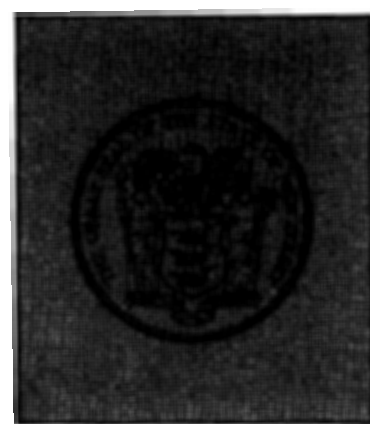


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17th Annual Report

Economic Policy Council
and Office of Economic Policy

STATE OF NEW JERSEY

Trenton, 1985

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August 15, 1985

The Honorable Thomas H. Kean
Governor
The State of New Jersey
Trenton, New Jersey 08625

Dear Governor Kean:

In accordance with Chapter 129 of New Jersey Public Law 1966, the Economic Policy Council is pleased to submit its 17th Annual Report.

In this Annual Report we present several studies carried out by the Office of Economic Policy under the guidance of the Council. They are devoted entirely to analyses of the 1982 Economic Censuses. The data of the 1982 Economic Censuses, newly released by the United States Department of Commerce, were used to compare the growth of the New Jersey economy with that of the nation and selected states. These comprehensive reviews are presented in four chapters. They convey an overall impression of the State economy performing comparatively well during this period.

In the first chapter we concentrate on an examination of the State's high technology service sector. This completes our analysis of New Jersey's high technology economy which we began several years ago.

Chapter II discusses the performance of the Garden State's manufacturing industries. Although the State's manufacturing employment declined over the 1977-1982 period, the relative decline in New Jersey was smaller than in other industrialized states, including those in the Middle-Atlantic region.

Chapter III deals with wholesale and retail trade -- one of the fast growing sectors of the New Jersey economy. The State's performance in this sector was considerably better than the nation's when we account for differences in population growth.

Finally, Chapter IV reviews recent trends in the service sector, which exhibits the fastest growth rate in New Jersey and nationally.

We also attempted to determine the direction and strength of effects of demographic and economic variables upon employment growth in particular sectors of the economy. We have identified significant employment growth roles for such variables as population, tax and wage differences, personal income, educational attainment of the labor force and the initial size of the manufacturing sector. We hope that our findings will contribute to the ensuing discussions on future public policy.

We would like to take this opportunity to express our thanks to the staff of the State Library; and to Arthur O'Neal, Vivien Shapiro, Shirley Goetz, Connie Hughes and Wally Falk of the State Department of Labor for their assistance in the preparation of this Report. Also, to Carol Maslowski from the Office of Economic Policy who with great skill prepared the manuscript.

The Council and Office appreciate your interest in our work. We look forward to assisting you in your efforts to sustain the prosperous growth of our economy and extend its benefits to all its citizens.

Sincerely,


Joseph J. Seneca

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PREFACE

This Annual Report is devoted entirely to an analysis of the 1982 Economic Censuses. These Censuses, conducted every five years by the United States Department of Commerce, Bureau of the Census, are the best comprehensive source of economic data on U.S. industries. The data are available on a state basis and permit an analysis of every major part of a state's economy. Data from the 1982 Censuses have recently become available and we have used the opportunity of this Report to examine the performance of the New Jersey economy on a sector by sector basis.

Accordingly, each chapter in this Report analyzes data from the 1982 Censuses. We have concentrated our studies on manufacturing, high technology services, general services, and wholesale and retail trade, and each of these sectors is the subject of an entire chapter in this Report.* Together, these sectors represent 68.3 percent of total nonagricultural employment in New Jersey. Their share in total employment of the private sectors was nearly 82 percent. The rate of employment growth of the industries included in the studies was 9.3 percent, approximately the same growth as for the entire economy (9.0%). The common approach of each chapter is to describe the changes that have occurred in New Jersey between 1977 and 1982, and compare these with the changes in other states and with those in the national economy. Each chapter also attempts to discover the

causes of the observed changes in the sector under study. One chapter specifically concentrates on an examination of the high technology service sector of the State to complete our analysis of New Jersey's high technology economy which we began several years ago.

Several cautionary points must be noted concerning the data used in the Report. First, although the Censuses were conducted in 1982, final data were not available for all sectors at the time of preparation of this Report. In particular, the analysis of the manufacturing sector had to rely upon preliminary data (which are subject to revision).

Second, it is important to be aware of the differences in the business cycle which are reflected in the 1982 Census data compared with the 1977 Census. In 1977, the economy was in a strong recovery following the 1973-75 recession, but 1982 was a recession year. Hence, we are comparing a peak and a trough in terms of the macroeconomic conditions at the time of each Census. However, since the emphasis of the Report is a comparison of New Jersey with the average national trends and with selected other states, we believe that this condition does not cause a significant distortion. Nevertheless, it is true that the 1982 recession had different effects on particular states, and to that extent, the analysis must be taken cautiously.

*We omit construction, transportation, finance, insurance and real estate (not included in the Censuses) and government.

Despite these possible problems, we have analyzed the results of the 1982 and 1977 Censuses because they provide the most reliable overall economic statistics on individual industries across states. Such an analysis is especially justified in the light of the discontinuation by the federal government of publication of the results from the Annual Survey of Manufactures.

Finally, the reader has to be aware of the major transformation that is occurring in New Jersey's economy. Economic data from the year 1982 were certainly influenced by this transformation. It is extremely important to monitor the structural changes in the State's economy in a systematic and comprehensive way. The economic changes that are currently taking place in New Jersey are the foundation of the transformed economy which reflect several major economic trends in the United States, trends in which New Jersey finds itself among the leaders. It will be extremely useful, therefore, to continue the analyses presented here for the five-year interval covering the next Economic Censuses, and we intend to do this.

A brief summary of each chapter in the Report is given below:

Chapter I: The Performance of High Technology Service Industries

This chapter identifies high technology service industries and their employment performance in New Jersey. We conclude that these industries are overrepresented in New Jersey; that they have been growing faster in New Jersey than elsewhere, and that they are an important and growing part of the State's economy. We also conclude that higher educational attainment is a major factor affecting their

growth, and that a fast-growing high technology service sector stimulates overall economic development.

Chapter II: The Performance of the New Jersey Manufacturing Sector

Chapter II discusses the performance of New Jersey's manufacturing sector in terms of employment, value added and capital expenditures. New Jersey experienced a decline of employment in this sector. Its performance was, however, better than other states of the Middle Atlantic region. An attempt was made to determine factors that have a major impact on the developments of the State's manufacturing industries. Analysis suggests that New Jersey's below-average performance was mainly a result of the relatively large size of the manufacturing sector and high relative wages.

Chapter III: New Jersey's Wholesale and Retail Sector

Chapter III analyzes New Jersey's wholesale and retail sector. Employment growth in the State did not quite keep pace with the national rate in the 1977-82 period, but when New Jersey's slower population growth is considered, its performance is found to be generally better than that of the United States. Moreover, the total dollar value of sales in New Jersey exhibited greater growth than the U.S. without deflating for the population growth difference.

In the retail sector, sales per employee in New Jersey grew by a greater percentage than the corresponding U.S. figure, but wholesale growth lagged behind the national increase. The New Jersey trade sector growth did not match that of Connecticut, New England states in general and the West; however, it did outpace other states in the

region, the midwestern states, the South, Southwest and South Atlantic.

Regression analysis shows retail, wholesale levels and growth to be directly related to economic development variables including per capita income and nonagricultural employment, and inversely related to sales tax rates and attractiveness to tourists.

Chapter IV: Growth of Service Industries in New Jersey and the United States

Chapter IV reviews the recent trends in, and analyzes the deter-

minants of, Selected Services which are the fastest-growing group of industries in the nation as well as in the State. A test of a simultaneous equations model reveals that employment growth in these industries is, directly or indirectly through wage increases, affected by growth in productivity, population, and in per capita income, among others. An important implication of the analysis is that specialization in services as a state economic development policy is, in general, a formidable task, since a more rapid employment growth in these industries tends to drive up wage rates relative to the national averages.

I.

THE PERFORMANCE OF HIGH TECHNOLOGY SERVICE INDUSTRIES IN NEW JERSEY*

Introduction

New Jersey, like many other states, has devoted considerable effort and resources to implement a high technology strategy to foster economic development. This strategy attempts to take advantage of the historical traditions that New Jersey possesses in high technology. The Economic Policy Council recommended such a strategy some time ago,** and the State now has a full-fledged program and policy commitment to stimulate high technology economic development. Many of the recommendations of the recent Report of the Governor's Commission on Science and Technology have been implemented. A \$90 million bond issue for high technology support was passed in November 1984, and related measures have also been put in place. Numerous other legislative and administrative proposals currently are under consideration. The State's basic approach has been to identify areas of high technology strength in

New Jersey and provide public support to stimulate their economic development. Rutgers University and other New Jersey educational institutions have received considerable resources from the bond issue to establish several high technology research centers. Other initiatives have been made in capital financing, labor training, and additional higher education support.

It is self-evident that we must be able to determine how New Jersey's high technology industries are performing; both in an absolute sense, and also relative to the nation and other competing industrial states. Such information is critically necessary in order to evaluate the effectiveness of public policy attempts to enhance high technology performance. In our last two Annual Reports we have developed a procedure for identifying and monitoring high technology performance in the State's manufacturing sector.*** We now present a similar analysis of the high

*Prepared by Joseph J. Seneca, Chairman, Economic Policy Council and Adam Broner, Director, Office of Economic Policy.

**See Adam Broner, "New Jersey's Comparative Advantage for Technical Progress," 9th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1976; and Laurence H. Falk, "The High Technology Economy and Higher Education," 14th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1981.

***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 Joseph J. Seneca and Lynne Murray, "The Determinants of High Technology Growth," 16th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1984.

technology service sector. This analysis, together with the previous studies of manufacturing, provides a comprehensive framework for an on-going assessment of high technology industry in New Jersey.

The organization of this chapter is as follows:

Section I identifies the high technology service industries in question. Section II provides an analysis of the performance of these industries in New Jersey. Comparisons are made with respect to the nation as a whole, and a group of selected industrial states. Section III gives some tentative evidence on the determinants of high technology service growth and the relation between growth in high technology service industries and overall state economic performance. Finally, Section IV offers several conclusions and suggestions for additional investigation.

I. High Technology Service Industries

A central problem in our prior attempts to measure high technology economic performance was how to determine which specific manufacturing activities would be identified as "high technology" industries. In those studies, we developed a series of criteria which relied upon sales growth rates, investment performance and productivity levels. These criteria enabled us to designate 46 high technology manufacturing industries which we categorized as either high technology "product" industries (i.e., industries producing a high technology final product), or high technology "process" industries

(i.e., industries producing traditional products but doing so with a sophisticated technological process).

Fortunately, because of the nature of the service sector industries and their technologies, our current task is more straightforward than it was for the manufacturing sector. The "service sector" is an extremely large and heterogeneous group of industries. It represents approximately 58 percent of total employment in both New Jersey and the nation, and it encompasses the following broad categories of industries -- wholesale and retail trade, communications and transportation, finance, insurance and real estate, and "selected services." Elsewhere in this Annual Report we examine the performance of the "selected services" sector in New Jersey. Here, we focus our analysis on a specific subcategory of "selected services" industries and, using a similar procedure to the one we employed in our studies of the manufacturing sector, we have identified eight four-digit SIC industries (from the "selected service" category), in addition to the two digit industry of communications, as "high technology" service industries. Accordingly, these nine industries constitute our identification of the high technology service sector and are listed in Table 1. They correspond closely to other attempts to examine high technology service industry performance.*

In general, our high technology service industries are characterized by the use of high technology equipment and procedures to provide a "service." This is analogous, in concept, to the high technology "process" industries in the manufacturing sector studies.

*See, Theodore A. Minde, New Jersey's High Technology Economy, Department of Commerce and Economic Development, Trenton, February 1983.

Table 1: High Technology Service Industries

Industry -----	SIC ---
Computer Programing	7372
Data Processing	7374
Computer Related Services	7379
Research and Development Laboratories	7391
Testing Laboratories	7397
Blueprinting	7332
Photofinishing	7395
Engineering Services	8911 (part of)
Communications Services	48

II. Performance of New Jersey High Technology Service Industries

Tables 2 to 5 present data on the size and recent employment growth of these industries.* Table 2 indicates that in 1982, over 103,000 people were employed in high technology service industries in New Jersey. We also note from Table 2 that New Jersey has increased its relative share of the nation's total employment in these industries from 3.88 percent in 1977 to 4.31 percent in 1982. This increase in New

Jersey's share occurred in contrast to the decline in the combined share of high technology service employment of 23 other selected states over this same period** (from 70.6% to 70.08%). To place New Jersey's share (4.31%) in perspective, we note that in 1982, the State had 3.21 percent of the nation's population and 3.44 percent of its total employment. Thus, compared to relative shares of population and total employment, our State is overrepresented in high technology service employment.

*Value added and investment data are not available for service industries in the Census of Service Industries, and total employment, therefore, is the performance measure that is used in the analysis. Employment is obviously one important indicator of economic performance, but it is not the only one. Unfortunately, data availability constrain us to this measure.

**These 23 states consist of all the industrialized states in the country and represent over 70 percent of the nation's high technology service employment and 72 percent of its total nonagricultural employment.

Table 2: High-Technology Services Employment, 1977 and 1982

	1977		1982	
	Employment (1)	Share of U.S. Total (2)	Employment (3)	Share of U.S. Total (4)
United States Total	1,808,371	100.00%	2,398,969	100.00%
New Jersey	70,243	3.88	103,427	4.31
Selected States	1,276,817	70.60	1,681,219	70.08

Table 3 lists New Jersey's share of the nation's employment in each of the nine high technology service industries. Within these industries,

we are particularly overrepresented in the three computer service industries and in testing laboratories.*

Table 3: New Jersey's Share in United States High-Technology Services Employment in 1982 by Industry

Industry	SIC#	Share
Computer Programming	7372	5.07%
Data Processing	7374	5.14
Computer Related Services	7379	8.25
Research & Development Laboratories	7391	2.06
Testing Laboratories	7397	5.92
Blueprinting	7332	2.08
Photofinishing	7395	3.56
Engineering Services	8911 (part of)	4.52
Communication Services	48	4.08
Total		4.31

Table 4 provides some perspective on recent employment growth and indicates that while total employment in New Jersey grew slightly less than that in the nation over this time period (8.97% vs. 8.61%), the State's

growth rate in high technology service employment, 47.24 percent, far exceeded both the nation's (32.66%) and the average growth of the 23 selected industrial states (31.67%).

*We note that the laboratory service industries -- research and development labs and testing labs -- are independent laboratories. The large research labs of manufacturing firms, an area where New Jersey is particularly well represented, appear in manufacturing data, not in service sector data. This point suggests that a general caution is in order before making too much of any distinction between the high technology "service" and "manufacturing" sectors.

