271	Newspaper: Publishing and Printing	15.7	15.9	8.0
32R	Other in Stone, Clay, Glass & Concrete Products	12.6	15.5	7.2
24	Lumber & Wood Products, Except Furniture	5.5	25.8	14.0
284	Soap, Detergents and Cleaning Preparations	24.4	4.1	-4
283	Drugs	43.1	2.1	2.3
381	Engineering, Lab, Scientific & Research Instru.	5.7	15.1	10.7
26R	Other in Paper and Allied Products	16.1	5.2	2.6
332	Iron and Steel Foundries	2.7	28.1	-13.0
361	Electric Transmission & Distribution Equipment	4.0	17.0	5.2
221	Broad Woven Fabric Mills, Cotton	0.5	132.0	-19.1
20R	Other in Food and Kindred Products	18.5	3.5	-1.0
367	Electronic Components and Accessories	19.6	3.0	14.2
30	Rubber & Miscellaneous Plastics Products	36.1	1.5	14.5
203	Canned and Preserved Fruits and Vegetables	10.0	4.6	-9.1
262	Paper Mills, Except Building Paper Mills	2.1	19.0	6.6
33R	Other in Primary Metal Industries	4.2	5.5	3.6
365	Radio & Television Equipment, Except Comm. Types	3.6	5.6	-16.3
342	Cutlery, Hand Tools and General Hardware	5.9	3.1	3.6
234	Women's, Misses', Children's & Infants Undergarments	4.1	2.4	-10.8
36R	Other in Electrical & Electronic, Machinery & Supplies	6.7	1.2	-2.7
344	Fabricated Structural Metal Products	12.4	0	-4.8
	Total Growing	345.090	+9.27	+6.86

Table 3 (continued)

SIC Code	Declining Industries	New Jersey Employment 1982 (000's)	1982-1986 Employment Change New Jersey (Percent)	1982-1986 Employment Change United States (Percent)
		(1)	(2)	(3)
299	Miscellaneous Products of Petroleum and Coal	2.2	-9	-25.9
326	Pottery and Related Products	3.6	-2.2	-9.3
208	Beverages	5.7	-2.5	-8.3
364	Electric Lighting and Wiring Equipment	11.5	-1.4	4.7
204	Grain Mill Products	13.0	-1.2	-10.4
23R	Other in Apparel & Other Finished Products	14.7	-1.9	1.4
232	Men's, Youths' and Boys' Furnishings & Garments	3.6	-7.8	-2.4
335	Rolling, Drawing & Extruding of Nonferrous Metals	8.3	-3.9	1.3
28R	Other in Chemicals and Allied Products	10.5	-3.0	-3.8
	Other	5.3	-12.5	-24.0
331	Blast Furnaces, Steel Works & Rolling & Finish. Mills	4.0	-10.5	-24.4
231	Men's, Youths' and Boys' Suits, Coats & Overcoats	2.7	-20.0	-17.5
285	Paints, Varnishes, Lacquers, Enamels & Allied Products	4.8	-12.5	6.0
282	Plastics Materials & Synthetic Resins, Synthetic Rubber, & Other Man-Made Fibers	7.3	-9.6	-8.3
333	Primary Smelting & Refining of Nonferrous Metals	2.6	-35.4	-28.8
382	Measuring and Controlling Instruments	8.5	-12.0	3.2
354	Metalworking Machinery and Equipment	8.7	-12.2	-3.8
226	Dyeing and Finishing Textiles, Except Wool and Knit Goods	4.7	-22.6	-12.0
355	Special Industry Machinery, Except Metalworking	8.7	-13.6	-8.8
35R	Other in Machinery, Except Electrical	29.3	-4.3	-1.8
265	Paperboard Containers and Boxes	12.4	-10.7	3.3
346	Metal Forgings and Stampings	7.2	-20.0	7.2
356	General Industrial Machinery and Equipment	14.9	-10.3	-6.5
353	Construction, Mining and Materials Handling Machines	4.9	-31.8	-29.7
341	Metal Cans and Shipping Containers	5.4	-29.3	-12.8
22R	Other in Textile Mill Products	11.4	-16.3	-2.7
37	Transportation Equipment	14.7	-12.9	15.3
39	Miscellaneous Manufacturing Industries	23.6	-8.5	-2.7
38R	Other in Measuring, Analyzing & Controlling Instruments	21.5	-10.0	.3
322	Glass and Glassware, Pressed or Blown	10.9	-22.4	-18.1
291	Petroleum Refining	9.0	-27.8	-18.7
281	Industrial Inorganic Chemicals	10.9	-23.4	-9.6
286	Industrial Organic Chemicals	23.5	-11.7	-10.4
34R	Other in Fabricated Metal Products, Except Machinery and Transportation Equipment	23.4	-12.0	2.0
233	Women's, Misses' and Juniors' Outerwear	23.3	-11.4	-3.4
362	Electrical Industrial Apparatus	5.8	-51.7	-6.8
	Total Declining	384.510	-11.82	-2.54
	All Industries	729.600	-1.84	+1.60



tries reduced their employment in New Jersey by 11.82 percent, while in the U.S., the same industries lost only 2.54 percent of their employment. Overall, the entire manufacturing sector in New Jersey lost 1.84 percent of its employment, while the United States gained 1.60 percent over the 1982-1986 period.

In Table 4 we show the average economic indicators in 1982 for the two subgroups: growing and declining industries. The classification of industries into these groups is based on their employment change during the 1982-86 period. The average indicators are not standardized in this section. Therefore, they reflect both the intrinsic and composition differences between New Jersey and the United States.

The analysis of Table 4 is revealing. In general, the comparison of the indicators of the two groups of industries in New Jersey shows that the growing industries have had much better qualitative characteristics than the declining industries. Moreover, those superior characteristics prevailed in comparisons between New Jersey and the U.S.

Labor Productivity as measured by value added per employee was 18 percent higher in the growing industries (\$52,880/44,351), meaning that industries with higher levels of productivity were growing faster in terms of employment during the 1982-86 period.

Unit Labor Costs were 13 percent lower in the growing industries, in-

Table 4
CHARACTERISTICS OF GROWING AND DECLINING INDUSTRIES

	New Jersey			United States		
	Growing	Declining	Total	Growing	Declining	Total
1. Labor Productivity (dollars/employee)	52,880	44,351	48,610	44,798	47,406	46,252
2. Labor Earnings (dollars/employee)	19,734	19,036	19,385	18,058	20,036	19,161
3. Unit Labor Costs (cents per dollar of V.A.)	37.32	42.92	39.88	40.31	42.27	41.43
4. Capital Modernization (dollars per employee)	3,233	3,108	3,170	3,636	4,620	4,185
5. Investment per Value Added (cents per dollar of V.A.)	6.11	7.01	6.52	8.12	9.75	9.05
6. Investment per Ship- ment (cents per dollar of shipment)	3.34	2.60	2.93	3.75	3.84	3.80
7. Material Intensity (cents per dollar of shipment)	45.38	62.86	55.05	53.76	60.64	57.96
8. Exportability (percent of shipment)	4.84	7.49	6.30	5.40	10.28	8.38

dicating that more profitable (the difference between value added and payroll) industries grew faster than the less profitable industries.

Capital Expenditures per employee were higher (\$3,233 vs. \$3,108, or +4%) in the growing industries. This is even more pronounced by the difference in the ratios of investments to shipment (3.34 vs. 2.60, or +28.5%). The lower ratios of investment to value added can easily be explained by the relatively high volume of value added per employee for growing industries which raises the denominator of this characteristic.

Material Intensity of the growing industries was much lower (45.38 vs. 62.86, or -28%) showing a shift toward low material-intensive industries in New Jersey.