Table 4: Comparison of Total Nonagricultural and High-Technology Services Employment Change 1982/1977

	Nonagricultural Employment	High-Technology Services Employment
United States	+8.61%	+32.66%
New Jersey	+8.97	+47.24
Selected Industrial States	+7.81	+31.67

Although high technology service industries are not yet a large component of total employment,* Table 4 indicates that they are growing very fast and much faster certainly than overall employment. Moreover, within this rapid growth performance, New Jersey's high technology service industry is growing significantly faster than its national counterpart.

Table 5 disaggregates the overall high technology service employment growth into its specific industry components. Total employment by

industry in New Jersey is given for each year along with the industry's growth rate for both New Jersey and the United States. The large two digit "communications services" industry and its growth (39.3%) clearly dominates New Jersey's high technology service sector with over 50 percent of the State's total in both 1977 and 1982. However, communications' share of New Jersey's total has been declining (59.0% in 1977 vs. 55.8% in 1982), largely because of the even more rapid growth in most of the other service industries.

Table 5: Employment Growth of High-Technology Services in New Jersey 1977-1982

Industry	N.J. Employment		N.J. Growth (%) (3)	U.S. Growth (%) (4)
	1977 (1)	1982 (2)		
Computer Programming	3,382	6,424	89.95	146.92
Data Processing	6,628	9,433	42.32	48.47
Computer Related Services	1,657	3,590	116.66	158.43
R&D Laboratories	765	1,323	72.94	32.13
Testing Laboratories	1,502	2,071	37.88	38.45
Blueprinting	222	403	81.53	52.02
Photofinishing	2,243	2,557	14.00	11.55
Engineering Services	12,430	19,935	60.38	63.01
Communication Services	41,414	57,691	39.30	19.53
	70,243	103,427	47.24	32.66

*High-technology service industry employment in New Jersey in 1982 (103,427) represented 14.4 percent of total service employment in the State.

Compared to national growth rates, New Jersey's rate of employment growth exceeded the nation's in communications, research and development laboratories, and photo-finishing. The dominance of the two digit level communications industry was responsible for the lead of the State's overall growth rate (47.2%) over the national rate (32.6%).

New Jersey's employment growth in high technology service industries is compared to 15 other industrial states in Table 6.* New Jersey's

growth (47.2%) ranks third in this comparison, behind only Connecticut (69.7%) and Massachusetts (53.5%). Table 7 provides two measures of the relative size of the high technology service sector across states. Employment in high technology services is expressed as a fraction of a state's total population (column 1), and of its total nonagricultural employment (column 3). The relative rankings of the 23 industrial states for each measure are given in columns (2) and (4).

Table 6: High-Technology Services Growth, 1977-1982
Middle Atlantic and Other Selected States

State	1977 Total Employed (1)	1982 Total Employed (2)	Employment Growth (%) 1982/1977 (3)	Rank of Employment Growth (4)
New York	182,437	209,770	14.98	14
New Jersey	70,243	103,427	47.24	3
Pennsylvania	87,879	107,069	21.84	9
Connecticut	22,041	36,964	67.71	1
Massachusetts	58,764	90,230	53.55	2
Illinois	92,163	98,891	7.30	16
Indiana	29,342	34,054	16.06	13
Michigan	61,896	74,927	21.05	11
Ohio	71,601	87,202	21.79	10
Wisconsin	25,883	30,710	18.65	12
Tennessee	32,396	37,181++	14.77	15
Texas	121,335	176,521	45.48	4
Florida	74,759	105,180	40.69	6
Georgia	43,395	57,732	33.04	7
North Carolina	32,258+	42,408+++	31.47	8
California	227,485	323,199	42.07	5

- +) Does not include R&D Laboratories and Blueprinting.
- ++) Does not include Blueprinting.
- +++) R&D Laboratories were estimated.

*The analysis is constrained to these 15 states because of data availability.

Table 7: Level of High-Technology Services in Relation to Total Population and Nonagricultural Employment in 1982

	Percent of Population (1)	Rank (2)	Percent of Nonagricultural Employment (3)	Rank (4)
United States - Total	1.036		2.678	
Connecticut	1.172	5	2.598	8
Massachusetts	1.561	1	3.441	1
New Hampshire	0.780	14	1.887	14
Rhode Island	0.752	15	1.842	17
Vermont	0.625	20	1.598	23
New York	1.188	4	2.900	4
New Jersey	1.391	2	3.353	2
Pennsylvania	0.902	9	2.347	11
Illinois	0.864	10	2.154	12
Indiana	0.622	21	1.694	21
Michigan	0.823	11	2.350	10
Ohio	0.808	13	2.107	13
Wisconsin	0.644	18	1.645	22
Alabama	0.815	12	2.444	9
Kentucky	0.593	22	1.869	15
Mississippi	0.534	23	1.716	20
Tennessee	0.671	17	1.848	16
Texas	1.155	6	2.814	5
Florida	1.010	8	2.796	6
Georgia	1.024	7	2.622	7
North Carolina	0.705	16	1.814	18
South Carolina	0.628	19	1.731	19
California	1.307	3	3.290	3
Total Selected States	1.009		2.593	

In 1982, New Jersey's employment in high technology service industries was 1.39 percent of its total population and 3.35 percent of the State's total nonagricultural employment. By both measures, New Jersey ranked second among the 23 industrial states, behind only Massachusetts, in the relative importance of high technology service industries in its economy.

III. High Technology Services Growth

The previous analysis has provided an assessment of the performance of New Jersey's high technology service industries. The purpose of this section is to attempt to examine some of the determinants of employment growth in these industries. Specifically, we seek to explain what causes the variations we observe in

the rates of growth in high technology service employment. Data problems constrain the analysis to sixteen states*. Because of this small sample, it is important to emphasize that our results can only be viewed as suggestive. However, these data represent the best comprehensive source available to examine this issue.

The dependent variable in the analysis is the percentage change in high technology service employment growth between 1977 to 1982 (as reported in Table 6 for sixteen states where the available data permit con-

sistent measurement).

Previous analyses of the determinants of growth in high technology manufacturing industries suggest that taxes, wages, educational attainment and the initial size of the high technology employment base are systematic determinants of the rate of growth. We expect similar factors to play an important role in determining high technology service employment growth.

Equation (1) below lists the results for the high technology service growth analysis:

$$(1) \text{ HTSG} = -1.07 - 0.405(\text{TAX}) - 0.305(\text{WAGE}) + 6.44(\text{EDUC})$$

$$(-0.03) \quad (-2.16)^+ \quad (-.996) \quad (5.01)^{++}$$

$$\bar{R}^2 = .646 \quad F(3,12) = 10.11$$

Numbers in parentheses are t-statistics.

+ Significant at 0.10.

++ Significant at .05.

where,

HTSG = Percentage change in high technology service employment, 1977-1982 (as given in Table 6 above).

WAGE = Index of state wages relative to U.S. wages (state wages adjusted for industry mix) (1977).

TAX = State and local taxes as a percentage of state personal income, relative to total state and local taxes as a percentage of U.S. personal income (1977), expressed as an index.

EDUC = Percentage of state's population with four or more years of higher education (as of 1980).

*These states are California, Connecticut, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas and Wisconsin.

Equation (1) indicates that relative tax burdens and wage costs exert a negative effect on high technology service employment growth. The wage variable has the expected negative sign but is statistically insignificant.* Relative tax burdens across states also have the expected negative influence on service employment growth, and this variable is statistically significant. The level of educational attainment of a state's population is directly related to high technology service sector growth and is strongly statistically significant. In fact, the education variable was consistently significant regardless of the combinations of other independent variables used in the equation.

The measure of educational attainment -- the percentage of a state's population with four or more years of higher education -- is not necessarily the most appropriate. For example, a more precise measure might have been the percent of a state's population with advanced scientific and technical degrees. However, such data are not available across states. Nevertheless, the strong and consistent results of this broadly defined education variable point to the close linkages between higher educational attainment levels

and high technology economic success.

The introduction into the equation of the size of high technology service sector employment base (in 1977) did not improve the equation and the variable was insignificant and was not included in equation (1).**

Table 8 lists the New Jersey values for each variable and the mean values for the entire sample of 16 states. New Jersey's relative tax profile and its relative wage costs, both negative factors in high technology employment service growth, exceeded the sample means. However, New Jersey's educational attainment level (18.3% of the population in 1980 with four or more years of higher education), a positive factor for growth, was considerably larger than the sample mean of the 16 states (15.9%). Table 9 shows the relative importance of each variable in terms of its effect on high technology service employment growth. Thus, a one unit increase in the state's population with four or more years of higher education (e.g., in New Jersey from 18.3% to 19.3%) would have resulted in a 6.43 percentage point higher increase in the high technology service growth rate (or approximately an additional 4,500 jobs

*The variable is measured by wages in manufacturing industries -- the only available indicator of a state's labor costs across states. Thus, the manufacturing wage is taken as a proxy for general labor costs, an assumption which may not be appropriate to this analysis of service employment changes.

**The idea of using the size of the employment base is to test whether states having a relatively large high technology service sector in the initial period (1977) would lead to higher growth rates because of agglomeration economies. However, this was not evident in the results, although such an agglomeration effect was found in our previous studies of the manufacturing sector (see Seneca and Murray, op. cit.).

Table 8: New Jersey Values vs. Sample Means

Variable	New Jersey Value	Sample Mean
EDUC	18.3	15.9
TAX	104.6	101.0
WAGE	102.7	98.9
HTSG	47.24	29.95

over the five year period from 1977 to 1982).^{*} Similarly, one unit increases in relative taxes and wage costs would reduce the growth rate by about .4 and .3 percentage points respectively. Of the three variables in equation (1), taxes and, to an extent, educational attainment are under direct state control as policy instruments and can be used to stimulate high technology growth.

Equation (1) and the discussion indicate that high technology service employment growth is affected systematically by various factors and can, to an extent, be influenced by purposeful state policies. We cannot conclude, however, that these are the only factors that influence high technology growth; e.g., a consider-

able amount of variation in our dependent variable remains unexplained. Moreover, the aggregate nature of the data simply does not permit specific policy recommendations. Finally, this analysis would not necessarily extend in an environment when there is a concerted effort by all states to follow exactly the same strategy. Nevertheless, the strength of the statistical relation between higher education and high technology employment, even as measured by our broadly defined variable, certainly suggests that this is a potentially fruitful policy area. It confirms a great deal of intuition, and casual observation of the importance of higher education to high technology economic development.

Table 9: Effect on High Technology Service Growth (HTSG)

Variable	Coefficient	Effect of a 1 Unit Increase on HTSG
EDUC	6.44	+6.44 percentage points
TAX	-0.405	-.405 " "
WAGE	-0.305	-.305 " "

^{*}An additional 6.43 percentage points in New Jersey would mean a 53.67 percent growth rate rather than the actual 47.24 percent rate experienced from 1977 to 1982. On an initial base of 70,243 high technology service jobs, this would yield a 1982 employment total of 107,942 rather than the actual number of 103,427.

However, a bothersome and skeptical comment on the general policy emphasis to stimulate high technology as a major economic development strategy remains. The argument is as follows: since high technology, as glamorous and as appealing as it may be, is only a relatively small part of total economic activity, it can never be the center of an effective economic development program that will lift a state's (or nation's) economy to significantly higher overall employment and income growth rates. This is a serious and worthy critique of the popular pursuit by local governments, states, and entire countries of the high technology goal.

Certainly, the high technology service sector is relatively small. In New Jersey in 1982, high technology service employment (as defined here) stood at 103,427 or 14.4 percent of "selected service" sector employment and only 3.1 percent of total nonagricultural employment in the State. Even if high technology manufacturing employment is added in, total high technology employment would only be approximately 8 percent of total employment in 1982.

Thus, the argument is that, even if we significantly raise the growth rates of all high technology industries (service and manufacturing), we cannot have a markedly large effect on total employment and upon overall economic development. This argument is vulnerable on two grounds. First, it ignores the linkages between the high technology sectors and all other areas in the economy. Spillover and multiplier effects between these areas exist and must be accounted for. Growth in high technology will bring growth elsewhere. High technology growth is a sign of a vibrant, dynamic, and changing economic base. Second, it is clear that high tech-

nology production processes will continue to spread from the distinctly identifiable "high technology industries," to other industries and ultimately all phases of economic activity. The productivity gains that high technology production techniques offer will increasingly be applied in more traditional areas and the distinction between what is now called "high technology" and the rest of the economy will eventually be lost. In this process, output, income and, possibly, employment throughout the economy will increase. In time, the entire idea of a separate high technology economy will disappear according to current criteria because the entire economy's production activities will significantly embody today's high technology techniques.

Accordingly, in the remainder of this section, we attempt to address the previously-posed skeptical argument by examining, at least, the first of the counterarguments to it -- namely that employment growth in high technology areas will cause an employment spillover to the remaining parts of the economy.

We, therefore, hypothesize the following: total employment growth (net of high technology growth) is, in part, determined by high technology growth rates. That is, states with greater high technology growth rates, will also have higher overall employment growth rates. Thus, the dependent variable in this analysis is a state's percentage growth in total employment (net of high technology service employment growth). We hypothesize that this is directly related to the growth of the high technology service sector, after accounting for other factors that also affect total employment growth. Equation (2) provides the results of this analysis (for the same sample of 16 states over the same time period).

$$(2) \text{ NAG} = 77.51 + .178(\text{HTSG}) - 0.062(\text{TAX}) - 0.432(\text{WAGE}) - 1.043(\text{MAN})$$

$$(8.09)^* \quad (3.78)^* \quad (1.38) \quad (-4.62)^* \quad (-6.75)^*$$

$$\bar{R}^2 = .903 \quad F(4, 11) = 36.12$$

Numbers in parentheses are t-statistics. *Significant at the .01 level.

where,

NAG = Percentage change in total nonagricultural employment, 1977 to 1982 exclusive of high technology service employment.

MAN = Percent of manufacturing employment in total nonagricultural employment, (1980).

HTSG = Percentage change in high technology service employment 1977 to 1982.

TAX; WAGE = As previously defined in equation (1) above.

Equation (2) indicates, that after accounting for other factors (relative taxes, and wages, and the size of the manufacturing sector), there is a direct and statistically significant relation between high technology service employment growth and the growth in all other employment. This result provides some evidence of the employment linkages and spillovers which exist between the high technology sector and the rest of the economy.* We believe that a fast-growing high technology sector stimulates employment growth elsewhere. Accordingly, these results suggest that the narrow view that the high technology sector is "too small" to affect overall economic activity is inappropriate.

Suppose that high technology service employment in New Jersey increased by one percent more than it actually did in each of the five years covered by this study. Compounded, this would mean a 5.1 percent higher growth rate over the entire five year period; or 54.75 percent compared to the actual growth of 47.24 percent. This is a difference of 7.51 percentage points. From equation (2) above, an increase of 7.51 percentage points in the high technology service growth rate (HTSG) would mean a higher total employment growth rate (NAG) of 1.34 percentage points over the five-year period. For New Jersey, which experienced a 7.45 percent growth in (NAG) from 1977 to 1982 (net of high technology service employment growth), a further 1.34 percentage point increase would have meant approximately 42,500 additional jobs over this time, or 8,500 jobs per year.**

The magnitude of the relation is of interest, and equation (2) provides some information on this issue.

*A test of simultaneity using a variant of equation (1), which included NAG as an independent variable, showed that NAG does not influence HTSG. Thus, it seems reasonable to conclude that HTSG affects NAG but not the converse.

**To complete the analysis, an additional 7.51 percentage point increase in New Jersey's high technology service employment growth could have been achieved by increasing the value of the educational attainment variable from 18.30 percent to 19.47 percent. This result follows from equation (1). Thus, the logic is that educational changes affect (HTSG), and changes in (HTSG) in turn affect (NAG).

IV. Conclusions

This chapter has attempted to identify high technology service industries and assess their employment performance in New Jersey, in other competing states, and in the nation as a whole. Our conclusions are that these industries are overrepresented in New Jersey; that they have been growing faster in our State than elsewhere, and that they represent an important and growing part of New Jersey's economy.

We have also attempted to examine the determinants of employment growth in these high technology service industries and the role these industries play in the overall economic performance of a state. Our results suggest that higher educational attainment is a major, positive factor affecting high technology service employment growth. This outcome is consistent despite significant data problems and a necessarily broadly defined measure of educational attainment. An additional analysis indicates that success in high technology service industries leads to higher overall employment growth rates. This argues against the narrow view that high technology industries, because of their relatively small share in the total economy, can never be a meaningful source of major economic development gains. Our results suggest the contrary; namely high technology success is indicative of a dynamic and growing overall economy.

While this chapter is our third recent study of the state's high technology manufacturing and service industries, further research is still warranted. For the service sector, a larger sample of states would be most useful. Unfortunately, we have exhausted the possibilities in the 1982 Economic Censuses. More detailed

examinations of particular high technology industries would be a fruitful line of additional work with a particular focus on the skill, education and training requirements of their labor forces.

Finally, we should recall that we have used employment as our performance measure to analyze New Jersey's high technology service industries. This was necessary because there is no systematic measure of output in service industries and the Economic Censuses, at least, provide a consistent measure of employment across industries and states. Nevertheless, the diffusion of high technology techniques throughout our economy will increase not only employment, but will also raise output, and will do so not only in high technology service industries, but across the board in all economic activities. We have some tentative and suggestive evidence of the employment effect in this process from equation (2). Nowhere, however, have we been able to examine how high technology processes are being applied in the larger economy and the effect this is having on output, incomes, and labor force requirements.

Our results which point to the importance of higher education to high technology success suggest that the ultimate constraint to high technology productivity gains and economic development may be the human factor of bottlenecks and shortages of appropriate labor skills, education and training. Assessing such implications, which are arising from the spread of high technology processes to ever more "traditional" industries, is a most appropriate topic for further research.

II.

THE PERFORMANCE OF THE NEW JERSEY MANUFACTURING SECTOR*

Introduction

The manufacturing sector was long considered the backbone of a developed economy and an engine of economic growth. This sector's ability to produce for markets outside its location added to its importance. Not surprisingly, the recent decline of some manufacturing activities in the United States is viewed with concern by many. The manufacturing industries of New Jersey were analyzed by the Economic Policy Council ten years ago.** This paper updates that review based on the most currently available data. Section I discusses data on manufacturing employment, value added and capital expenditures. New Jersey's performance is compared with that of the United States and selected states. These comparisons are analyzed on various levels of industry aggregation. Section II examines the underlying factors that explain the performance of New Jersey's manufacturing sector. Finally, Section III provides a summary and some conclusions.

I. The Magnitude of Decline

A. Employment

In the five year period that marks the two most recent Economic Censuses (1977-1982), employment in the New Jersey manufacturing sector declined by 27,700 or by 3.6 percent.*** That figure can be better appreciated if it is related to national performance and compared over a longer time period. Table 1 provides data for New Jersey and the United States for three five-year periods.

Table 1 reveals that the decline in New Jersey's manufacturing employment for the recent period 1977-82 is the smallest in any of the 5-year periods since 1967, both in number of employees and in percentages (cols. 2 and 3). In comparison to the United States, New Jersey's performance was most unfavorable in the 1972-77 period where the gap was 9.8 percentage points (col. 5, row b). In contrast, New Jersey's performance was only 1.3 percentage points below that of the United States in the period 1977-82 (col. 5, row c).

*Prepared by Jerzy Zachariasz, Office of Economic Policy.

**See Dr. Adam Broner, "New Jersey's Manufacturing Industries: A Long-Run Overview," 8th Annual Report of the Economic Policy Council and Office of Economic Policy, 1975.

***1982 data on manufacturing activities are based in this chapter on Census of Manufactures Preliminary Reports.

Table 1: Manufacturing Employment Changes, New Jersey and United States
1967-1982

New Jersey			United States	N.J. Compared to U.S. p.p.+
Year	Change Thousand	Percent	Change (%)	
(1)	(2)	(3)	(4)	(5)
(a) 1967-72	-45.0	-5.1	-1.5	-3.6
(b) 1972-77	-57.7	-6.9	+2.9	-9.8
(c) 1977-82	-27.7	-3.6	-2.3	-1.3
(d) 1967-1982	-130.4	-14.8	-1.0	-13.8

+percentage points

As shown in Table 2, New Jersey performed substantially better than its neighbors New York and Pennsylvania but considerably worse than Connecticut and Massachusetts.

It is worth noting that the two states in the sample whose performances were more favorable than that of New Jersey in 1977-82 experienced a sharp decline in the 1967-72 period: Connecticut (-16.5%) and Massachusetts (-13.3%) compared to New Jersey's -5.1 percent. When the fifteen year period 1967-82 is considered, all sample states show a substantial decline in manufacturing employment. This is in contrast with the national situation where manufacturing employment declined by only one percent. These data reflect the well known fact that there was a

shift in manufacturing activities away from the industrialized states of the Northeast. In 1967 twelve states with 38 percent of U.S. population were responsible for 51 percent of total U.S. manufacturing employment. By 1980 these same states represented only 45 percent of manufacturing employment and their share of population decreased to 35 percent.

In 1967, on the other hand, 17 states had 25 percent of the United States population and represented only 16 percent of the nation's manufacturing. By 1980, the same states' share in manufacturing employment increased to 24 percent and their population's share increased to 27 percent. Section II attempts to determine factors that explain a states' manufacturing performance.

Table 2: Changes in Manufacturing Employment (percent)
New Jersey and Selected States

	New Jersey	New York	Pennsylvania	Connecticut	Massachusetts
1967-72	-5.1	-12.9	-9.0	-16.5	-13.3
1972-77	-6.9	-10.1	-5.7	+3.3	-1.0
1977-82	-3.6	-6.3	-11.6	+2.9	+5.1
1967-82	-14.8	-26.6	-24.2	-11.3	-9.8

There were both losers and winners during the time spans considered. During the decade 1972-1982 New Jersey's manufacturing sector lost 85,500 jobs. Changes (mainly losses) did not affect individual industries evenly (see Tables 3 and 4 and Appendix I).

In a two-digit classification (industrial groups), the highest absolute loss was registered by the apparel industry where employment declined by 18,900 from 69,700 to 50,800 (Table 3, row c). That industry declined nationally as well, but New Jersey's decline was more dramatic, 27.1 percent vs. 13.1 percent for the United States (Table 3, row c). The share of the apparel industry employment in total manufacturing employment has been reduced from 8.3 percent in 1972 to 6.8 percent in 1982. This is still higher than the respective share for the nation which is 6.3 percent (Table 4, row c).

The electric and electronic equipment industry group lost 15,900 employees, or 16.5 percent. This is in sharp contrast to the nation where an increase of 15.8 percent was experienced (Table 3, row b). Three industries of that group are particularly responsible for this situation. The communication equipment industry registered a 17.1 percent decline in New Jersey, while the United States showed an increase in employment of 34 percent. Electronic components increased by 52 percent for the U.S., while in New Jersey that increase was below two percent (Appendix I). The share of the electric and electronics group in New Jersey is still slightly higher than that for the nation (10.7% vs. 10.1%) in 1982 (Table 4, row b).

Another industrial group that negatively affected New Jersey's manufacturing employment in the past decade is the food and kindred

Table 3: New Jersey Manufacturing Employment by Industry Groups

SIC	Industry	1972-1982				U.S.
		1972 (000)	1982 (000)	Change (000)	Percent Change	Percent Change
a.	28 Chemicals & Allied Products	97.6	91.8	-5.8	-5.9	+3.5
b.	36 Electric & Electronic Equipment	96.5	80.6	-15.9	-16.5	+15.8
c.	23 Apparel & Other Textile Products	69.7	50.8	-18.9	-27.1	-13.1
d.	35 Machinery Except Electrical	62.3	58.3	-4.0	-6.4	+19.1
e.	34 Fabricated Metal Products	59.4	53.2	-6.9	-11.6	-2.8
f.	20 Food & Kindred Products	53.7	39.4	-14.3	-26.6	-4.8
g.	27 Printing & Publishing	42.0	53.7	+11.7	+27.9	+22.4
h.	32 Stone, Clay & Glass Products	37.9	26.7	-11.2	-29.6	-14.9
i.	30 Rubber & Misc. Plastic Products	36.6	34.8	-1.8	-4.9	+2.0
j.	26 Paper & Allied Products	31.6	26.9	-4.7	-14.9	-4.8
k.	33 Primary Metal Industries	30.7	20.9	-9.8	-31.9	-25.2
l.	22 Textile Mill Products	29.9	16.7	-13.2	-44.1	-23.4
m.	37 Transportation Equipment	26.0	17.7	-8.3	-32.0	-5.8
n.	38 Instrument & Related Products	22.6	29.0	+6.4	+28.6	+38.3
o.	25 Furniture & Fixtures	10.8	9.9	-.9	-8.4	-5.8
p.	31 Leather & Leather Products	9.1	4.5	-5.1	-50.5	-26.4
q.	24 Lumber & Lumber Products	6.2	5.9	-.3	-4.9	-16.4
r.	29 Petroleum & Coal Products	6.7	7.3	+.6	+9.0	+1.1
s.	39 Misc. Manufacturing Industries	27.4	24.7	-3.3	-9.9	-14.2
t.	Administrative & Auxiliary	79.4	98.7	+19.3	+24.3	+19.8
TOTAL		836.1	750.6	-85.5	-10.2	+0.5

Table 4: New Jersey's Composition of the Manufacturing Sector (percent)
1972-1982

SIC	Industry	1972	1982	U.S. 1982
---	-----	---	---	---
		(1)	(2)	(3)
a. 28	Chemicals & Allied Products	11.7	12.2	4.5
b. 36	Electric & Electronic Equipment	11.6	10.7	10.1
c. 23	Apparel & Other Textile Products	8.3	6.8	6.3
d. 35	Machinery, Except Electrical	7.4	7.8	11.4
e. 34	Fabricated Metal Products	7.1	7.1	7.6
f. 20	Food & Kindred Products	6.4	5.2	7.9
g. 27	Printing & Publishing	5.0	7.2	6.8
h. 32	Stone, Clay & Glass Products	4.5	3.6	2.8
i. 30	Rubber & Misc. Plastic Products	4.4	4.6	3.3
j. 26	Paper & Allied Products	3.8	3.6	3.2
k. 33	Primary Metal Industries	3.7	2.8	4.5
l. 22	Textile Mill Products	3.6	2.2	3.8
m. 37	Transportation Equipment	3.1	2.4	8.5
n. 38	Instrument & Related Products	2.7	3.8	3.3
o. 25	Furniture & Fixtures	1.3	1.3	2.3
p. 31	Leather & Leather Products	1.1	0.5	1.1
q. 24	Lumber & Lumber Products	0.7	0.8	3.0
r. 29	Petroleum & Coal Products	0.8	1.0	0.8
s. 39	Misc. Manufacturing Industries	3.3	3.2	2.0
t.	Administrative & Auxiliary	9.5	13.2	6.8
	TOTAL	100.0	100.0	100.0

products group. Employment in that industry group declined by over 26 percent, which amounts to a loss of 14,300 employees in the 1972-82 period. In the same period, that industrial group declined nationally by about five percent (Table 3, row f). The share of that group in manufacturing employment declined from 6.4 percent in 1972 to 5.2 percent in 1982 in New Jersey, while for the nation that share was 7.9 percent in 1982 (Table 4). All industries within this group show declines which range from 54 percent for fats and oils to 0.3 percent for grained mill products (Appendix I).

Textile mill products show one of the highest rates of employment decline in New Jersey (44%). This resulted in a sizable loss in the

number of jobs (13,200). The national loss of employment in this group is also high -- over 23 percent (Table 3, row 1). The share of this industry declined from 3.6 percent to 2.2 percent in New Jersey (1982) while the share on the national level is 3.8 percent in the same year (Table 4, row 1).

The chemical industry which is the largest employer in New Jersey (over 90,000) experienced a relatively modest decline of 5.9 percent and the share of this industrial group in New Jersey manufacturing employment increased in 1982 to 12.2 percent from 11.7 percent in 1972. The respective share for the United States in 1982 is only 4.5 percent (Tables 3 and 4, row a).

In this group a significant decline in the number of jobs was registered in industrial organic chemicals (7,000). However, some chemical industries experienced a substantial growth: soaps, cleaners (over 20%) and drugs (over 10%) (Appendix I).

The highest employment gain in New Jersey manufacturing belonged to administrative and auxiliary units which include central offices that serve their own manufacturing establishments. Employment in such units increased in the decade in New Jersey by over 19,000, or by 24.3 percent, while nationally that growth was 19.8 percent (Table 3, row t).

New Jersey experienced a sizable gain in employment in the printing and publishing industrial group. During the decade nearly 12,000 new jobs were created in that area, which translates into a 27.9 percent growth (Table 3, row g). Employment in the books industry and in printing trade services industries doubled. Commercial printing increased by 50 percent (Appendix I).

Another industry which registered employment growth is the instrument products industrial group where employment in New Jersey increased by 28.6 percent in the decade (Table 3, row n). New Jersey followed a national trend since the respective U.S. growth is even higher

(38%). In terms of the number of employees, the gain was, however, modest (6,400), since the share of this group in total New Jersey manufacturing employment is only 3.8 percent.

B. Value Added

Value added is usually referred to as a measure of output. Value added can, however, also be considered as a proxy measure for income generated and distributed as a remuneration for factors of production (labor, capital, land). For our purposes, this aspect is important since it allows us to measure the income generated by the manufacturing sector of a given state. The aggregate levels of value added for individual states are not comparable without adjustment for the size of these states. Table 5 introduces data showing the level of per capita value added for New Jersey, the United States, and selected states.