Finally, the Export Ratios were much lower in the growing industries, which indicates that the difficult export situation of U.S. manufacturers during the 1982-86 period was less of a factor in the growth of these industries than it would have been were their export dependencies much higher.

Even more interesting are the comparisons between New Jersey and the U.S. for those diverse groups of industries. New Jersey's labor productivity advantage was much higher for the growing industries (\$52,880 vs. \$44,798) than for the entire manufacturing sector (+18% vs. +5%). Unit labor cost (row 3) differentials were -7.5 percent in favor of New Jersey's growing industries $(37.32/40.31 - 1.00) \times 100$ vs. less than -4 percent for the entire sector $(39.88/41.43 - 1.00) \times 100$.

New Jersey's disadvantage in capital expenditures per employee was less pronounced for the growing industries (-11% vs. -24%). Similar favorable results for growing indus-

tries for N.J. vs. the U.S. were found for the other two investment indicators (rows 5 and 6) (-25% vs. -28% and -11% vs. -23%).

Material intensity of the New Jersey growing industries was lower than in the U.S. for the same group of industries (45.38 vs. 53.76). It suggests that economies in materials costs or concentration on less material-intensive industries may be a contributing factor to industrial growth in the State. Our export measure is the only exception to this more favorable picture for the growing industries. The latter were less dependent on exports, but this condition at a time of high dollar exchange rates and low economic growth in the world economy may have turned out to be a blessing, at least during this period.

Section III

In Section I we analyzed various economic indicators which characterize the entire manufacturing sector. Differences in these indicators between the State and the U.S. were subsequently subdivided into components measuring what we call the intrinsic difference and the composition difference. Section II introduced the distinction between manufacturing industries where employment increased or declined during the 1982-1986 period. In Section II characteristics of growing and declining industries were not decomposed to indicate the intrinsic rates and the industry mix components. This is the subject of analysis in Section III.

Table 5 provides this analysis. We concentrate on the decomposition of economic characteristics of various economic indicators for the growing and declining industries. Here we use the same technique that was applied and explained in Section I (Table 2) to single-out the differences due to the intrinsic rates

Table 5
COMPONENTS OF ECONOMIC CHARACTERISTICS OF GROWING AND DECLINING MANUFACTURING INDUSTRIES IN NEW JERSEY

	New Jersey Rates and Composition	U.S. Rates and Composition	U.S. Rates and N.J. Composition	Intrinsic Rates	Composition	Total Difference	Percent of Difference in Intrinsic Rate Col.(4)/Col.(1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Labor Productivity-Total	48,610	46,252	51,419	-2,809	5,167	2,358	-5.78%
Growing	52,880	44,798	55,196	-2,316	10,398	8,082	-4.38
Declining	44,351	47,406	47,652	-3,301	246	-3,055	-7.44
Labor Earnings-Total	19,385	19,161	19,130	255	-31	224	1.32
Growing	19,734	18,058	19,065	669	-1,007	1,676	3.39
Declining	19,036	20,036	19,191	-159	-841	-1,000	-0.84
Unit Labor Costs-Total	39.88	41.43	37.97	1.91	-3.46	-1.55	4.79
Growing	37.32	40.31	35.20	2.12	-5.11	-2.99	5.68
Declining	42.92	42.27	41.27	1.65	-1.00	0.65	3.84
Capital Modernization-Total	3,170	4,185	4,536	-1,366	351	-1,015	-43.09
Growing	3,233	3,636	4,067	-834	431	-403	-25.80
Declining	3,108	3,620	5,003	-1,895	383	-1,512	-60.97
Inv. per Value Added-Total	6.52	9.05	8.42	-1.90	-0.63	-2.53	-29.14
Growing	6.11	8.12	7.38	-1.27	-0.74	-2.01	-20.79
Declining	7.00	9.75	9.65	-2.65	-0.10	-2.75	-37.86
Inv. per Shipment-Total	2.93	3.80	3.84	-0.91	0.04	-0.87	-31.06
Growing	3.34	3.75	3.81	-0.47	0.06	-0.41	-14.07
Declining	2.60	3.84	3.97	-1.27	0.00	-1.27	-48.85
Material Intensity-Total	55.05	57.96	55.51	-0.46	-2.45	-2.91	-0.84
Growing	45.38	53.76	48.65	-3.27	-5.11	-8.38	-7.21
Declining	62.86	60.64	61.05	1.81	0.41	2.22	2.88
Exportability-Total	6.30	8.38	7.56	-1.26	-0.82	-2.08	-20.00
Growing	4.84	5.40	5.58	-0.74	0.18	-0.56	-15.29
Declining	7.49	10.28	9.15	-1.66	-1.13	-2.79	-22.16

(col. 4) and to the composition (col. 5). The level of the indicator for the entire manufacturing sector shown in Table 5 is the same as in Table 2. In addition to this total, Table 5 subdivides this into the average characteristic for the group of growing and declining industries. The most informative observations can be drawn from the analysis of column (4). When the growing and declining industries in New Jersey are compared in column (4), we observe essentially the superior performance of growing industries in comparison with the declining industries. The exceptions, however, are the measures of labor and unit labor costs. The differentials in these two latter indicators are minimal.

However, the result of comparing the indicators for growing industries in New Jersey with the same group of industries in the U.S. is surprising. As it turns out, our major advantage is due to composition differences. When composition differences are eliminated as they are in column (4), even the growing industries do not have superior indicators in comparison with the United States. Thus, we conclude that it is the industry composition which leads to better overall economic characteristics, where they exist, of the State's manufacturing sector and especially of the growing industries.*

Section IV

So far, we have established that growing industries in New Jersey have superior economic performance indicators compared with the New Jersey declining industries and in some, but not all, instances also in comparison

with the U.S. We have also noticed that without the influence of the industrial composition factor, N.J.'s indicators (e.g., productivity) are not superior to their national counterparts. We have seen that the low levels of investment in New Jersey are often associated with higher unit labor costs. But all these results are based on average relationships, i.e., all manufacturing industries. This summarizes but can also obscure the changes occurring in individual industries.

It is, therefore, necessary to apply an analytical method that accounts for the association among the economic indicators in individual industries. The multiple regression technique applied in this section will assist us in identifying the causes of manufacturing employment changes between 1982 and 1986 in N.J.

It will be useful to report first on the correlations among the eight economic indicators used in this study. The unit of observation is now the individual three-digit SIC industry; both growing and declining industries are included, and the sample size is 60. The correlation matrix is presented in Appendix 1.

Labor productivity is negatively correlated with unit labor cost (-.661) and positively correlated with earnings per employee (+.526) and investment per employee (+.507). Earnings per employee is positively correlated with investment per employee (+.658). The three investment variables are obviously correlated with each other. Also, investment per employee is positively correlated with material intensity (+.517).

*We also investigated whether there were significant structural changes within the manufacturing sector of New Jersey and the United States during the 1982-86 period and whether they had significantly influenced the overall indicators analyzed in this Chapter. We found no such changes. The interested reader may obtain further detailed information on this subject from the Office of Economic Policy.

The first regression equation tests the hypothesis that the 1982 economic indicators of industry performance can explain the changes in New Jersey manufacturing employment between 1982 and 1986. Notice that we are implicitly assuming that the level of those characteristics in 1982 exert effects on the employment change over the 1982-1986 period.

The higher labor productivity in the industry, the larger we expect the employment change to be because the State has a comparative advantage in higher labor productivity industries. The relationship between earnings per employee and employment growth in various industries should follow the productivity relationship, meaning that both these indicators reflect different quantities of skilled labor applied in various industries. Therefore, higher-paid workers are also more productive and, hence, the regression coefficient should be positive.