In all the census years since 1967, New Jersey's per capita value added in the manufacturing sector is substantially higher than that for the United States. The level of New Jersey value added is also consistently higher than that for New York and Pennsylvania. The Garden State performance was, however, consistently below that of Connecticut, but was better than Massachusetts in

Table 5: Per Capita Value Added in Manufacturing (\$)

	U.S.	N.J.	N.Y.	PA	CT	MA
	----	----	----	-----	-----	-----
1967	1,327	1,839	1,408	1,650	2,177	1,558
1972	1,699	2,232	1,655	1,976	2,216	1,842
1977	2,663	3,110	2,481	3,031	3,540	2,831
1982*	3,597	4,302	3,600	3,901	5,177	4,514

*A proxy derived by subtracting the cost of materials from the value of shipment data since value added data were not available at the time this chapter was prepared.

Table 6: Per Capita Value Added in Manufacturing
(New Jersey as Percentage of the United States and of Selected States)

	N.J./U.S.	N.J./N.Y.	N.J./PA	N.J./CT	N.J./MA
1967	139	131	111	84	118
1972	131	135	113	101	121
1977	117	125	103	88	110
1982	120	120	110	83	95

1967, 1972 and 1977. Only in 1982 did Massachusetts' per capita value added exceed that of New Jersey.

New Jersey's advantage in this indicator has declined since 1967. If the average for the United States is taken as 100, New Jersey's per capita value was 139 in 1967 but only 120 in 1982. There was, however, some improvement in 1982 as compared to 1977 (Table 6).

The per capita value added of a state or nation is a function of the level of value added per employee and employment. The level of value added per employee depends to some degree on the industrial mix since manufacturing industries differ in the level of value added per employee because of specific technologies used.

When value added per employee is used as a measure of employee work efficiency, the effect of the mix should be neutralized to arrive at comparable data. This is usually done by using standardized industrial compositions. Since our emphasis here is on income generated, such a procedure is not imperative. If a given state has a higher value added

per capita than another state, the given state has a real advantage of higher income generated even if it may be a result of its industry mix. The advantage remains an advantage. Value added per employee is, however, an interesting indicator that allows us to determine the source of New Jersey's advantage in per capita value added.

The 1982 data in Table 7 reveal that N.J.'s advantage, as compared to the national average, in per capita value added by the manufacturing sector is a result of relatively higher level of employment in that sector in New Jersey. The level of employment in New Jersey is 1.22 times the nation's level (col. 3, row c), while the per employee value added is .98 times the U.S. value (col. 2, row c). The product of these two indicators is 1.196, or a 19.6 percent advantage (col. 1, row c).

New Jersey's 1972 high advantage in per capita value added is a result of both an advantage of value added per employee and the relatively high level of manufacturing employment. The effect of the level of employment seems, however, to be the leading factor in that year as well.

Table 7: Per Capita and Per Employee Value Added (\$) New Jersey and United States

	V a l u e A d d e d		Manufacturing Employment as Percent of Population
	Per Capita	Per Employee	
	(1)	(2)	
<u>1982</u>			
a. N.J.	4,302	42,631	10.09
b. U.S.	3,597	43,523	8.27
c. N.J./U.S.	1.196	.980	1.220
<u>1972</u>			
d. N.J.	2,232	19,628	11.38
e. U.S.	1,699	18,609	9.14
f. N.J./U.S.	1.314	1.054	1.245

C. Capital Expenditures

The level of capital investment deserves attention because it is, other things equal, an indicator of future growth. New Jersey's aggregate capital expenditures in the manufacturing sector have been con-

sistently below the United States average relative to the number of employees and as a percentage of value added (Table 8). New Jersey's expenditures are, however, in line with other major states in the region.

Table 8: Capital Expenditures in the Manufacturing Sector New Jersey and Selected States Index (U.S. = 100)

a. Per Employee (\$)	New Jersey				Selected States			
	1967	1972	1977	1982	1967	1972	1977	1982
U.S.	1113	1265	2423	3960	100	100	100	100
N.J.	935	1124	1768	2754	84	89	73	70
N.Y.	679	897	1675	3101	61	71	69	78
PA	1053	1043	1728	2915	95	82	71	74
CT	933	832	1374	2479	84	66	57	63
Mass.	692	869	1555	2756	62	67	64	70
b. Percentage of Value Added								
U.S.	8.2	6.8	8.1	9.1	100	100	100	100
N.J.	6.5	5.7	6.0	6.5	79	84	74	71
N.Y.	5.2	5.0	5.7	6.9	63	74	70	76
PA	8.5	6.3	6.4	7.4	104	93	79	81
CT	7.0	4.9	5.2	6.4	85	72	64	70
Mass.	5.7	5.0	5.8	6.8	70	74	73	75

Aggregate data on capital expenditures are heavily affected by the industry mix. The number of jobs generated by a given amount of capital investment differs from industry to industry.

Some assessment of New Jersey's capital investment performance, where the mix factor is eliminated, can be reached by comparing the level of New Jersey's per employee capital investment for individual industries with the value of this indicator for the same industries at the national level.

In Table 9 New Jersey's per employee capital investment of individual major industrial groups is compared to that of the United States. The same comparisons for 80 individual industries at the three-

digit level are shown in Appendix II. As expected, New Jersey's performance, compared to that of the United States, differs substantially if related to individual industries.

The data reveal that New Jersey's chemical industry group took up about one-fourth of the State's total capital expenditures. While the level of capital expenditures per employee is the State's highest (\$6,285), it is still far below the nation's level of \$10,485.

There is, however, one industry in the chemical group where the value of capital expenditures is higher for New Jersey than for the United States. The New Jersey drug industry spent 4.6 percent more on capital investment per employee than the U.S. drug industry (see Appendix II).

Table 9: Capital Expenditures Per Employee in Manufacturing by Industry Group
New Jersey and United States, 1982

SIC	Industry	N.J. (\$ million)	Per Employee		N.J. as Percentage of U.S.
			N.J. (\$)	U.S. (\$)	
28	Chemicals & Allied Products	577.0	6,285	10,485	59.9
36	Electric & Electronic Equipment	176.0	2,182	3,942	55.4
23	Apparel & Other Textile Products	55.2	1,086	566	191.9
35	Machinery, except Electrical	139.5	2,380	3,896	61.1
34	Fabricated Metal Products	109.8	2,063	2,651	77.8
20	Food & Kindred Products	158.6	4,025	4,559	88.3
27	Printing & Publishing	163.9	3,052	2,510	121.5
32	Stone, Clay & Glass Products	100.0	3,745	4,378	85.5
30	Rubber & Misc. Plastic Products	83.7	2,405	3,257	73.8
26	Paper & Allied Products	97.7	3,632	8,440	43.0
33	Primary Metal Industries	77.7	3,718	5,429	68.5
22	Textile Mill Products	23.0	1,377	2,720	50.6
37	Transportation Equipment	48.0	2,711	4,515	60.0
38	Instruments & Related Prod.	69.2	2,386	3,391	70.4
25	Furniture & Fixtures	10.1	1,020	1,294	78.8
31	Leather & Leather Products	1.9	422	639	66.0
39	Miscellaneous Manufacturing Indus.	42.7	1,728	1,783	96.9
	Total Listed	1,934.0			
	Other	133.4			
	TOTAL	2,067.4			

The printing and publishing industrial group in N.J. spent, as a group, 21.5 percent more per employee than all states on average. The newspaper industry capital expenditures in New Jersey amounted to \$3,052 per employee vs. \$2,510 for the nation.

The apparel industry (SIC 23) shows a relatively high level of capital expenditures in New Jersey. That industry spent \$1,086 per employee in New Jersey while the average for all states respective figure is only \$566. The apparel industry is a substantial employer in New Jersey with 50,800 employees (or 6.8% of all manufacturing).

The performance of the State electric and electronic equipment industry (SIC 36) is especially disappointing. This industry is the second largest manufacturing employer in the State (80,600). Capital expenditures in this industry group for New Jersey amount to only 55 percent of that of the average of all states. Only one industry in this group (electric and industrial apparatus), which employs only 3,900 persons, shows a higher level of capital expenditures than the United States. All other industries of this group show a substantially lower level of capital expenditures per employee in comparison to that of the average for all states (Appendix II).

A similar situation exists in the State's machinery industry (SIC 35) where only one industry (special industrial machinery) shows a higher level of spending in New Jersey than in the United States.

New Jersey's capital expenditure per employee in the food industry group is relatively close to that of the country as a whole -- \$4,025 New Jersey vs. \$4,559 United States. Five of the nine industries of this group show higher capital investment in New Jersey than in the United States on a per employee basis: meat products 20 percent higher, dairy 39 percent, preserved fruits and vegetables 13 percent, bakery products 16 percent, and miscellaneous food 44 percent.

There is also another group where New Jersey's performance is close to that of the United States. This is the most heterogenous group called miscellaneous manufacturing industries (SIC 39). The respective figures of capital spending are: \$1,728 for New Jersey and \$1,783 for the United States. Three industries of this group show higher levels of capital spending in New Jersey: jewelry (48%), toys and sporting goods (13%), costume jewelry and notions (15%).

In all other industry groups not discussed above, New Jersey's performance was mixed. Some individual industries of these groups performed in New Jersey better than the United States. These are listed below:

<u>SIC</u>	
322	glass blown or pressed, 22.5% better
3069	rubber products, 74% better
339	miscellaneous primary metals, 62% better
344	fabricated structural metal, .3% better
265	paperboard containers and boxes, 23% better

II. Causes of Decline

In this section we make an attempt to investigate the reasons for the decline in performance of the New Jersey manufacturing sector. What are the systematic and quantitative factors that explain state by state variation of changes, over time, in manufacturing employment? For the period 1967-82 these changes were highly differentiated. The employment index for individual states (1967 = 100) ranges from 73.4 to 291.0 and the standard deviation is 41.2, or 34 percent of the mean. There are, of course, numerous factors affecting manufacturing employment (labor costs and labor availability, skills of the labor force, cost of land, infrastructure or availability of transportation facilities and transfer cost, proximity of markets, level of taxation and others).*

The regression method allows us to identify statistically significant determinants of manufacturing growth and also to find the quantitative relationships between the values of those factors and the changes in manufacturing employment. After experimenting with several explanatory variables, we selected the following three variables: the size of the manufacturing sector, the wage level and the education level. The form of the final regression equation and the specification of the variables are as follows:

$$\text{GROWTH} = a\text{WAGES} + b\text{EDUC} + c\text{LEVEL} + C$$

where:

$$\text{GROWTH} = \text{state by state index of 1982 manufacturing employment (1967 = 100)}$$

LEVEL = state by state manufacturing employment as percentage of total population (1967)

EDUC = state by state percentage of population (25 years and over) who completed at least four years of high school (1970)

WAGES = state's average manufacturing wage rate relative to the United States average (in percent) adjusted for the industrial mix of the given state (1972)

a,b,c = coefficients of regression

C = constant

There are good reasons why the relative LEVEL (size) of the manufacturing sector in 1967 would affect the condition for growth of this sector in the period 1967-82. States with an oversized manufacturing sector would, in 1967, have relatively high prices of industrial and residential land and high costs, and prices of services. There are physical and economic limits on how high a percentage of the population can be employed in the manufacturing sector. On the other hand, states with an undersized manufacturing sector would, in general, offer lower prices of land and services and have a relatively low cost of living. These advantages, at some point, outweigh the disadvantages of usually imperfect infrastructure. Therefore, a negative relationship between the LEVEL indicator and the manufacturing growth should be expected. There is also an arithmetic effect involved here. The higher the initial level of manufacturing, the lower the percentage of growth as a result of the same absolute change.

*See Joseph J. Seneca, "The Determinants of High Technology Growth," Chapter II, 16th Annual Report, Economic Policy Council and Office of Economic Policy, Trenton, 1984, and E. Willard Miller, Manufacturing -- A Study of Industrial Location, The Pennsylvania State University Press, University Park and London, 1977.

The role of relative WAGES for manufacturing growth is self-explanatory, as a general proposition. It is obvious that, other things being equal, lower wages attract the location and growth of the manufacturing sector. The expected relationship between wage rates and growth of manufacturing employment would therefore be negative.

A positive relation is expected between the EDUCATION variable and the dependent variable -- manufacturing GROWTH. The education level of the population determines the potential skill level of the labor force. It is obvious that other things equal, states with better labor force skill characteristics would be more attractive to most manufacturing activities.

It should be noted that two tax variables we experimented with proved to be statistically insignificant in the context of this regression. We detected, however, negative but weak correlation between per capita tax load and employment growth ($r = -.27$) and for corporation tax rates this relationship was: $r = -.24$.

To assume some size compatibility of states in the regression calculation, we included in that calculation states with a population of no less than one million. The states included in the regression (38 states) represent, however, 94 percent of the United States population and 96 percent of its manufacturing employment.

The numerical results of the regression are as follows:

$$\text{GROWTH} = -5.974\text{LEVEL} - 1.088\text{WAGES}$$

(-5.116) (-2.431)

$$+ 1.365\text{EDUC} + 203.4$$

(+2.362) (+6.463)

$$\bar{R}^2 = .61 \quad F(3,34) = 19.9$$

The numbers in parentheses are t statistics, and their values indicate that the coefficients of all variables used in this regression are significant, with the level of confidence at least 97.5 percent.

The value of \bar{R}^2 indicates that 61 percent of the variation, among states, of manufacturing employment changes during the period 1967-1982 is explained by the regression.

The coefficient of the LEVEL variable indicates that an increase of one percentage point of the LEVEL variable (manufacturing employment as a percentage of population) results in a 6.0 percentage point lowering of the index of manufacturing employment in the context of this regression. For each percentage point of higher relative WAGE rate, a lowering of the manufacturing growth by about 1.1 percentage points should be expected. Finally, one additional percentage point of EDUC (percent of population with four years of high school) is expected to increase the manufacturing employment growth by about 1.4 percentage points.

The coefficients of the regression equation enable us to calculate the expected values of the manufacturing employment indexes for each state. The expected value of that index for N.J. is 85.7 which is very close to the actual figure (85.2). These results suggest that taking into account the three explanatory factors in the equation, N.J. should have expected such a significant decline in manufacturing employment.

The poor performance of the manufacturing sector in New Jersey compared to the average (mean) of the 38 states can be attributed mainly to the relatively high initial level of the manufacturing sector and to the higher relative wages. The higher level of education had some mitigating effect, but only a small one, since New Jersey's value of this

Table 10: Value of Regression Variables
New Jersey vs. 38 States

Variable	N.J. Value	38 States Mean	Difference N.J.-38 States	Regression Coefficient	Effect on Mfg. Growth
	(1)	(2)	(3)	(4)	(5)
a. Expected					
Mfg. Emp.	85.7	115.9	-30.2	--	-30.2
b. LEVEL	12.7	8.8	+3.9	-5.974	-23.3
c. WAGES	104.2	96.7	+7.5	-1.088	-8.2
d. EDUC	52.5	51.6	+0.9	+1.365	+1.2

indicator is only marginally higher than the average. The contribution of individual factors to the total difference between New Jersey's manufacturing employment growth (decline) and that of the average for 38 states can be assessed using the regression variables and coefficients. The results of such an assessment are shown in Table 10.