Unit labor costs, which also reflects the industry's gross profitability in New Jersey, should be negatively associated with employment growth. Lower labor cost per unit of output should lead to the expansion of New Jersey's share in the national market of that industry's output. Hence, low-cost industries should exhibit more rapid growth, assuming all other things equal. The amount of capital investment per employee, in particular industries, is first of all determined by the industry's technology. For example, the apparel industry requires much less investment per employee than the automobile industry or oil refineries. To some extent these differences should also be reflected in the payroll/value added variable (unit labor cost) since the difference between value added and payroll contains cap-

ital amortization in addition to net income. Therefore, we hypothesize that, after the technological differences are removed, the more an industry invests (per employee), the more it tends to expand; hence, we expect a positive regression coefficient for the investment variable.

We also hypothesize that the higher the industry's relative employment share (N.J. share/U.S. share), the less its employment will grow because competition from other states will tend to nullify whatever advantage a state has in reaping a disproportionate share of the market.

Under the hypothesis that New Jersey is not predisposed to concentrate on more material-intensive industries, we expect material-intensity to be negatively associated with employment growth.

Finally, the more an industry depends on exporting its output, the more difficult its expansion should be at a time (1982-86) when high exchange rates of the dollar and other factors have limited U.S. exports. Hence, exportability should have a negative regression coefficient.

The variables considered so far mainly reflect factors influencing the supply of goods from New Jersey industries. This is important from the viewpoint of the competitiveness of the State's industries. However, employment growth will also depend on the aggregate demand conditions which are essentially determined in the national market, and upon which New Jersey industries have little effect. Therefore, we have chosen a national variable, employment change in the U.S., to reflect the overall macroeconomic conditions. The estimated equation is shown in Table 6.

Table 6
REGRESSION EQUATION 1

Variable Name	Type of Variable	Regression Coefficient	t-statistic
Percent change of employment in N.J. (1982-86)	dependent		
New Jersey Payroll/Employee	independent	-.513	-.97
New Jersey Payroll/Value Added	"	-28.113	-1.75
Ratio of Employment Shares (N.J./U.S.)	"	-1.432	-.73
N.J. Material Intensity Shipment-Value Added Shipment	"	-25.016	-1.47
N.J. Investment/Employment	"	.801	.84
N.J. Export Rates (Export/Shipment)	"	-42.435	-1.45
Percent Change in U.S. Employment (1982-86)		.674	4.22
Constant			2.69
R ²			.4357
Adjusted R ²			.3598
f-statistics (6.53)			5.74
Durbin-Watson statistic			1.07
Number of Observations			60

*Since the three investment indicators are correlated with each other, only one investment indicator could be used in the regression equation. Also, a given relationship exists between labor productivity (Value Added per Employee), labor earnings (Payroll per Employee) and unit labor cost (Payroll per Value Added), which prevents us from using all three interrelated variables in one equation.

In general, the equation is not satisfactory since most regression coefficients are not statistically significant at the customary five percent level. However, several coefficients are close to significance. The signs of the regression coefficients are also of interest. The coefficient of payroll per employee is negative, although we postulated a positive relationship with employment change. The coefficients of the employment shares ratio, material intensity, export rates, and payroll per value added are negative as expected. Investment per employee is positively associated with employment change in accordance with our hypo-

thesis, but the estimated coefficient is statistically insignificant. An interesting result is obtained for the demand variable -- the U.S. employment change -- the coefficient of which is highly significant. It confirms and strengthens our belief that overall demand conditions in the national market are extremely important for New Jersey's employment growth.*

An analysis of the residuals of equation 1 (the difference between the fitted and actual values of employment change) led to the hypothesis that the growing industries and the declining industries respond

*The t statistics for the hypothesis that N.J. employment changes exactly follow U.S. employment changes, i.e., the regression coefficient equals 1.0 equals -2.04. Therefore, the hypothesis is rejected and we conclude that the true coefficient is less than 1.0.

differently to the economic variables investigated in this study. We applied the Chow test for differences in the regression coefficients for two distinct groups of industries, namely, the industries where employment grew during the 1982-1986 period and the industries where employment declined.

The result of the Chow test was significant, confirming the hypothesis of the different behavior of the two industry groups. As a result, additional variables were generated by assigning a binary variable which equals 1 for the growing industries and 0 for the declining, and a new equation was estimated which included these additional variables.

The results of equation 2 allowed us to derive two equations, each valid only for the growing industries (equation 2A below) or for the declining industries (equation 2B). Interestingly, several of the regression coefficients for the newly-generated variables are significant.*

The interpretation of these equations is as follows: For the group of growing industries (equation 2A), the negative and significant coefficient of material intensity means that the more material input is needed per unit of output, the less this industry is growing in New Jersey. This phenomenon has been observed in a previous section. It reflects the predilection of state business to concentrate on less material-intensive, and by implication, more labor-intensive (skilled labor-intensive) industries. Transportation costs may also be a factor leading to such specialization.

The other variable that has a statistically significant coefficient is the New Jersey export rate. The higher the export rate for an indus-

try, the less employment growth in that industry in New Jersey. It explains the difficulties the U.S. economy (including New Jersey) has had during the last several years in foreign trade. A lower export dependency meant less impediment to growth.

No other variable exerted any significant influence on employment growth of this group of industries. Especially worth noting is the indication that even unit labor cost has the wrong sign and is insignificant at the customary five percent level. The ratio of employment shares, although insignificant, has the expected sign. The national employment variable, which was highly significant in the previous Equation 1, is now insignificant. This change is due to the subdivision into two groups of industries, the behavior of which in New Jersey was strongly influenced by national demand. In other words, employment changes in New Jersey by-and-large follow similar (although not identical) employment changes in the U.S. The industries that are growing in New Jersey are, with some exceptions, also growing in the U.S. and vice-versa. Hence, the overall demand conditions determine the behavior of these two distinct groups of industries both nationally and in New Jersey.

When this distinction was explicitly introduced in Equation 2, the national demand variable became redundant and, therefore, its coefficient is insignificant. In the declining industries, the national employment variable, although insignificant at the five percent level, comes close to significance at the 20 percent level. The sign of this variable is positive, implying that employment changes in the group of declining industries in N.J. are following similar declines in the U.S.

*The basic equation from which regression equations 2A and 2B are derived is reported in Appendix 2.

Table 7
REGRESSION EQUATION 2A AND 2B

Variable Name	Type of Variable	Equation 2A		Equation 2B	
		Coefficient	t-statistic	Coefficient	t-statistic
Percent Change of Employment in N.J.	dependent				
Payroll/Employee	independent	.244	0.44	-.873	-2.41
Payroll/Value Added	"	30.615	1.65	-54.998	-3.91
Ratio of Employment Shares (NJ/US)	"	-2.411	-1.30	3.114	1.39
N.J. Material Intensity	"	-40.195	-1.98	4.584	.35
N.J. Export Rates (Export/Shipment)	"	-152.782	-2.83	12.557	.56
Percent Change in U.S. Employment		-.0492	0.20	.214	1.43
Constant		23.13	2.34	23.13	2.34
R2		.7625			.7625
Adjusted R2		.7019			.7019
F-statistics (12,47)		12.576			12.576
Durbin-Watson statistic		1.584			1.584
Number of Observations		23			37

Other regression coefficients for the declining industries, such as earnings per employee and especially the unit labor cost variable are negative and statistically significant at the one percent level. This can be interpreted to mean that the higher wages per worker and the higher unit labor costs, the more those industries were declining in New Jersey. Since the effect of the national trend in employment has been explicitly accounted for, the negative coefficients mean that earnings and labor cost are influencing the decline of those industries beyond what happened to them nationally.

Several other indicators were found to be insignificant for both derived equations. The ratio of the employment shares variable was meant to test the hypothesis that the more the State specializes in a particular industry, the less it succeeds in faster employment growth. There is some truth to it in the growing industries ($t = -1.30$), but the opposite sign appears in the declining industries ($t = 1.39$).

Regression equations 1 and 2 are concerned only with inter-industry relationships within the State of New Jersey. The next step is to investigate whether these relationships are unique for New Jersey or if similar inter-industry behavior can be found nationwide. Since the latter are influenced by overall demand-supply conditions in the national and international economies, dissimilar behavior will indicate the presence of some local, unique conditions in the State. Therefore, by relating New Jersey's economic indicators to their U.S. counterparts, we eliminate what is general (or nationwide) and leave only the unique New Jersey charac-

teristic. This is accomplished by dividing each New Jersey indicator by the same United States indicator in all industries.

Regression equation 3, with the dependent variable being the ratios of the N.J. over the U.S. employment change indices over the 1982-86 period and the independent variables all the previous indicators expressed as N.J. over U.S. ratios, was unsatisfactory. All coefficients were insignificant and the closest to significance came the productivity ratio ($+ = 1.80$).*

Such results should not be surprising. On the surface they suggest that there were no unique characteristics in New Jersey, that the indicators in the State more or less follow the U.S. indicators and, therefore, there are no systematic variations of the N.J./U.S. ratios.

A closer examination of the residuals, however, indicated that we may again be dealing with two groups of industries which are responding differently to the ratios of economic indicators. For example, the growing industries may grow more, while the declining industries may decline more in New Jersey than in the U.S. In such a case, no systematic relationship for all manufacturing industries may be observed. When viewed separately, however, two distinctive and opposite relationships may exist.

As in a previous case, we applied the Chow test for differences in regression coefficients and found the difference to be significant. Consequently, the regression equation was reformulated in such a way that allows the distinction of the two groups -- the growing and declining

*In a separate equation that excluded three outlying observations, we found the productivity ratio variable significant, although the entire regression result was still unsatisfactory. (Adjusted $R^2 = 0.10$; Durbin-Watson = 1.21, $F(5,52) = 2.22$).

Table 8
REGRESSION EQUATIONS 4A AND 4B
Dependent Variable N.J./U.S. Ratio of Employment Change During 1982-1986

Variable Name	Type of Variable	Regression 4A		Regression 4B	
		Coefficient	t-statistic	Coefficient	t-statistic
Ratio of Employment Change (N.J./U.S.)	dependent				
Labor Productivity Ratio (N.J./U.S.)	independent	.2523	3.44	.1605	3.54
Export/Shipment Ratio "	"	-.1211	-1.54	.1606	3.60
Constant		.7795	6.52	.7795	6.52
R ²		.505		.505	
Adjusted R ²		.449		.559	
F-statistics (6.53)		9.03		9.03	
Durbin-Watson		1.58		1.58	
Number of Observations		23		37	

industries. The results are presented in Regression Equations 4A and 4B, where the former applies to the growing and the latter to declining industries (Table 8).

Except for the two independent variables shown in Table 8, the estimated coefficients of all other variables were statistically insignificant for both groups of industries. The positive and significant result for labor productivity in the growing industries means that higher employment growth in New Jersey than in the U.S. were accompanied by higher productivity ratios and lower employment growth ratios by lower productivity ratios.

Higher employment ratios (meaning New Jersey employment grew faster) were also accompanied by export ratios lower than in the U.S. (lower export dependency). Again, during the 1982-86 period when U.S. exporters experienced known difficulties, a lower export dependency may have contributed positively to employment growth. However, the coefficient for the export ratio in the growing industries was statistically significant only at more than the 10 percent level.

For the group of declining industries (equation 4B), the following situation prevailed. The positive productivity coefficient means that, on the whole, lower relative employment growth was accompanied by lower productivity ratios as well. For both groups, the conclusion is the same -- improving productivity leads to higher employment growth or less employment decline. In the growing industries productivity was New Jersey's comparative advantage; in the declining industries -- a comparative disadvantage.

The export ratio coefficient in the declining industries is positive and significant implying that the lower the export ratio, the lower the

employment ratio. This means that where New Jersey industries managed to export relatively more than the same industries in the U.S., the State's employment growth was also relatively higher than in the U.S.

Summary and Conclusions

Recent declines of manufacturing employment in the United States and New Jersey are cause for serious concern. This study undertaken by the Office of Economic Policy reviews in detail the performance of more than sixty New Jersey manufacturing industries in terms of labor productivity, unit labor costs, investment rates per employee or unit of output and the percentage of overseas exports in total industry shipment.

These indicators based on the latest Census of Manufactures (1982) are compared for both New Jersey and the U.S. manufacturing industries and subsequently linked with the employment change in each industry between 1982 and 1986. A further analysis examines a group of growing industries and a group that has declined. Each growing and declining industry is analyzed in terms of the eight economic performance indicators. The summary statistics for these two distinct groups of industries are presented and analyzed in this Chapter. We isolate the change in the economic indicators inherent to each industry from the effect that is due to industrial composition differences. Using employment growth in each industry during 1982-86 and the 1982 economic characteristics of these industries, we are able to detect several important causes of rapid growth or decline.

Among the major findings of this study are:

-- New Jersey manufacturing industries invested much less than the nation's manufacturing businesses in 1982. Although this finding is not

new, it underscores the continuation of a trend we have now observed for a long period of time. If continued, it can only lead to further contraction of manufacturing in the future.

-- Since N.J. was concentrating more on industries with relatively higher labor productivity, the entire manufacturing sector showed higher labor productivity in N.J. compared with the U.S.

-- A similar situation was observed in unit labor cost. Higher intrinsic unit labor cost was accompanied by a concentration on industries with lower cost and resulted in a lower unit labor cost for New Jersey's manufacturing sector as a whole.

-- New Jersey is concentrating on less material-intensive industries and, by implication, on more skilled labor-intensive industries.

-- The dependency on exports is lower in N.J. than in the nation as a whole. This is a factor that has helped the State's economy at a time of high dollar exchange rates, but is a source of concern in the long run.

-- With the exception of investments and exports, N.J.'s growing manufacturing industries had superior indicators when compared with the equivalent U.S. industries.

-- This was not the case when declining industries in N.J. were compared with the identical industries in the nation. Without exception, the economic indicators for N.J.'s declining manufacturing industries were worse than for the same industries in the U.S.

-- Although the entire group of growing industries in New Jersey exhibited superior performance characteristics, it was mainly the result of a different industry composition. At an identical industrial composition, N.J.'s indicators were

below the nation's industries. A similar statement can be made for the declining industries, with the exception of earnings and material intensity.

The analysis of determinants of employment growth and decline in manufacturing industries in N.J. revealed the following:

-- Growing industries were negatively associated with low export dependent industries. Lower export dependency was less of a factor in impeding growth of these industries in the last several years.

-- For the declining industries, the most significant factors were associated with labor cost. The higher the earnings and the higher unit labor cost, the more those industries declined in employment.

-- In comparison with the U.S., the growing industries had a positive association with labor productivity. A similar positive relationship existed between the N.J./U.S. employment change and the productivity ratio in the declining industries. In the growing industries, labor productivity was N.J.'s comparative advantage; in the declining industries -- a comparative disadvantage.

The most important policy implications following from this study are measures necessary to reverse the trend of insufficient new investment in N.J. manufacturing industries. A stronger business retention program should be adopted which will include assistance in solving operating difficulties whether generated by lack of sufficient capital, organization & management problems, or indifference by local government to the needs of manufacturing companies. The State should avoid levying new taxes on manufacturing companies and create hospitable conditions for operating and locating businesses in New Jersey.