New Jersey's expected growth index for manufacturing employment is 30.2 points lower than the average for the 38 states (row a, cols. 1, 2, 3 and 5). Col. 3, rows b, c, d list differences in value of the three explanatory variables. These differences multiplied by the respective regression coefficients arrive at the effect of these differences on the index of manufacturing employment (col. 5).

The LEVEL variable was 3.9 percentage points higher than the average for the 38 states in 1967. Multiplying that difference by the regression coefficient for that variable, we conclude that this difference is responsible for lowering New Jersey's growth by 23.3 percentage points (row b) as compared to the 38 states value. The wage rates were 7.5 percentage points higher in New Jersey in 1972 than for the 38 states and this resulted in an 8.2 percentage point lower growth of manufacturing in New Jersey as compared to 38 states (row c).

Finally, the EDUCATION variable was responsible for a 1.2 percentage points positive manufacturing growth in New Jersey as compared to the 38 states mean (row d). The algebraic sum of these differences adds up to 30.2 percentage points which is the difference between the value of New Jersey's index of manufacturing employment growth (decline) and the respective average index for 38 states (row a).

A review of col. 5 in Table 10 suggests that the LEVEL variable had a compelling effect on the growth situation of manufacturing in New Jersey. As noted, New Jersey's manufacturing employment index was 30.2 percentage points below the value of that index for the sample states and over 23 percentage points of this difference (or 77 percent) is attributable to the effect of a higher initial level of the manufacturing sector in New Jersey.

The results in Table 10 of the regression explain past changes based on past conditions. The explanatory variables pertain to 1967, 1970 and 1972. It is therefore of interest to review the direction of the changes that have occurred since then. These changes can be analyzed by employing the regression coefficients using more recent* values of the explanatory variables. Such a calculation is presented in Table 11 below.

*LEVEL 1982; WAGES 1982; and EDUC 1980 latest available data.

Table 11: New Jersey's Recent Value of Explanatory Variables

	N.J. Regression Values	N.J. New Values	New Values Minus Regres- sion Values	Regression Coefficient	Effect on Manufac- turing Growth
	(1)	(2)	(3)	(4)	(5)
LEVEL	12.7 (1967)	10.1 (1982)	-2.6	-5.974	+15.2
WAGES	104.2 (1972)	101.2 (1982)	-3.0	-1.088	+3.3
EDUC	52.5 (1970)	67.4 (1980)	+14.9	+1.365	+20.3
TOTAL					+38.8

The results shown in Table 11 suggest that the values of explanatory indicators changed in New Jersey in a direction that is more conducive to manufacturing growth. The level of the manufacturing sector declined and so did the level of relative wages. The education indicator increased substantially. If in the beginning of the 1970's New Jersey explanatory variables had been on the recent level, New Jersey's expected growth index of manufacturing would have been about 38 percentage points higher than indicated by the basic regression calculation, or about 124 instead of 85.7.

These results in no way imply that in the new situation we can expect a growth of New Jersey's manufacturing sector in the magnitude resulting from the calculation shown in Table 11. The regression coefficients, as they are, embody relationships between states and to the mean. These relationships have changed too, if only because the value of the explanatory indicators in other states changed as did the sample mean.

It is of interest to note that a comparison of changes in the variable values (New Jersey vs. 38 states averages) reveals that these changes were in New Jersey's favor compared

to the respective changes for the 38-state average.

As shown in Table 12 the LEVEL indicator, a powerful explanatory variable in our regression, decreased in New Jersey by 2.6 percentage points, or by over 20 percent. Since this variable is negatively related to employment growth, a decline indicates improvement. At the same time, the 38 states average value of the LEVEL indicator declined by only 0.7 percentage point (or 8%).

The WAGE variable, which is also negatively related to employment growth, declined by 3.0 percentage points in New Jersey, while the mean for the 38 states shows an increase of 3.5 percentage points.

The changes in the EDUC variable were approximately the same for both: New Jersey and 38 states average (14.9 vs 14.4).

Our analyses were, so far, based on a regression that involved all states with populations over one million. Individual states are on highly different levels of industrial development and include both so-called industrialized and non-industrialized states. The results of the regression reflect these variations.

Table 12: Change in Value of Explanatory Variables
New Jersey vs. 38 States

Variable	New Jersey			38 States Mean		
	Regression Values	New Values	Change	Regression Values	New Values	Change
	(1)	(2)	(2)-(1)	(3)	(4)	(4)-(3)
LEVEL	12.7 (1967)	10.1 (1982)	-2.6	8.8 (1982)	8.1 (1982)	-0.7
WAGES	104.2 (1972)	101.2 (1982)	-3.0	96.7 (1970)	100.2 (1982)	+3.5
EDUC	52.5 (1970)	67.4 (1980)	+14.9	51.6 (1970)	66.0 (1980)	+14.4

The results for individual states, and for our purposes the results for New Jersey, are affected by these well-known differences between the industrialized (declining) and non-industrialized (growing) states.

There remains, however, a legitimate question concerning New Jersey's performance as it relates to other industrially developed states. What are the factors that explain the differences in growth (or rather decline) among industrialized states alone? In that context, we made an attempt to formulate a regression equation that involves only states with manufacturing sectors that exceed the average level of manufacturing employment. Experiments with this set of states revealed that the LEVEL variable is statistically insignificant when applied for this sample. Such results should be expected since within this group of states, the variation of that variable across states is low. The standard deviation of this variable is 12 percent of the mean when fifteen states are included, while the respective figure for the 38 state sample is 25 percent. The EDUCATION variable as formulated for the regression involving 38 states is here also insignificant.

The relative WAGE factor is not only highly significant but explains about 70 percent of all variation of

manufacturing growth (or decline) if applied as a single independent variable in this regression of fifteen states.

The result of the regression is as follows:

$$\text{GROWTH} = -1.559\text{WAGES} + 247.1$$

$$(-5.669)^* \quad (+9.001)$$

$$\bar{R}^2 = .69 \quad F(1,13) = 32.1$$

*Significant at the 99.5 level of confidence.

New Jersey's performance, as measured by this fifteen state regression, can be evaluated as follows: if the level of New Jersey's relative wages is taken into account, the value of the expected (estimated) growth index is 84.7, while the actual index is 85.2 or 0.5 percentage points higher.

Some interesting observations can be made by reviewing data for the individual industrialized states (Table 13). Except for three states, all other industrialized states registered a decline in manufacturing. This suggests that states with an initially large manufacturing sector (above average) had only a one-in-five chance experiencing a positive growth of this sector in the 1967-82 period. Nine of the states show a decline of 10 percent or more

Table 13: Employment Index and Relative Wage Indicator
Fifteen Industrialized States

	1982 Employment (1967 = 100)	Employment Change 1967-82 (%)	Relative Wage 1972
1. Maine	99.2	-0.8	87.23
2. Massachusetts	90.3	-9.7	97.48
3. Connecticut	88.7	-11.3	95.46
4. New York	73.4	-26.6	106.42
5. New Jersey	85.2	-14.8	104.16
6. Pennsylvania	75.8	-24.2	100.76
7. Ohio	79.2	-20.8	108.29
8. Indiana	82.3	-17.7	106.84
9. Illinois	77.1	-22.9	106.99
10. Michigan	78.8	-21.2	115.13
11. Wisconsin	96.9	-3.1	104.36
12. Missouri	90.0	-10.0	96.98
13. North Carolina	124.3	+24.3	85.95
14. South Carolina	120.8	+20.8	86.47
15. Georgia	119.0	+19.0	88.75
MEAN	92.1	-7.9	99.42

and the highest decline was experienced by New York (26.6%), followed by Pennsylvania (24.2%), Illinois (22.9%), and Michigan (21.2%). The states that experienced manufacturing growth were: North Carolina, South Carolina and Georgia.

III. Summary and Conclusions

New Jersey experienced a substantial decline in manufacturing employment in the period 1967-1982. The most drastic decline occurred in the period 1972-77, while in the last five year (1977-82) that decline was modest as a percentage of decline and as related to the nation's performance. New Jersey's employment performance was worse than that of Connecticut, and better than those of New York and Pennsylvania, and sometimes better than Massachusetts.

The per capita value added generated by this sector is higher in New Jersey than for the nation.

Aggregate capital expenditures per employee and as percentage of value added were, in the past, and are currently, below the average level of all states. However, in a number of industries, New Jersey capital expenditures surpassed the United States' performance.

An attempt was made to determine the major factors explaining New Jersey's relatively poor performance in the manufacturing sector. The results of the investigation suggest that three factors explain a large part (61%) of inter-state variation in employment changes during the period 1967-82 when all states with a population of over one million are

considered. In that regression, relative wage levels, education levels and the size of the manufacturing sector (in the end of the 1960's or beginning of the 1970's) proved to be statistically significant. New Jersey's actual performance is very close to that estimated on the basis of this regression coefficient.

It follows that given the conditions that prevailed in New Jersey at the end of the sixties or the beginning of the seventies, a decline of the manufacturing sector of the magnitude actually experienced was to be expected. The values of the explanatory indicators in N.J. have changed significantly since then in the direction conducive to growth. These changes are greater than the respective changes in the average for the 38 states.

The results of the first regression reflect relations across all states with a population above one million and explained New Jersey's performance in the context of the well known shift of manufacturing activities from the industrialized states of the Northeast to less industrially developed states.

We also investigated New Jersey's performance in the context of other industrialized states only. A regression calculation involving 15 states with above average (mean) relative size of the manufacturing sector, revealed that in this context the relative wage indicator is a powerful and highly significant single factor that explains a large part of the variation in the performance of the manufacturing sector in this category. Here again, New Jersey's actual performance is very close to the performance estimated on the basis of this regression result.

APPENDIX I
CHANGES OF MANUFACTURING EMPLOYMENT IN NEW JERSEY
by Major Industries

	1972 ----- (thousand)	1977 -----	1982 -----	Change 1972-82 ----- Thous. Percent -----		U.S. Change Percent -----
28. Chemicals and Allied Products						
TOTAL	97.6	95.6	91.8	-5.8	-5.9	+3.5
281 Indus. Inorgan Chem.	6.4	4.4	4.4	-2.0	-31.3	+8.9
282 Plastics	5.4	5.7	4.9	-.5	-9.3	-15.1
283 Drugs	28.5	n.a.	31.4	+2.9	+10.2	+27.5
284 Soaps, Cleaners	20.7	22.2	25.0	+4.3	+20.8	+11.7
285 Paints & Allied Prod.	6.4	5.5	4.3	-2.1	-32.8	-17.3
286 Indus. Organ. Chem.	21.4	20.1	14.4	-7.0	-34.5	-37.2
287 Agricultural Chem.	1.4	1.0	0.6	-.8	-57.1	+5.4
289 Misc. Chemical Prod.	7.4	7.4	6.8	-.6	-8.1	-1.6
36. Electric and Electronic Equipment						
TOTAL	96.5	77.6	80.6	-15.9	-16.5	+15.8
361 Elec. Dist. Equip.	5.6	6.1	4.7	-.9	-16.1	-9.5
362 Elect. Indus. App.	4.3	3.6	3.5	-.8	-18.6	+14.9
363 Household Appliances	4.2	2.6	1.3	-2.4	-57.1	-20.7
364 Elec. Light & Wiring Equipment	17.4	11.0	9.8	-7.6	-43.7	-9.5
365 Radio & Television	3.6	4.8	3.7	+.1	+2.8	-40.0
366 Comm. Equipment	39.7	27.0	32.9	-6.8	-17.1	+34.0
367 Electronic Comp.	18.0	14.1	18.3	+.3	+1.7	+52.3
369 Misc. Elec. Equip.	3.7	5.7	5.8	+2.1	+56.8	+71.5
23. Apparel and Other Textile Products						
TOTAL	69.7	59.7	50.8	-18.9	-27.1	-13.1
233 Women's & Misses Outerwear	29.9	28.1	23.6	-3.6	-12.0	-2.8
234 Women's & Childrens Undergarments	4.6	3.5	3.9	-0.7	-15.2	-22.2
239 Misc. Fab. Textile	11.3	9.0	11.8	+0.5	+4.4	-6.8

(continued)

	<u>1972</u>	<u>1977</u>	<u>1982</u>	<u>Change 1972-82</u>		<u>U.S.</u>
	<u>(thousand)</u>			<u>Thous.</u>	<u>Percent</u>	<u>Change</u>
				<u>-----</u>	<u>-----</u>	<u>-----</u>
35. Machinery, Except Electrical						
TOTAL	62.3	63.5	58.3	-4.0	-6.4	+19.0
353 Construction Mach.	5.3	4.5	4.1	-1.2	-22.6	+18.1
354 Metalwashing Mach.	7.2	8.1	6.9	-0.3	-0.4	+5.7
355 Spec. Ind. Machinery	11.8	11.1	10.9	-0.9	-7.6	-31.9
356 Gen. Industrial Mach.	13.4	14.4	12.8	-1.1	-8.2	+18.0
357 Off. & Comput. Mach.	6.8	n.a.	7.4	+0.6	-8.8	+94.7
358 Refrig. & Ser. Mach.	9.1	8.3	6.6	-2.5	-27.4	-13.1
359 Misc. Mach, except Electrical	6.3	n.a.	8.2	+1.9	-30.2	+49.5
34. Fabricated Metal Products						
TOTAL	59.4	51.9	53.2	-6.2	-10.4	-2.8
341 Metal Cans & Cont.	8.5	6.3	4.1	-4.4	-51.8	-27.0
342 Cutlery, Hand Tools	8.6	9.3	7.3	-1.3	-15.1	-8.9
343 Plumbing & Heating	1.7	1.9	1.5	-0.2	-11.8	-2.3
344 Fab. Struc. Metal	13.1	12.6	12.2	-0.9	-0.7	+15.5
345 Screw Mach. Prod.	4.8	4.0	4.2	-0.6	-12.5	-8.8
347 Metal Services	3.1	3.2	3.7	+0.6	+19.4	+17.1
349 Misc. Fab. Metals	12.3	13.4	13.2	+0.9	+7.3	+15.3
20. Food and Kindred Products						
TOTAL	53.7	43.2	39.4	-14.3	-26.6	-4.8
201 Meat Products	5.2	4.4	4.9	-0.3	-5.8	+3.9
202 Dairy	3.0	2.6	2.6	-0.4	-13.3	-23.3
203 Pres. Fruits & Veg.	10.0	7.7	6.8	-3.2	-32.0	-5.7
204 Grain Milled Products	1.0	0.9	0.7	-0.3	-0.3	-3.6
205 Bakery Products	11.8	9.3	7.9	-3.9	-33.1	-8.2
206 Sugar & Confectionary	3.8	3.1	2.5	-1.3	-34.2	-10.2
207 Fat & Oils	2.2	1.5	1.0	-1.2	-54.5	-2.8
208 Beverages	9.2	7.4	6.3	-2.9	-31.5	-8.6
209 Misc. Foods	7.6	6.3	6.1	-1.0	-13.2	+17.2

(continued)

	<u>1972</u>	<u>1977</u>	<u>1982</u>	<u>Change</u>	<u>1972-82</u>	<u>U.S.</u>
	(thousand)			<u>Thous.</u>	<u>Percent</u>	<u>Change</u>
				<u>-----</u>	<u>-----</u>	<u>Percent</u>
27. Printing and Publishing						
TOTAL	42.0	45.4	53.7	+11.7	+27.9	+22.3
2711 Newspapers	11.2	11.8	12.8	+1.6	+14.3	+15.6
2721 Periodicals	EE	1.2	2.5	--	--	+41.9
273 Books	3.2	4.1	6.3	+3.1	+96.9	+14.0
275 Commercial Printing	13.2	13.6	19.8	+6.6	+50.0	+31.2
278 Blank Books	5.3	5.8	4.8	-0.5	-9.4	+17.5
279 Printing Trade Ser.	2.2	2.9	4.5	+2.3	+104.5	+17.8
32. Stone, Clay and Glass Products						
TOTAL	37.9	BB	26.7	-11.2	-29.6	+14.9
322 Glass-Pressed or Blown	15.2	13.1	9.4	-58.8	-38.2	-18.3
3231 Prod. of Pressed Glass	2.8	2.9	3.4	+0.6	+21.4	+18.3
326 Pottery & Related Products	3.9	3.6	3.9			
327 Concrete, Gypsum, Plastics	5.9	3.8	3.3	-2.6	-44.1	-9.4
329 Nonmetallic Mineral Products	8.3	7.6	5.8	-2.5	-30.1	5.3
30. Rubber and Miscellaneous Plastics Products						
TOTAL	36.6	38.7	34.8	-1.8	-4.9	+2.0
3079 Misc. Plastic Prod.	26.8	30.8	29.1	+2.3	+8.5	+38.9
3069 Rubber Products	4.5	4.6	3.9	-0.6	-13.3	-12.0
26. Paper and Allied Products						
TOTAL	31.6	29.4	26.9	-4.7	-14.9	-4.8
264 Converted Paper Products	11.3	12.4	13.1	+1.8	+15.9	+11.9
265 Paperboard Con- tainers & Boxes	14.7	12.7	10.7	-4.0	-27.2	-16.8

(continued)

	1972	1977	1982	Change	1972-82	U.S.
	-----	-----	-----	-----	-----	Change
	(thousand)			Thous.	Percent	Percent
	-----	-----	-----	-----	-----	-----
33. Primary Metal Industries						
TOTAL	30.7	21.7	20.9	-9.8	-31.9	-25.2
331 Blast Furnace	4.4	3.1	3.5	-0.9	-22.5	-33.6
332 Iron/Steel Found.	4.6	3.4	3.4	-1.2	-26.1	-27.7
335 Nonferrous Rolling	11.7	9.0	8.0	-3.7	-31.6	-8.3
336 Nonferrous Foundries	2.4	1.9	1.7	-0.7	-29.2	-7.4
339 Misc. Primary Metal	2.0	2.0	1.7	-0.3	-15.0	+2.0
22. Textile Mill Products						
TOTAL	22.9	23.4	16.7	-13.2	-44.2	-23.4
225 Knitting Mills	12.4	9.9	7.3	-5.1	-41.4	-25.9
226 Textile Finishing	7.3	6.0	4.5	-2.8	-38.3	-27.5
228 Yarn and Thread	0.8	0.9	0.5	-1.3	-37.5	-24.0
229 Misc. Textile Goods	5.0	4.3	2.7	-2.3	-46.0	-22.9
37. Transportation Equipment						
TOTAL	26.0	21.2	17.7	-8.3	-31.9	-5.8
371 Motor Vehicles	n.a.	n.a.	n.a.			-23.8
372 Aircraft & Parts	5.6	n.a.	4.8	-0.8	-14.3	+28.0
373 Ship Building & Repairing	n.a.	n.a.	1.8	--	--	+12.1
38. Instruments and Related Products						
TOTAL	22.6	26.9	29.0	+6.4	+28.3	+37.3
3811 Engineering & Scien- tific Instruments	1.9	3.9	3.9	+1.8	+94.7	16.5
382 Measuring Equipment	4.6	6.1	7.8	+3.2	+69.6	+46.5
384 Medical Instruments	9.4	10.6	10.0	+0.6	+6.4	+55.4
3861 Photo. Equipment	n.a.	5.2	5.0	--	--	--
39. Miscellaneous Manufacturing Industries Employment						
TOTAL	27.4	23.6	24.7	-2.7	-9.9	-14.3
391 Jewelry	n.a.	2.9	2.7	--	--	-6.2
394 Toys & Sporting Goods	7.5	6.0	7.4	-0.1	-1.3	-25.8
395 Pens, Pencils & Office Supplies	2.4	2.7	4.1	+1.7	+70.8	+1.0
396 Costume Jewelry & Notions	2.9	n.a.	2.5	-0.4	-9.6	-17.4
399 Misc. Manuf.	11.3	9.3	7.9	-3.4	-30.1	-7.3

APPENDIX II

CAPITAL EXPENDITURES PER EMPLOYEE IN MANUFACTURING BY INDUSTRY
New Jersey and United States 1982

	N.J. Capital Expenditures (\$ million)	Per Employee Capital Expenditures		N.J. as Percent of U.S.
	(1)	N.J.	U.S.	(4)
28. Chemicals and Allied Products				
TOTAL	577.0	6,285	10,485	59.9
281 Industrial	28.5	6,477	9,219	70.3
282 Plastics	45.1	9,204	12,097	76.1
283 Drugs	247.4	7,878	7,533	104.6
284 Soaps, Cleaners	74.6	2,984	5,171	57.1
285 Paints & Allied Products	11.5	2,674	4,853	55.1
286 Indus. Organic Chemicals	136.5	9,479	21,245	44.6
287 Agricultural Chemicals	1.9	3,167	13,952	22.7
289 Misc. Chemical Products	32.0	4,705	6,499	72.4
36. Electric and Electronic Equipment				
TOTAL	176.0	2,183	3,942	55.4
361 Elec. Dist. Equipment	5.9	1,255	2,078	60.4
362 Elec. Indus. Apparatus	3.9	1,114	738	150.9
363 Household Appliances	2.6	1,444	2,336	61.8
364 Elec. Light. & Wiring Equip.	15.1	1,224	2,128	57.5
365 Radio and Television	4.9	1,324	2,642	50.1
366 Communications Equipment	79.8	2,425	3,838	63.2
367 Electronic Components	48.6	2,655	5,828	45.6
369 Misc. Electrical Equip.	15.9	2,741	3,596	76.2
23. Apparel and Other Textile Products				
TOTAL	55.2	1,086	356	305.1
233 Women's & Misses Outerwear	39.1	1,656	528	313.6
234 Women's & Childrens Undergarments	3.5	897	463	193.7
239 Misc. Fab. Textile	9.0	762	967	78.8

(continued)	N.J. Capital Expenditures (\$ million)	Per Employee Capital Expenditures		N.J. as Percent of U.S.
		N.J.	U.S.	
	(1)	(2)	(3)	(4)
35. Machinery, Except Electrical				
TOTAL	139.5	2,380	3,896	61.1
353 Construction Machinery	14.3	3,487	5,128	68.0
354 Metalwashing Machines	16.6	2,405	2,478	97.1
355 Spec. Industrial Mach.	27.1	2,486	2,240	111.0
356 Gen. Industrial Mach.	20.8	1,625	2,920	55.7
357 Office & Computing Mach.	24.0	3,243	6,844	47.4
358 Refrig. & Ser. Mach.	13.4	2,030	2,470	82.2
359 Misc. Mach., except Elec.	18.9	2,362	2,650	89.1
34. Fabricated Metal Products				
TOTAL	109.8	2,063	2,651	77.8
341 Metal Cans & Cont.	17.6	4,292	4,622	92.9
342 Cutlery, Hand Tools	13.7	1,876	2,390	78.5
343 Plumbing & Heating	n.a.		2,036	n.a.
344 Fab. Struc. Metal	21.8	1,786	1,780	100.3
345 Screw Machine Products	7.5	1,785	2,285	78.1
347 Metal Services	7.2	1,945	2,067	94.1
349 Misc. Fab. Metals	27.5	2,083	2,982	69.9
20. Food and Kindred Products				
TOTAL	158.6	4,025	4,559	88.3
201 Meat Products	15.5	3,163	2,622	120.6
202 Dairy	17.8	6,846	4,910	139.4
203 Pres. Fruits & Veg.	33.0	4,852	4,291	113.1
204 Grain Milled Products	1.8	2,571	8,229	31.2
205 Bakery Products	20.2	2,556	2,197	116.3
206 Sugar & Confectionary	9.3	3,720	4,899	75.9
207 Fats & Oils	5.2	5,200	10,131	51.3
208 Beverages	24.9	3,952	7,812	50.6
209 Misc. Foods	31.0	5,081	3,521	144.3

(continued)	N.J. Capital Expenditures (\$ million)	Per Employee Capital Expenditures N.J.	Per Employee Capital Expenditures U.S.	N.J. as Percent of U.S.
	(1)	(2)	(3)	(4)
27. Printing and Publishing				
TOTAL	163.9	3,052	2,510	121.6
2711 Newspapers	76.5	5,976	2,550	234.4
2721 Periodicals	2.5	1,000	2,217	45.1
273 Books	9.2	1,460	2,439	59.7
275 Commercial Printing	49.8	2,515	2,843	88.5
278 Blank Books	5.4	1,125	1,266	88.7
279 Printing Trade Services	10.9	2,422	2,375	102.0
32. Stone, Clay and Glass Products				
TOTAL	100.0	3,745	4,378	85.6
322 Glass-Pressed or Blown	63.0	6,702	5,473	122.5
3231 Prod. of Pressed Glass	6.9	2,029	2,825	71.8
326 Pottery & Related Prod.	4.3	1,102	2,269	48.7
327 Concrete, Gypsum & Plastics	8.5	2,575	3,422	75.2
329 Nonmetallic Mineral Prod.	15.7	2,706	3,710	72.9
30. Rubber and Miscellaneous Plastics Products				
TOTAL	83.7	2,405	3,257	73.8
3079 Misc. Plastic Products	72.8	2,501	3,440	72.7
3069 Rubber Products	8.0	2,051	1,176	174.4
26. Paper and Allied Products				
TOTAL	97.7	3,632	3,257	73.8
264 Converted Paper Prod.	43.5	3,321	3,686	90.1
265 Paperboard Containers & Boxes	34.6	3,233	2,615	123.6
33. Primary Metal Industries				
TOTAL	77.7	3,718	5,429	68.5
331 Blast Furnace	n.a.	n.a.	6,581	n.a.
332 Iron & Steel Foundries	5.5	1,618	3,104	52.1
335 Nonferrous Rolling	n.a.	n.a.	5,452	n.a.
336 Nonferrous Foundries	n.a.	n.a.	2,325	n.a.
339 Misc. Primary Metal	10.1	5,941	3,670	161.8

(continued)	N.J. Capital Expenditures (\$ million)	Per Employee Capital Expenditures N.J.	U.S.	N.J. as Percent of U.S.
	----- (1)	----- (2)	----- (3)	----- (4)
22. Textile Mill Products				
TOTAL	23.0	1,377	967	142.4
225 Knitting Mills	7.0	958	1,140	84.0
226 Textile Finishing	7.8	1,733	2,034	85.2
228 Yarn and Thread	.6	1,200	2,242	
229 Misc. Textile Goods	4.9	1,815	2,738	66.3
Other	3.3	1,500	606	247.5
37. Transportation Equipment				
TOTAL	48.0	2,711	4,515	60.0
371 Motor Vehicles	n.a.	n.a.	6,954	n.a.
372 Aircraft & Parts	14.1	2,937	3,103	94.6
373 Ship Building & Repairing	n.a.	n.a.	2,435	n.a.
38. Instruments and Related Products				
TOTAL	69.2	2,386	3,391	70.4
3811 Enginerring & Scientific Instruments	3.9	1,054	2,494	42.3
382 Measuring Equipment	12.0	1,538	2,642	58.2
384 Medical Instruments	24.5	2,450	3,202	76.5
3861 Photo Equipment	23.4	4,680	6,346	73.7
39. Miscellaneous Manufacturing Industries Employment				
TOTAL	42.7	1,728	1,783	96.9
391 Jewelry	4.4	1,629	1,098	148.4
394 Toys & Sporting Goods	16.7	2,256	2,000	112.8
395 Pens, Pencils & Office Supplies	7.6	1,853	2,309	80.3
396 Costume Jewelry & Notions	4.0	1,739	1,518	114.6
399 Miscellaneous Manuf.	9.9	1,253	1,918	65.3

III.

NEW JERSEY'S WHOLESALE AND RETAIL SALES SECTOR*

INTRODUCTION

The trade sector is of vital importance to New Jersey. Wholesale and retail trade sales taken together form a good barometer of a state's economic well-being. For example, the most recent recovery was said to be consumer-led; this meant that wholesale and retail sales were foremost among the factors underlying the emergence of the national economy from recession.

Many variables determine how the trade sector grows in a state; some of them can be either directly or indirectly affected by state policy. Raising state sales taxes (retail or gasoline for example) can cause losses of retail sales to other states and/or they can simply reduce sales in accordance with the law of demand: high prices (taxes) are associated with low sales. Other variables, such as housing starts, which can be affected by state policy, can have an effect on related sales (furniture and appliances for example).

This Chapter analyzes New Jersey's growing trade sector. First, the health of the State's sector is examined paying special attention to the share in U.S. sales

realized by this state and other states of particular interest. Second, growth rates for major trade categories in New Jersey and various regions of the U.S. are compared for the census years 1977 and 1982.** Finally, regression analysis is used in an attempt to uncover the determinants of the selected sales categories, and elasticities are estimated to determine the effects that small changes in each of the determinants can have on total sales in each category.

THE TRADE SECTOR

Employment in the Trade Sector

In the 1977 and 1982 census years the trade sector accounted for 22.5 and 22.7 percent, respectively, of New Jersey's total nonagricultural employment. At a time when the State's manufacturing sector share is declining, the stability (and even slight relative growth) of the trade sector takes on added importance. Manufacturing employment, which once had the largest share of the State's nonagricultural employment, has fallen until it is now approximately on a par with trade.

Table 1 summarizes total employment in the trade sector for New

*Prepared by Laurence H. Falk, Office of Economic Policy.

**For a description of the 1977 and 1982 retail trade censuses, see Connie O. Hughes, "Retail Trade in New Jersey: 1982", New Jersey Economic Indicators, April 8, 1985, pp. 8-12.