* * * * *

**APPENDIX 1
CORRELATION MATRIX**

	Productivity	Earnings	Unit Labor Costs	Inv/ Emp	Inv/ VA	Inv/ Shpm	Material Intensity	Export Rate	Emp. Change %
Productivity	1.00								
Earnings	.53	1.00							
Unit Labor Costs	-.66	-.14	1.00						
Inv/Emp	.51	.65	-.32	1.00					
Inv/VA	-.04	.24	.05	.73	1.00				
Inv/Shpm	-.19	.01	.13	.38	.81	1.00			
Mat. Intensity	.32	.35	-.15	.52	.32	-.19	1.00		
Export Rate	-.01	.18	.16	.01	.02	.02	-.06	1.00	
Emp Change %	-.06	-.25	-.09	-.14	-.03	-.03	-.17	-.25	1.00

**APPENDIX 2
REGRESSION EQUATION 2**

	Independent Variable	Estimated Coefficient	Standard Error	t-statistic
	C	23.133	9.881	2.341
1)	NJEARN	.873	.361	-2.417
	DNJEARN	1.117	.637	1.753
2)	EARNVANJ	-54.998	14.057	-3.913
	DEARNVAN	85.613	21.033	4.070
3)	SARERATA	3.114	2.243	1.388
	DSHARERA	-5.525	2.881	-1.918
4)	MATSHPNJ	4.584	12.942	.354
	DMATCHPN	-44.779	22.071	-2.029
5)	NUEXFRAT	12.557	22.587	.556
	DNJEXPRA	-165.339	58.461	-2.828
6)	EMP%US	.214	.149	1.433
	DEMP%US	.263	.290	.907

1) Earning/Employee; 2) Earning/Value Added; 3) Share of N.J. in U.S. Employment;

4) Materials/Shipment 5) Export/Shipment; 6) Employment change in the U.S. 1982-86.

Variables with D prefix denote a binary variable with growing industries = 1 and declining = 0.

IV.

STATISTICAL TABLES

Table 1
POPULATION AND EMPLOYMENT, NEW JERSEY, 1960 - 1985

Year	Resident Population (000's)	Work/ Labor Force (000's)	Total Employment (000's)	Unemployment		Insured
				Number (000's)	Rate (%)	Unemploy- ment Rate (%)
*1960	6,066.8	2,507.4	2,337.2	168.5	6.7	5.7
1961	6,222.2	2,543.5	2,355.9	185.5	7.3	6.0
1962	6,370.7	2,575.1	2,415.0	159.0	6.2	5.2
1963	6,503.2	2,618.4	2,447.9	168.8	6.4	5.4
1964	6,614.6	2,655.5	2,489.6	162.1	6.1	4.8
1965	6,720.3	2,724.5	2,582.2	140.0	5.1	3.9
1966	6,821.1	2,790.3	2,665.3	122.6	4.4	3.2
1967	6,917.5	2,803.0	2,701.0	102.0	3.6	3.4
1968	7,012.8	2,829.0	2,730.0	99.0	3.5	3.3
1969	7,103.3	2,898.0	2,805.0	93.0	3.2	3.3
*1970	7,170.0	2,996.0	2,859.0	138.0	4.6	4.4
1971	7,282.0	3,012.0	2,840.0	172.0	5.7	5.4
1972	7,337.0	3,117.0	2,935.0	182.0	5.8	5.1
1973	7,335.0	3,190.0	3,011.0	180.0	5.6	4.7
1974	7,335.0	3,226.0	3,023.0	204.0	6.3	5.7
1975	7,341.0	3,264.0	2,929.0	334.0	10.2	7.8
1976	7,344.0	3,318.0	2,973.0	346.0	10.4	6.4
1977	7,342.0	3,383.0	3,065.0	317.0	9.4	5.6
1978	7,356.0	3,457.0	3,209.0	248.0	7.2	5.1
1979	7,373.0	3,570.0	3,323.0	247.0	6.9	4.7
*1980	7,365.0	3,594.0	3,334.0	260.0	7.2	4.7
1981	7,407.0	3,593.0	3,330.0	263.0	7.3	4.3
1982	7,428.0	3,632.0	3,306.0	326.0	9.0	4.7
1983	7,464.0	3,673.0	3,385.0	288.0	7.8	3.8
1984	7,517.0(r)	3,828.0	3,592.0	236.0	6.2	3.1
1985	7,562.0(p)	3,853.0	3,635.0	218.0	5.7	3.0

*Population figures for 1960, 1970 and 1980 are April 1 census counts. Estimates for intercensal years are as of July 1, and those estimates from 1981 to 1985 are subject to revision.

**For data prior to 1967, persons involved in labor-management disputes are included in total workforce and excluded from employment and unemployment. After 1966, persons involved in labor-management disputes are included in employment.

NOTES: The rate of insured unemployment is based on weekly averages of insured unemployment (State UI Program) expressed as a percent of the average total number of jobs covered by the State Unemployment Compensation Program.

- Work/labor force, employment and unemployment estimates are adjusted to latest benchmarks.

- Labor force estimates for 1970 to 1985 are published data obtained directly from the Current Population Survey conducted for the U.S. Department of Labor.

(r) - revised.

(p) - provisional

SOURCE: N.J. Depart. of Labor, Division of Planning & Research.

Table 2
WAGE AND SALARY WORKERS IN NONAGRICULTURAL ESTABLISHMENTS, MAJOR INDUSTRY DIVISIONS,
New Jersey, 1960-1985 (in thousands)

Year	Total Non-Agricultural Payroll Employment	Manu- facturing	Mining	Contract Construction	Trans- portation & Public Utilities	Wholesale & Retail Trade	Finance, Insurance & Real Estates	Services and Miscellaneous	Govern- ment
1960	2,017.1	808.8	3.5	98.7	149.5	374.5	88.0	252.0	242.1
1961	2,033.6	791.5	3.4	100.0	150.1	380.1	90.6	264.2	253.6
1962	2,095.8	812.8	3.4	101.3	150.8	393.1	92.8	279.9	262.8
1963	2,129.4	809.4	3.5	101.2	151.9	405.3	94.5	291.5	272.1
1964	2,168.7	806.7	3.6	106.8	153.4	420.0	96.6	301.6	280.0
1965	2,259.0	837.5	3.5	110.6	157.0	438.5	98.6	315.6	295.4
1966	2,359.1	879.3	3.0	111.2	162.2	459.6	101.0	330.8	312.0
1967	2,421.5	882.8	2.8	112.2	166.3	472.0	104.7	351.6	329.2
1968	2,485.2	885.3	3.1	115.6	166.3	489.5	108.4	372.6	344.4
1969	2,569.6	892.5	3.3	118.1	176.2	514.9	111.3	393.2	360.1
1970	2,606.2	860.7	3.2	120.4	182.2	538.0	116.5	410.4	374.8
1971	2,607.6	818.3	3.0	117.6	181.1	558.3	120.4	421.0	338.0
1972	2,674.4	823.3	3.2	121.6	181.2	577.3	124.6	437.9	405.3
1973	2,760.8	842.6	3.3	126.8	186.4	596.9	131.0	456.8	417.1
1974	2,783.4	825.9	3.2	118.7	185.8	603.5	136.5	469.9	439.9
1975	2,699.9	747.9	2.8	99.2	174.3	599.3	135.2	471.1	470.2
1976	2,753.7	756.2	2.7	93.9	176.0	618.5	138.0	488.0	480.5
1977	2,836.9	767.3	2.9	94.5	178.2	637.3	142.9	509.8	504.0
1978	2,961.9	786.8	2.6	105.3	188.5	665.9	147.7	542.2	523.0
1979	3,027.2	799.1	2.6	113.7	190.4	678.6	153.9	571.0	517.8
1980	3,060.4	781.0	2.4	111.2	194.5	680.3	158.1	603.1	529.7
1981	3,098.9(r)	771.1(r)	2.3	108.7	196.5	690.6	161.8	638.9(r)	529.0
1982	3,092.7(r)	729.6(r)	2.1	107.3	197.1	701.2	167.1	663.3(r)	524.7
1983	3,165.1(r)	715.1(r)	2.0	112.1	203.0	735.3	172.7(r)	703.7(r)	521.2
1984	3,329.3(r)	726.8	2.2	131.3(r)	219.4(r)	787.3(r)	183.0(r)	757.3(r)	522.1(r)
1985	3,419.1	719.1	2.2	140.1	224.9	813.4	192.5	792.6	534.4