Table 1: Employment in the Trade Sector
United States and New Jersey, 1977-1982

	Employees 1977		Employees 1982		% Change 1982/1977		N.J. Share of U.S. (%)		Trade Employment Growth Index/Popu- lation Growth Index	
	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.	1977	1982	U.S.	N.J.
	—	—	—	—	—	—	—	—	—	—
<u>Retail</u>										
Building Materials Dealers	470,110	12,548	504,157	13,061	7.2	4.1	2.7	2.6	1.017	1.028
General Merchandise Stores	2,016,897	66,495	1,839,158	57,749	-8.8	-13.2	3.3	3.1	.865	.857
Food Stores	1,959,008	71,509	2,347,603	79,217	19.8	10.8	3.7	3.4	1.137	1.094
Automotive Dealers	1,114,692	29,265	1,051,174	28,882	-5.7	-1.3	2.6	2.7	.895	.974
Gasoline Stations	672,673	19,213	603,886	20,014	-10.2	4.2	2.9	3.3	.852	1.029
Apparel & Accessories Stores	839,717	32,363	978,849	36,074	16.6	11.5	3.9	3.7	1.106	1.101
Furniture & Home Equip. Dealers	512,793	16,398	542,635	17,504	5.8	6.7	3.2	3.2	1.004	1.053
Eating & Drinking Places	3,759,222	106,243	4,665,830	124,477	24.1	17.2	2.8	2.7	1.177	1.157
Drug & Proprietary Stores	459,548	13,495	496,217	15,645	8.2	15.2	2.9	3.2	1.027	1.137
Miscellaneous Retail Stores	1,235,422	47,105	1,438,304	53,515	16.4	13.6	3.8	3.7	1.104	1.121
TOTAL RETAIL	13,040,082	414,634	14,467,813	446,138	10.9	7.6	3.2	3.1	1.052	1.062
<u>Wholesale</u>										
Durables Wholesale	2,539,035	102,679	2,912,848	123,212	14.7	20.0	4.0	4.2	1.088	1.185
Nondurables Wholesale	1,858,054	79,344	2,072,032	88,237	11.5	11.2	4.3	4.3	1.058	1.098
TOTAL WHOLESALE	4,397,089	182,023	4,984,880	211,449	13.4	16.2	4.1	4.2	1.076	1.147
TOTAL TRADE SECTOR	17,437,171	596,657	19,452,693	657,587	11.6	10.2	3.4	3.4	1.059	1.089

Jersey and the United States. Total employment in retail trade grew from 13.0 million to 14.5 million, or 10.9 percent, in the U.S. over the 1977-82 period. Over the same time span, New Jersey's retail trade employment grew from 414,634 to 446,138, or by 7.6 percent. Wholesale trade employment in the U.S. grew from 4.4 million to 5.0 million, or 13.4 percent, during the five year period compared to New Jersey's growth from 182,023 to 211,449, or 16.2 percent. Overall New Jersey employment did not quite keep pace with the U.S.; total growth in the U.S. was 11.6 percent compared to New Jersey's 10.2 percent rate. However, New Jersey's population grew much slower than the national rate during this period; New Jersey's population rose only 1.3 percent during the five year period while the national increase was 5.4 percent. It is therefore instructive to examine the last two columns of Table 1, which display indexes of trade sector growth deflated for population growth. On this basis, both of New Jersey's trade sectors, retail and wholesale, performed better than those of the nation as a whole. But the situation in the retail sector was mixed, and the U.S. growth on a population basis was better than that

of New Jersey in four of ten categories: general merchandise, food, apparel and eating and drinking places.

Total Sales

The better than average performance of the sector is perhaps seen most clearly in sales figures. In 1977 and 1982 New Jersey's retail trade sales totalled \$24,287 and \$36,306 million, respectively. The wholesale totals were \$55,287 and \$89,375 million during the same periods. Despite a population that was growing slower than the national average, New Jersey increased its share of national sales in both categories: retail sales grew from 3.359 percent of national sales in 1977 to 3.406 percent in 1982; wholesale sales rose from 4.397 percent to 4.473 percent of the national totals during the two census years.

Table 2 looks at selected growth rates for the State and nation. Disposable personal income is added to the comparison since most retail purchases in New Jersey, as elsewhere, are made from disposable income -- personal income after payment of personal taxes.

Table 2: Sales, Disposable Income and Population, 1977-82

	T o t a l s				Percent Increase	
	United States		New Jersey		1977-82	
	1977	1982	1977	1982	U.S.	N.J.
Retail Sales (\$ billion)	723.1	1,065.9	24.3	36.3	47.4	49.5
Wholesale Sales (\$ billion)	1,258.4	1,997.9	55.3	89.4	58.8	61.5
Disposable Income (\$ billion)	1,314.0	2,180.5	50.5	82.0	65.9	62.5
Population (million)	219.8	231.5	7.3	7.4	5.4	1.2

Sources: U.S. Dept. of Commerce, Census of Retail Trade 1977 and 1982, and Statistical Abstract of the United States 1984.

The 1977-82 growth rates for New Jersey exceeded those of the United States for both retail and wholesale dollars sales totals. Retail sales in New Jersey rose 49.5 percent vs. the U.S. increase of 47.4 percent; New Jersey wholesale sales rose by 61.5 percent compared to the U.S. gain of 58.8 percent. But total population and disposable income grew faster in the U.S., which means that sales per dollar of disposable personal income and sales per capita in New Jersey grew even faster than the differences in rates for total sales shown in Table 2. Table 3 illustrates these growth rates.

In 1977 both per capita retail and wholesale sales were signifi-

cantly higher in New Jersey than the all-state averages.* Moreover, the 1977-82 growth rates were higher in New Jersey than in the nation thus widening the gaps in per capita sales. Both New Jersey and the U.S. overall had declining sales/disposable personal income ratios, but New Jersey ratios fell considerably less than the U.S. average.

Overall, then, the trade sector in the State has given a strong performance indeed. The following section provides more detail, breaking retail sales into eight major components and decomposing wholesale trade into durables and nondurables. Comparisons with other states are also given with stress placed on nearby competitor states.

Table 3: Trade Sector Sales Per Capita and as a Percent of Disposable Income United States and New Jersey, 1977-82

	United States		New Jersey		Percent Growth 1977-82	
	1977	1982	1977	1982	U.S.	N.J.
<u>Retail Sales</u>						
Per Capita	3,290.6	4,603.7	3,307.9	4,888.4	39.9	47.8
Per Hundred Dollars of Disposable Income	55.0	48.9	48.1	44.3	-11.2	-8.0
<u>Wholesale Sales</u>						
Per Capita	5,726.3	8,628.9	7,535.7	12,033.8	50.7	59.7
Per Hundred Dollars of Disposable Income	95.8	91.6	109.6	108.9	-4.3	-0.6

Source: U.S. Dept. of Commerce, Census of Retail Trade 1977 and 1982, and Statistical Abstract of the United States, 1984.

*Total wholesale sales exceed retail amounts since items may be sold at wholesale more than once before the final retail sales are made.

Table 4: Components of the Trade Sector
1977 and 1982

	S a l e s (\$000)				Percent Change 1977-82	
	1977		1982		U.S.	N.J.
	U.S.	N.J.	U.S.	N.J.		
<u>Retail Trade</u>						
Total All						
Establishments	723,124,221	24,293,563	1,065,917,067	36,306,776	47.4	49.5
Establishments with Payroll	699,634,863	23,540,962	1,039,028,742	35,503,409	48.5	50.8
<u>Establishments with Payrolls</u>						
Building Materials Dealers, etc.	37,792,894	895,037	49,939,276	1,324,464	32.1	48.0
General Merchandise						
Stores	93,455,460	2,885,768	119,946,921	3,620,532	28.3	25.5
Food Stores	152,744,891	5,631,462	240,519,746	8,432,563	57.5	49.7
Automotive Dealers	147,202,491	4,183,874	190,752,100	6,114,455	29.6	46.1
Gasoline Service Stations	53,748,847	1,719,237	94,718,664	3,157,567	76.2	83.7
Apparel & Accessory Stores	34,719,433	1,463,919	56,869,088	2,258,108	63.8	54.3
Furniture & Home Equipment Stores	31,568,389	1,102,528	45,314,169	1,688,110	43.5	53.1
Eating & Dining Places	61,307,142	2,068,439	101,722,808	3,159,730	65.9	52.8
Drug & Prescription Stores	23,057,288	606,672	36,242,417	1,000,781	57.6	65.0
Miscellaneous Retail Sales	64,038,028	2,984,026	103,003,553	4,747,111	60.8	59.1
<u>Wholesale Trade</u>						
Total	1,258,400,268	55,327,312	1,997,894,780	89,374,548	58.8	61.5
Durables	608,756,066	26,260,866	881,212,118	41,468,265	44.7	57.9
Nondurables	649,644,202	29,066,446	1,116,682,662	47,906,283	71.9	64.8

Source: U.S. Dept. of Commerce, Census of Retail Trade, 1977 and 1982 and Statistical Abstract of the United States, 1984. Except for the total figure, retail sales are not available for all establishments for 1982, hence, establishments-with-payroll data were used for retail components for both 1982 and 1977.

COMPONENTS AND INTERSTATE COMPARISONS

New Jersey's performance in the competition for wholesale and retail sales overall is not evenly distributed among components. Table 4 gives comparisons for major sales categories.

The State's total-sector advantage breaks down into a set of mixed results for components. In the retail sector, large growth rate advantages over the national rates are seen for building materials, automotive dealers, gasoline service stations, furniture and home equipment stores and drug stores. These categories, in large, reflect the State's healthy economy overall vis-a-vis the U.S. average, its booming construction business, its advantageous geographical location in the face of the explosion in foreign car sales and, perhaps, the New Jersey tax rate which was lower than the New York and Pennsylvania rate in the census years. However, the State's growth experience in other retail businesses -- general merchandise (including department stores), food, apparel and accessories and eating and drinking places -- has not matched the national averages. But growth of these categories is logically closely related to population gains and, as has been noted, the State's 1977-82 population growth lagged far behind the United States. On the other hand, it is reasonable to expect that relatively high-income, high-wealth states such as New Jersey should have better than average performances in categories other than those incorporating food, clothing and basic household items. This is reflected in the data.

Wholesale trade, divided between durables and nondurables, also shows mixed results. The State has performed extremely well (57.9% N.J. vs. 44.7% U.S. growth) in the durables area, but the nondurables growth

shows a (64.8% vs. 71.9%) growth deficit. The durables growth can at least partly be explained by examining the retail list which shows the higher than national growth rates are in durables -- automobiles, building materials and furniture.

There exists no definitive measure of productivity in the trade sector. Output per employee is not actually measurable; but sales per employee can at least serve as a crude proxy. Data for this measure are presented in Table 5.

The growth in overall retail sales per employee in New Jersey surpassed the national rate (40.2% vs. 33.9%). However, the State's increase was somewhat less than the U.S. rate (39.1% vs. 40.0%) in wholesale trade. In both cases, retail and wholesale, New Jersey's growth rates are partly attributable to a favorable mix of establishment types. On the basis of the 1977 U.S. mix, New Jersey's retail growth rate would have been only 39.8 percent (instead of 40.2%) and its wholesale growth rate would have been 38.6 percent vs. the 39.1 percent of the Table. Hence, had it not been for a favorable mix, New Jersey's retail growth advantage would have been narrowed somewhat and the State's wholesale growth disadvantage would have been slightly greater.

Notice should be taken of several pertinent facts in Table 5. Sales per employee levels in N.J. are generally higher in most types of establishments, both retail and wholesale. As for particular subcategories of retail establishments, building materials stores, automotive dealers and furniture and equipment stores show significantly faster growth of sales per employee than in the nation as a whole. The State has also outpaced the nation in two large nondurable categories -- food and apparel and accessories.

However, general merchandise stores, gasoline service stations, eating and drinking places, and drug stores, etc., had somewhat slower increases in productivity. Bearing in mind that, with the exception of general merchandise, these sectors show higher levels of productivity, the lower than national rates of

increase should not be of great concern. Wholesale sector sales per employee figures show a similar mixed situation. While the State significantly outpaced the nation in durables (31.6% vs. 26.3%), the nation's increase was higher in nondurables (54.1% vs 48.2%) resulting in a small lead of 40.0 percent to 39.1 percent for the U.S.

Table 5: Sales Per Employee (\$) in the Trade Sector
United States and New Jersey
1977 - 1982

	1977		1982		Percent Change 1977-82	
	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.
<u>Retail Trade</u>						
Total	53,653	56,758	71,817	79,579	33.9	40.2
<u>Establishments with Payroll</u>						
Building Material Dealers, etc.						
General Merchandise Stores	46,336	45,115	65,218	62,694	40.8	39.0
Food Stores	77,971	78,731	102,453	106,449	31.4	35.2
Automotive Dealers	132,057	142,773	181,466	211,705	37.4	48.3
Gasoline Service Stations	79,903	89,274	156,849	157,767	96.3	76.7
Apparel & Accessory Stores	41,347	43,156	58,098	62,596	40.6	45.0
Furniture & Home Equip. Stores	61,562	65,813	83,508	96,441	35.6	46.5
Eating & Drinking Places	16,308	19,445	21,802	25,384	33.7	30.5
Drug & Proprietary Stores	50,174	44,744	73,037	63,968	45.6	43.0
Miscellaneous Retail Stores	51,835	63,024	71,615	88,706	38.2	40.7
<u>Wholesale Trade</u>						
Total	286,189	303,958	400,791	422,677	40.0	39.1
Durables	239,579	255,757	302,596	336,560	26.3	31.6
Nondurables	349,637	366,335	538,931	542,927	54.1	48.2

Geographical Comparisons

In this section we attempt to compare New Jersey's performance with three neighboring states. A useful index can be produced for any geographical area by dividing its 1982 share (%) of total U.S. sales by its share in 1977. Table 6 includes indexes for New Jersey's neighbor states: Connecticut, New York and Pennsylvania. In Table 6 and the analysis to follow, the relatively minor drug and proprietary stores and miscellaneous categories are omitted for technical reasons.

The indexes can be interpreted as follows: If a state's share in the total U.S. remains constant, its index will equal 1.000. When the share is greater in 1982 than in 1977, the index will be greater than 1.000 and, when the share is less, the index will be below unity.

Striking differences may be seen among the states of the region. Connecticut and New Jersey sectors appear strong, with Connecticut in the lead in most instances and overall. Connecticut wholesale trade growth significantly outperformed the other three states in durables as well as nondurables. Even so, Connecticut's performance in nondurables did not quite reach the average U.S. level (1.000). Connecticut's best relative growth category in retail sales was automotive products (index: 1.155); as is to be expected, durable wholesale trade also reflects this outstanding growth (1.157). Automotive sales and durables growth in New Jersey also far outpaced the national rates, even though they are somewhat lower than Connecticut rates.

Table 6: Indexes of Shares of U.S. Sales
Selected States
1982/1977 -- U.S. Share = 1.000

Trade Category	State			
	New Jersey	Connecticut	Pennsylvania	New York
<u>Retail Sales</u>				
Total	1.014	1.030	.925	.967
Building Materials	1.118	1.066	.948	1.123
Eating & Drinking	.922	.995	.917	.914
Food	.951	.924	.929	.893
Furniture	1.090	1.031	.865	1.116
Apparel	.987	1.046	.933	.983
Gasoline	1.045	1.049	.900	.876
Gen. Merchandise	.940	.970	.879	.892
<u>Wholesale Sales</u>				
Total	1.017	1.071	.920	.995
Durables	1.091	1.157	.942	1.005
Nondurables	.959	.999	.927	.964

Source: U.S. Dept. of Commerce, Census of Retail Trade 1977 and 1982 and Statistical Abstract of the United States, 1984.