Series have been adjusted to March 1985 benchmarks. (r) - revised

SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 3
WAGE AND SALARY WORKERS IN MANUFACTURING, DURABLE GOODS, NEW JERSEY, 1960-1985 (in thousands)

Year	Total Durable Goods	Lumber & Wood Products	Furniture and Fixtures	Stone, Clay & Glass Products	Primary Metal Industries	Ordnance and Fabricated Metals	Machinery Except Electrical	Electrical Machinery	Trans- portation Equipment	Instru- ments & Related Products	Miscellaneous Manu- facturing Industries
1960	436.8	5.7	9.8	33.7	42.6	54.8	61.0	122.3	48.5	31.7	26.8
1961	421.9	5.6	9.0	34.4	40.7	54.2	57.3	119.5	41.7	31.9	27.6
1962	436.3	5.8	9.7	34.6	40.1	56.1	60.3	125.2	42.5	32.4	29.9
1963	426.0	5.7	8.9	34.9	38.6	55.7	60.1	121.7	39.0	32.9	28.7
1964	419.1	5.6	9.0	35.6	37.9	57.2	61.4	115.1	35.6	31.0	30.7
1965	438.7	5.6	9.4	36.9	39.8	60.8	65.4	118.4	36.8	32.7	32.9
1966	463.4	5.2	10.5	39.3	40.4	64.7	70.8	129.9	36.4	34.3	31.9
1967	464.6	5.0	11.0	39.1	38.6	66.2	75.0	131.1	32.0	36.5	30.0
1968	460.9	5.3	10.2	38.8	38.5	67.5	75.8	127.6	31.7	35.8	29.7
1969	463.3	5.2	11.0	40.9	39.4	69.8	76.2	124.5	31.4	34.7	30.2
1970	434.3	4.9	10.5	39.6	37.2	67.0	72.8	115.2	26.3	33.2	27.5
1971	404.6	4.5	10.6	39.0	33.3	62.9	66.3	104.6	25.3	32.4	25.6
1972	405.9	5.1	10.8	39.9	31.8	63.5	65.8	102.9	25.7	35.1	25.2
1973	420.5	5.3	10.6	40.8	32.0	66.2	72.1	108.1	25.3	34.4	25.9
1974	413.2	5.0	10.3	40.5	31.2	64.4	76.1	105.1	21.1	33.9	25.6
1975	363.1	4.6	8.9	36.0	26.1	58.1	68.4	88.1	19.3	31.2	22.4
1976	363.0	5.3	8.7	36.1	23.9	59.4	67.5	86.8	19.8	31.3	24.0
1977	370.0	5.8	8.9	35.1	23.0	61.1	71.0	87.9	20.7	32.0	24.5
1978	382.8	6.0	10.0	35.2	24.5	64.1	74.2	89.8	20.9	32.3	25.7
1979	395.9	6.7	10.3	35.3	25.5	64.5	76.4	92.9	21.6	35.6	27.1
1980	384.3	5.9	9.7	33.1	25.7	60.8	75.1	92.2	18.5	37.2	26.1
1981	374.7	6.1	9.6	30.9	25.4	58.8	72.5	91.6	17.5	37.1	25.3
1982	350.1	5.5	9.9	27.1	21.8	54.3	66.5	90.9	14.7	35.7	23.6
1983	341.6	5.9	10.5	26.8(r)	20.7	50.9	60.9	93.1	15.1	34.2	23.5
1984	346.2(r)	6.4	12.6(r)	26.2(r)	21.6(r)	51.1(r)	59.9(r)	95.0(r)	16.1	33.5(r)	23.9(r)
1985	341.8	6.7	13.1	25.7	21.1	50.3	59.9	95.1	14.8	33.7	21.4

Series have been adjusted to March 1985 benchmarks. (r) - revised
SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 4
WAGE AND SALARY WORKERS IN MANUFACTURING, NONDURABLE GOODS, NEW JERSEY, 1960-1985

Year	Total Non- durable Goods	Food & Kindred Products	Tobacco Manufactures	Textile Mill Products	Apparel and Related Products	Paper Allied Products	Printing Publishing & Allied Industries	Chemicals & Allied Products	Petroleum, Refining & Related Industries	Rubber & Miscell- aneous Plastic Products	Leather and Leather Products
1960	372.0	62.9	1.7	31.4	77.7	28.0	32.3	86.4	11.5	29.2	11.0
1961	369.6	63.9	1.6	29.1	76.4	28.1	32.6	87.0	11.1	29.2	10.8
1962	376.5	64.2	1.5	28.6	75.8	29.7	33.0	91.0	10.7	30.7	11.5
1963	383.4	64.9	1.4	27.9	74.5	31.4	34.6	94.8	10.5	31.7	11.7
1964	387.6	65.0	1.5	27.8	74.6	31.5	35.8	96.4	9.7	34.2	11.2
1965	398.8	66.4	1.4	28.5	77.3	31.3	37.5	98.9	9.8	36.0	11.5
1966	415.9	67.2	.8	29.6	80.3	33.0	39.6	105.5	10.5	37.2	12.2
1967	418.1	65.3	.6	29.1	78.5	33.7	41.5	110.9	9.6	37.7	11.3
1968	424.5	64.5	.3	30.5	78.7	34.5	42.2	113.1	9.7	39.9	11.5
1969	429.2	63.2	.3	30.8	77.2	35.0	43.3	117.4	10.0	41.4	10.6
1970	426.4	63.5	.3	29.6	72.3	35.3	44.8	120.9	10.1	40.0	9.6
1971	413.7	61.7	.3	29.4	68.9	35.9	43.8	117.5	10.1	36.8	9.4
1972	417.4	59.8	.3	30.5	68.9	35.9	46.0	119.3	10.6	37.2	8.9
1973	422.1	68.7	.2	31.3	68.7	36.8	46.9	124.1	10.9	35.5	9.0
1974	412.7	56.7	.2	28.8	63.1	35.4	47.8	126.6	11.8	34.0	8.4
1975	384.9	53.6	.2	24.5	57.9	32.1	46.4	121.0	12.1	29.3	7.9
1976	393.2	52.7	.2	23.9	61.1	33.2	47.4	122.4	11.9	32.0	8.3
1977	397.3	50.2	.3	22.8	59.7	33.4	49.7	127.2	11.9	34.2	7.9
1978	404.0	49.9	.5	22.4	59.3	33.7	51.7	130.0	11.9	37.3	7.3
1979	403.3	49.5	.4	21.5	56.5	33.9	54.3	129.6	11.9	38.8	6.9
1980	396.8	49.3	.4	20.2	55.7	32.3	55.4	128.2	12.0	37.4	5.9
1981	396.4	48.1	.3	19.0	56.1	31.3	57.7	128.9	11.8	37.3	5.9
1982	379.6	47.2	.3	16.6	50.4	30.6	57.7	124.5	11.2	36.1	5.1
1983	373.5	47.7	.3	15.4	50.6(r)	31.2	58.0	119.1	10.3	36.2	4.7
1984	380.5(r)	47.7(r)	.4(r)	15.1(r)	50.2(r)	31.9(r)	62.7	119.9(r)	10.0(r)	38.4(r)	4.3(r)
1985	377.3	48.2	.3	14.4	47.0	30.7	65.4	120.8	9.2	37.1	4.2

Series have been adjusted to March 1985 benchmarks. (r) - revised

SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 5
EMPLOYMENT, HOURS, AND EARNINGS OF PRODUCTION
WORKERS ON MANUFACTURING PAYROLLS, NEW JERSEY, 1950-1985

Year	Employment (thousands)*	Average Weekly Hours**	Average Weekly Earnings (dollars)**	Average Hourly Earnings (dollars)**
1950	n.a.	40.8	61.65	1.51
1951	n.a.	41.1	67.28	1.65
1952	n.a.	41.1	71.02	1.73
1953	n.a.	40.9	74.32	1.82
1954	n.a.	39.8	74.43	1.87
1955	n.a.	40.7	79.16	1.94
1956	n.a.	40.5	82.98	2.05
1957	n.a.	39.9	85.23	2.14
1958	563.7	39.4	86.80	2.20
1959	583.8	40.3	92.45	2.29
1960	580.8	39.6	93.93	2.37
1961	563.1	40.0	97.60	2.44
1962	576.0	40.5	101.66	2.51
1963	567.5	40.5	104.90	2.59
1964	564.4	40.6	108.40	2.67
1965	587.1	41.0	112.34	2.74
1966	616.5	41.3	117.29	2.84
1967	616.7	40.6	118.96	2.93
1968	616.9	40.7	125.76	3.09
1969	621.3	40.8	132.60	3.25
1970	592.6	40.3	139.44	3.46
1971	564.4	40.4	150.29	3.72
1972	561.1	40.9	163.35	3.99
1973	582.3	41.4	176.41	4.26
1974	559.8	40.7	186.11	4.57
1975	500.9	39.9	199.68	4.99
1976	509.7	40.4	215.33	5.33
1977	517.2	41.1	239.20	5.82
1978	528.5	40.8	256.22	6.28
1979	530.7	41.2	276.45	6.71
1980	509.9	40.7	297.16	7.31
1981	503.1	40.6	325.95	8.02
1982	467.7	39.9	345.53	8.66
1983	457.1	40.6	369.87	9.11
1984	458.2(r)	41.1	390.45	9.50
1985	442.7	40.8	402.29	9.86

n.a. - not available (r) - revised

Data have been adjusted to a 1985 benchmark.

SOURCE: New Jersey Department of Labor, Division of Planning & Research.

Table 6
CONSUMER PRICE INDEXES*
FOR URBAN WAGE EARNERS AND CLERICAL WORKERS, 1955-1985
(1967 = 100.0)

Year	United States	New York SCA**	Philadelphia SMSA***
1955	80.2	78.2	80.6
1956	81.4	79.4	81.6
1957	84.3	82.0	84.2
1958	86.6	84.5	85.8
1959	87.3	85.6	86.8
1960	88.7	87.3	88.4
1961	89.6	88.1	89.4
1962	90.6	89.4	90.1
1963	91.7	91.3	91.8
1964	92.9	92.8	93.2
1965	94.5	94.3	94.7
1966	97.2	97.5	97.3
1967	100.0	100.0	100.0
1968	104.2	104.3	104.8
1969	109.8	110.8	110.4
1970	116.3	119.0	117.8
1971	121.3	125.9	123.5
1972	125.3	131.4	127.0
1973	133.1	139.7	135.5
1974	147.7	154.8	151.6
1975	161.2	166.6	164.2
1976	170.5	176.3	172.4
1977	181.5	185.5	183.5
1978	195.3	195.4	194.8
1979	217.7	212.8	214.7
1980	247.0	236.8	242.5
1981	272.3	259.9	266.8
1982	288.6	274.1	278.4
1983	297.4	285.0	289.6
1984	307.6	295.1	303.4
1985	318.5	307.3	317.1

*Annual averages.

**Standard Consolidated Area: New York-Northeastern New Jersey including Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, and Union counties.

***Standard Metropolitan Statistical Area, including Camden, Burlington, and Gloucester counties.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics.

Table 7
PERSONAL INCOME, NEW JERSEY AND UNITED STATES, 1955-1985

Year	Total Personal Income		Per Capita Personal Income			
	New Jersey (millions of dollars)	United States	New Jersey (current dollars)	United States	New Jersey (1967 dollars)	United States
1955	12,434	307,601	2,260	1,872	2,846	2,334
1956	13,494	329,933	2,403	1,972	2,985	2,423
1957	14,349	348,309	2,501	2,044	3,010	2,425
1958	14,559	358,913	2,472	2,061	2,903	2,380
1959	15,675	382,548	2,606	2,160	3,023	2,474
1960	16,502	398,843	2,704	2,216	3,078	2,498
1961	17,281	414,285	2,758	2,264	3,108	2,527
1962	18,537	440,023	2,907	2,369	3,239	2,615
1963	19,461	462,406	2,980	2,454	3,255	2,676
1964	20,858	495,188	3,132	2,592	3,368	2,790
1965	22,472	536,152	3,321	2,772	3,514	2,933
1966	24,320	582,630	3,550	2,980	3,645	3,066
1967	26,183	623,757	3,779	3,161	3,779	3,161
1968	28,740	683,561	4,103	3,430	3,924	3,292
1969	32,205(r)	766,649(r)	4,539(r)	3,809(r)	4,104(r)	3,469(r)
1970	35,096(r)	825,528(r)	4,881(r)	4,051(r)	4,122(r)	3,483(r)
1971	37,703(r)	888,453(r)	5,178(r)	4,296(r)	4,152(r)	3,542(r)
1972	40,824(r)	976,071(r)	5,564(r)	4,664(r)	4,307(r)	3,722(r)
1973	44,511(r)	1,095,076(r)	6,068(r)	5,181(r)	4,410(r)	3,893(r)
1974	48,289(r)	1,204,070(r)	6,583(r)	5,644(r)	4,297(r)	3,821(r)
1975	51,628(r)	1,307,539(r)	7,032(r)	6,069(r)	4,252(r)	3,765(r)
1976	56,182(r)	1,446,099(r)	7,650(r)	6,647(r)	4,388(r)	3,899(r)
1977	61,245(r)	1,601,844(r)	8,342(r)	7,289(r)	4,521(r)	4,016(r)
1978	67,716(r)	1,806,207(r)	9,205(r)	8,133(r)	4,718(r)	4,164(r)
1979	74,069(r)	2,026,684(r)	10,182(r)	9,025(r)	4,764(r)	4,146(r)
1980	84,425(r)	2,252,021(r)	11,445(r)	9,910(r)	4,776(r)	4,012(r)
1981	94,083(r)	2,512,327(r)	12,701(r)	10,940(r)	4,823(r)	4,018(r)
1982	102,022(r)	2,660,940(r)	13,731(r)	11,470(r)	4,970(r)	3,974(r)
1983	110,383(r)	2,833,184(r)	14,781(r)	12,093(r)	5,145(r)	4,066(r)
1984	120,745(r)	3,101,402(r)	16,063(r)	13,114(r)	5,368(r)	4,263(r)
1985	130,154	3,310,545	17,211	13,867	5,513	4,354

Personal income data revised as of August 1986.

- a. The average of the Consumer Price Indexes (Urban Wage Earners and Clerical Workers) for the New York Standard Consolidated Area and the Philadelphia SMSA was used to express New Jersey per capita personal income in constant 1967 dollars.
- b. The Consumer Price Index (Urban Wage Earners and Clerical Workers) for the United States was used to express United States per capita personal income in constant 1967 dollars.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis.

Table 8
PRODUCTION AND TRADE, NEW JERSEY, 1965-1985

Year	Total	ELECTRIC Large Industrial and Commercial Users (kilowatt hours in thousands)	POWER Small Industrial and Commercial Users (thousands)	SALES Value of New Dwelling Units Authorized (\$000)	Construction Contracts Awarded (\$000)	Retail Stores Sales* (\$000,000)	Passenger Cars (number)	Commercial Vehicles (number)
1965	25,964,004	11,712,402	6,433,961	727,586	1,555,689	10,396	378,768	30,980
1966	28,512,856	12,814,406	7,043,455	588,874	1,651,494	10,711	352,573	31,072
1967	30,146,448	13,147,596	7,620,829	572,646	1,906,577	10,947	302,680	27,471
1968	32,616,153	13,863,329	8,394,581	597,980	2,380,846	12,030	356,762	30,724
1969	35,637,643	15,042,515	9,214,088	562,616	2,205,705	12,582	356,583	34,616
1970	38,156,144	15,394,352	10,185,005	599,034	2,740,746	14,274	348,304	36,027
1971	39,919,508	15,564,483	11,056,580	876,144	2,409,797	15,359	370,004	35,255**
1972	42,318,122	16,192,817	12,143,135	1,062,430	2,948,735	16,399	443,628	50,545
1973	45,540,943	17,018,962	13,233,603	1,030,506	2,513,229	17,874	453,334	53,735
1974	43,995,014	16,390,080	12,904,974	588,291	2,353,822	18,024	351,103	51,663
1975	43,477,908	14,927,694	13,509,510	574,101	1,950,095	19,636	298,926	31,493
1976	45,605,101	15,759,346	14,289,144	832,433	2,063,615	21,833	384,407	45,731
1977	46,398,759	15,659,679	14,744,406	998,931	4,805,407(r)	24,076	448,669	61,578
1978	48,113,001	16,386,752	15,474,339	1,262,831	4,096,430(r)	28,951(r)	436,849	65,772
1979	48,783,424	16,593,515	15,782,667	1,274,353	3,613,237	31,901(r)	402,484	63,867
1980	49,851,000(r)	16,345,000	16,446,000	1,010,084	3,789,979	34,077(r)	396,150	56,390
1981	49,635,000(r)	16,311,000(r)	16,741,000	1,022,130	3,568,772	35,658(r)	327,051	39,093
1982	48,752,000(r)	15,233,000(r)	17,263,000(r)	1,003,694	3,675,524	37,414(r)	305,568	38,649
1983	50,924,000	15,380,000	18,176,000	1,837,655	5,621,357(r)	40,663(r)	354,699	48,068
1984	52,611,000	15,708,000	19,315,000	2,274,406	6,379,206(p)	44,840	501,165	66,017
1985	53,764,000	15,640,000	25,750,000	3,139,186	8,101,975	48,260	***	***

*Data prior to 1976 are based on different sample design and are not strictly comparable with later retail sales figures.

**Years 1965-70 compiled by N.J. Auto List. Years 1971-84 are from the N.J. Division of Motor Vehicles.

***Because of computerization delays, available figures for 1985 do not accurately reflect the number of registrations.

(r) - revised

SOURCES: Electric Power Sales: Edison Electric Institute and U.S. Department of Energy. New Dwelling Units Authorized: New Jersey Department of Labor in cooperation with U.S. Department of Commerce. Construction Contracts Awarded: F.W. Dodge Corporation. Retail Sales: U.S. Department of Commerce. Registration of New Vehicles: New Jersey Auto Lists, Inc.; N.J. Division of Motor Vehicles.

Prepared by: New Jersey Department of Labor, Division of Planning and Research.

Table 9
BUSINESS ACTIVITY, NEW JERSEY, 1955-1985

Year	Business Telephones Net Gains	Business Failures (Number)	Liabilities Business Failures (\$000)	New Incor- porations (Number)	New Jersey Turnpike	
					Toll Revenue (\$000)	Number of Vehicles (000)
1955	31,659	456	29,753	8,386	21,123	25,888
1956	37,452	582	33,919	8,839	24,513	31,588
1957	29,856	565	39,604	8,097	29,023	39,270
1958	21,892	778	43,475	8,757	30,159	41,615
1959	35,051	639	27,619	10,436	33,318	46,199
1960	28,825(r)	714	49,071	10,172	35,584	49,083
1961	38,543(r)	717	53,282	9,650	37,193	51,738
1962	39,383	591	58,468	9,984	39,240	54,901
1963	29,716	509	256,075	9,716	40,779	56,677
1964	36,771	442	49,261	10,023	44,149	60,708
1965	47,251	512	96,334	10,439	46,122	64,958
1966	54,650	442	61,191	9,656	48,610	69,850
1967	48,620	414	64,215	10,220	51,230	73,529
1968	53,293	423	42,692	13,168(r)	55,340	78,205
1969	73,211	343	53,141	12,038(r)	57,637	80,618
1970	58,787	463	142,196	13,958	63,934	89,655
1971	45,401	428	102,738	15,563	70,124	98,534(r)**
1972	66,989	453	173,428	16,462	75,940	107,933
1973	87,064	491	201,463	16,312	78,997	110,422
1974	55,327	643	110,441	15,410	75,243	106,628
1975	31,164	768	213,209	16,022	84,385	105,633
1976	53,040	660	174,457	18,270	91,082	109,234
1977	76,351	535	194,995	19,366	95,112	113,664
1978	73,114	415	198,834	20,381	100,838	120,623
1979	67,957	421	194,188	21,172	100,885	121,031
1980	69,040	430	182,709	21,484	118,614	122,588
1981	76,340	521	372,568	24,113	126,188	127,212
1982	29,839	512	346,598	22,401	129,922	132,932
1983	*	689	315,383	26,215	139,895	143,855
1984	*	1,005(r)	947,890(r)**	27,646	151,913	156,029
1985	*	982	1,342,823**	28,030	162,449	167,179

n.a. - not available

*Effective January 1, 1983 New Jersey Bell stopped the leasing of new telephones as a service. Since business customers are purchasing telephones outright, there are no records as to the number of telephones in service. Therefore, this series has been discontinued.

SOURCES: Business Telephone Net Gains: N.J. Bell Telephone Company. Number and Liabilities of Business Failures and New Incorporations: Dun & Bradstreet, Inc. New Jersey Turnpike - Toll Revenue and Number of Vehicles: New Jersey Turnpike Authority.

Prepared by: New Jersey Department of Labor, Division of Planning and Research.

Table 10
RESIDENT POPULATION FOR NEW JERSEY COUNTIES
1970, 1980

County	C e n s u s		Provisional
	April 1, 1970	April 1, 1980	Estimates* July 1, 1985
Atlantic	175,043	194,119	205,100
Bergen	897,148	845,385	841,200
Burlington	323,132	362,542	380,100
Camden	456,291	471,650	488,100
Cape May	59,554	82,266	90,600
Cumberland	121,374	132,866	134,900
Essex	932,526	851,304	945,700
Gloucester	172,681	199,917	207,100
Hudson	607,839	556,972	555,900
Hunterdon	69,718	87,361	92,800
Mercer	304,116	307,863	317,700
Middlesex	583,813	595,893	626,700
Monmouth	461,849	503,173	530,900
Morris	383,454	407,630	417,100
Ocean	208,470	346,038	380,000
Passaic	460,782	447,585	461,400
Salem	60,346	64,676	65,200
Somerset	198,372	203,129	210,300
Sussex	77,528	116,119	119,600
Union	543,116	504,094	506,700
Warren	73,960	84,429	85,200
STATE TOTAL	7,171,112	7,365,011	7,562,000

*The State estimate is rounded to the nearest thousand and county estimates are rounded to the nearest hundred.

Prepared by New Jersey Department of Labor, Division of Planning and Research.

State of New Jersey
Office of Economic Policy
One W. State Street
Trenton, NJ 08625

U.S. Postage
Permit 21
Trenton, N.J.