Two other notable differences can be seen in New Jersey and Connecticut indexes. The Garden State growth rates in building materials and furniture and home equipment were well above Connecticut rates (building materials 1.118 vs. 1.066; furniture 1.090 vs. 1.031). On the other side, Connecticut led New Jersey in sales of eating and drinking places (.995 vs. .922).

Both New York and Pennsylvania trade sector growth fell behind the United States overall. Even automobiles and durables, which did so well in New Jersey and Connecticut, did not perform as well in Pennsylvania, though New York's figures held their own with the U.S.

Table 7 summarizes relative trade sector growth, comparing the four-states of Table 5 with other regions. While the entries do show how some states have performed, on the average, it should be kept in mind that simple averages do not actually depict how each region fared overall. But they do show where state indexes unweighted by population, exceeded or fell short of U.S. growth.

In retail sales New Jersey's share fared better than the Midwest and the four-state average which includes Connecticut, New York and Pennsylvania, but not as well as New England except Connecticut, the South etc., or the West. However, the State did exceptionally well in some categories -- outpacing all regions in building materials, furniture and automobiles. In wholesale trade New Jersey did significantly better than the Midwest and slightly better than the four-state average and the South etc., but it fell behind, by considerable percentages, the West and New England except Connecticut.

Among the other regions, one fact deserves special attention: The New

England figures for separate states (not included in the table) show very high rates of growth of wholesale durables in Vermont, New Hampshire and Massachusetts (indexes 1.367, 1.264 and 1.182, respectively). High rates of growth of retail automobile sales are responsible.

DETERMINANTS

Wholesale and retail sales levels and their growth rates are determined by a myriad of factors. Some factors promote high trade levels and growth rates. It is instructive to uncover the most important of these factors and find out what effects might be caused by any changes in them. An example would be to look into the effects of sales tax differences across states.

In what follows, cross-sectional (across all states, excluding Alaska and Washington, D.C.) ordinary-least-squares analysis is applied in an attempt to uncover the determinants of sales in the various trade categories. Current-dollar sales per capita are regressed against a number of independent variables to explain levels in both 1977 and 1982, and sales growth rates are regressed against others to explain growth over the five year period.

Models

The forms for the estimated equations are:

1. Level.
 - (a) Per capita retail sales in each category (1977 or 1982) = f (per capita income, sales tax rate, housing starts per capita, real estate assets per capita, corporate stock holdings per capita, other assets per capita, tourist attraction dummy, food tax, gasoline tax).

Table 7: Regional Comparison
 Arithmetical Mean of Indexes of Shares in U.S. Sales*, 1982/1977

Trade Category	N.J.	NJ, CT, NY & PA	New England, Except CT	Midwest	South Southwest & South Atlantic	West
<u>Retail Sales</u>						
Total	1.014	.989	1.039	.917	1.018	1.063
Building Materials	1.118	1.044	1.037	.847	1.049	1.062
Eating & Drinking Places	.992	.944	1.008	.910	1.059	1.043
Food Stores	.951	.923	.963	.938	1.031	1.109
Furniture	1.090	1.015	1.035	.870	1.014	1.050
Apparel	.987	.991	1.040	.892	1.002	1.059
Gasoline	1.045	.979	.992	.944	.991	1.086
Automobiles	1.129	1.050	1.121	.902	.993	1.043
Gen. Merch.	.940	.956	1.020	.962	1.069	1.128
<u>Wholesale Sales</u>						
Total	1.017	1.004	1.081	.888	1.000	1.086
Durables	1.091	1.075	1.203	.845	.996	1.061
Nondurables	.959	.951	.988	.909	1.006	1.114

Source: U.S. Dept. of Commerce, Census of Retail Trade 1977 and 1982 and Statistical Abstract of the United States, 1984.

*The index constructed for each state is: percentage share of total U.S. in 1982 divided by percentage share of total U.S., 1977. Regions include the following states: New England — Me., N.H., Vt., Mass., and R.I.; Midwest — Oh., Ind., Ill., Mich., Wis., Minn., Iowa, Mo., N. Dak., S. Dak., Neb., Kans.; South and South Atlantic — Del., Md., D.C., Va., W. Va., N.C., S.C., Ga., Fla., Ky., Tenn., Ala., Miss., Ark., La., Okla., and Tex.; West — Mont., Ida., Wyo., Colo., N. Mex., Ariz., Utah, Nev., Wash., Oreg., and Calif. Indexes shown are unweighted averages of states in region.

(b) Per capita wholesale sales in each category (1977 or 1982) = f (Per capita income, sales tax rate, real estate assets per capita, other assets per capita, population percent urban, tourist attraction dummy).*

2. Growth.

(a) For each category: retail sales in 1982/retail sales in 1977 = f (nonagricultural employment change 1982/77, tax rate change 1982 minus 1977, logarithm of population density, housing starts change 1982/77, population change 1982/77, automotive sales change 1982/77, population percent urban 1980, real estate per capita 1976, other assets per capita 1976, automotive dealer sales change 1982/77, tourist attraction dummy).

(b) For each category: wholesale sales in 1982/wholesale sales in 1977 = f (total retail sales 1982/77, personal income 1982/77, stock per capita 1976, other assets per capita 1976, logarithm of population density 1982, tourist attraction dummy).

A brief discussion of the explanatory variables and their expected influences follows:

1. Measures of economic status or development -- per capita income, growth of nonagricultural employment, housing starts and/or population growth. These measures are expected to exert a positive influence on sales levels or growth.

2. Excise tax rates -- general sales tax rates, sales tax rate on food or gasoline tax rate. Excise taxes are expected to negatively affect sales in general, or food or gasoline in particular for two reasons: 1) a sales tax levy is essentially a price increase which results in a reduction in quantity demanded, and 2) a difference in the tax rates of adjoining states can cause sales in one state to be lost to a lower taxed state.

3. Wealth -- stock, real estate or other assets per capita measure wealth in each state. Wealth may influence sales either positively or negatively. Buying may be financed by either income or wealth (+), but higher savings rates (and accumulation of wealth) mean lower consumption (-).

4. Tourist attraction -- Attractive states attract tourists who add their purchases to those of residents. Moreover, residents of other states build summer (or winter) homes in states of scenic or other attraction. These factors are expected to exert a positive influence on sales.

5. Population density and percent urban. These demographic variables can exert differing influences. For example, eating places are more often found in urban places. Automotive dealers may often be found in less densely populated states where there is little or no mass transit.

6. Growth in automotive sales. Gasoline sales should be positively affected by growth in automotive sales.

*For both wholesale and retail formulations data used for the explanatory variables are generally for the particular year 1977 or 1982. In some instances, however, other years are used because of data limitations (see years shown in the Appendix regression results.)

REGRESSION RESULTS

Complete results for regressions may be found in the appendix. This section will summarize the findings for the 1977 and 1982 level regressions and the 1982/77 growth regressions by presenting tables of elasticities, each elasticity estimating the percentage change in sales (or growth) that would result from a one percent change in each explanatory variable holding other explanatory variables constant.

Both levels and growth of sales have been investigated in the regressions. Each provides useful information. While the determinants are often the same for both level and growth, this is not always the case.

Retail Sales: Levels

Retail sales per capita are found in general (in Tables A-1 and A-2) to be related positively with personal income per capita, housing starts and assets held by state residents (non-real estate, non-stock) negatively with the sales tax rate, and, in the 1982 total retail sales regression, negatively with percent urban. These results seem very reasonable. The positive income results were anticipated. The negative tax rate coefficient shows that the law of demand has not been repealed: if prices are relatively high as they are in high sales tax states, quantities demanded will be less, other things constant.

Housing starts measure economic activity and are generally associated with many types of purchases (e.g., building materials and furniture and appliances). The negative percent urban coefficient for building materials dealer sales probably reflects the usual building supply dealer location in non-urban areas. The "vacation state" dummy variable is usually positive as expected. Tourists add their purchases to those

of residents in tourist states. They are "residents" while they are visiting and their purchases range from recreational items to summer homes and their furnishings.

Variations are found among the eight subcategories of sales. Nevertheless, they generally have some things in common: When statistically significant, the tax rate coefficients are always negative, a fact which can only please economists who expect negative price and sales relationships. Also expected, a tax on food has a negative effect on food sales and a gasoline tax is negatively related to gasoline station sales.

Generally, the hypothesized relationships are upheld by the regressions, but there are exceptions. For example, automotive dealer sales in 1977 showed a negative association with the attractiveness dummy. Perhaps this can be partially explained by people of non-tourist states travelling more (to tourist states); thus the populace of tourist states purchasing less.

Wholesale Sales: Levels

Table A-4 includes regressions for per capita wholesale trade categories. As expected, wholesale sales, durable and nondurable, were positively related to per capita income in 1977 as well as 1982. Sales tax rates were again negatively associated with sales.

The "vacation state" variable proved to be negatively associated with wholesale sales. Perhaps wholesalers try to avoid some higher costs which would be imposed on them if they were located in tourist states.

Mixed results are found for the assets variables. While real estate holdings are positively associated with nondurable sales, non-stock, non real estate assets are inversely associated with durables.

Elasticities: Levels

Tables 8 and 9 below give computed sales elasticities for the various explanatory variables, for retail and wholesale trade regressions, for the year 1977 and 1982. Where the explanatory variables are found in specific category regressions for both years, the elasticities for the two years have the same signs and are in reasonably close agreement. A change in per capita income generally has the strongest effect on retail and wholesale sales

with elasticities ranging from .310 to 2.115 (at the variable means) A one percent increase in per capita income would lead to a .31 percent increase in automotive dealer sales (1977 -- .4% in 1982) and over two percent increase in wholesale durables. Each of the elasticities listed in the table provides similar information: a one percent increase in the individual explanatory variable leads to a percentage change in the dependent variable equal to the particular figure listed.

Table 8: Level Regression Elasticities, 1977

	Dependent Variable (per capita \$ sales, 1977)											
	Retail									Wholesale		
	Total	Food Stores	Automotive Dealers	Eating & Drinking Places	Building Materials Dealers	Furniture & Appliances	Apparel & Accessories	General Merchandise	Gasoline Service Stations	Total	Durables	Nondurables
Per Capita Income	.465		.310				.869	.964	1.471	1.955	2.090	1.520
Sales Tax Rate	-.080	-.094		-.137	-.134	-.140	-.072			-.147		
Housing Starts Per Capita	-.088		.190		.296	.122			.232			
Real Estate Per Capita				.168	.238	.630						.295
Stock Per Capita								-.109				
Other Assets Per Capita	.043										-.360	
Population Density		-.0170	-.0390					-.043			-.00729	
Population Percent Urban				.614	-.628	.368		.367	-.626		.654	
Food Tax		-.027										
Gasoline Tax									-.197			
Dens											-.073	

Table 9: LEVEL REGRESSION ELASTICITIES, 1982

Dependent Variable (per capita \$ sales, 1982)

Retail

Wholesale

	Retail									Wholesale		
	Total	Food Stores	Automotive Dealers	Eating & Drinking Places	Building Materials Dealers	Furniture & Appliances	Apparel & Accessories	General Merchandise	Gasoline Service Stations	Total	Durables	Nondurables
Per Capita Income	.566	.191	.428			.671	.850		.655	1.980	2.115	1.650
Sales Tax Rate	-.053		-.075	-.081	-.112	-.128	-.094	-.149		-.220		-.333
Housing Starts Per Capita	.077	.089	.164		.141	.128						
Real Estate Per Capita				.148	.124							.155
Other Assets Per Capita	.056		.121		.158						-.363	
Population Density								-.039				
Population Percent Urban	-.104		-.285	.606	-.534	.194	.221	.404			.535	
Food Tax Rate		-.019										
Automotive Sales Per Capita									.351			

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We are especially interested in sales tax elasticities since the sales tax is a key policy variable for the State. It is important for state officials to be aware of the effects of increasing or decreasing sales taxes. Table 10 presents sales tax elasticities for the various sales categories.

From the above values it can be said that sales are "inelastic" with respect to the sales tax, i.e., a one percent change in the sales tax would lead to a less than one percent change in sales (in the opposite direction). A one percent increase in the sales tax, for example, would have led to retail sales reductions of .08 and .053 percent in 1977 and 1982, respectively. It must be understood that a one percent increase

in the sales tax would only be an increase from \$.06 to \$.0606 per dollar of sales. An increase in sales tax to \$.07, a more likely change of 16.67 percent, would reduce retail sales by about one full percentage point ($.08 \times 16.67 = 1.334$; $.053 \times 16.67 = .884$). For obvious reasons, such a loss should be considered in any proposal to change the sales tax. (A proposal to decrease the sales tax should consider the sales gain that would result.*)

It should also be noted that individual categories of sales would be affected more than others by tax changes. Little or no effect would be felt by some categories. The harm (or benefit) from a tax rate change would be felt more by some businesses than others.

Table 10: Sales Tax Elasticities

Sales Category	1977	1982
<u>Retail</u>		
Total Retail Sales	-.080	-.053
Food Stores	-.094	--
Automotive Dealers	--	-.075
Eating and Drinking	-.133	-.081
Building Materials	-.134	-.112
Furniture and Appliances	-.140	-.128
Apparel and Accesories	-.072	-.094
General Merchandise	--	-.149
Gasoline Service Stations	--	--
<u>Wholesale</u>		
Total Wholesale	-.147	-.220
Durables	--	--
Nondurables	--	--

Source: Tables 8 and 9.

*The reader should be cautioned that this analysis assumes that other states do not change their sales taxes also.

Growth Formulations

Tables A-3 and A-5 in the Appendix give full regression results for growth during the 1977-82 period. Table 11 below summarizes the sales elasticities of independent variables. With elasticities ranging from .240 to .825, nonagricultural employment growth proved to be the most strongly associated with sales growth. This means that a one percent increase in the rate of increase in nonagricultural employment growth was associated with an .822 percent increase in the rate of growth in total retail sales.

Nonagricultural employment growth was stronger than personal income growth and has replaced it in all but one of the regressions; both variables could not be included because of collinearity. The result leads to the conclusion that growth in the trade sector is, to a large degree, based on economic development in general.

From the table it may be seen that nonagricultural employment growth is always related positively to retail sales categories. As an exception, the category "gasoline service stations" has been regressed against population change which gives

a better fit. A one percent increase in the population growth rate would result in an 8/10ths percent increase in gasoline service station sales.

Tax rate changes appear twice among the determinants of retail sales. Although the expected negative sign was found, the effect is weak. A given percent change in the tax change would result in a much smaller dependent variable change.

For nondurable wholesale sales growth, personal income growth proved to be a better explanatory variable than nonagricultural employment growth. If total retail sales increased by a given percentage, the total nondurable wholesale trade growth rate should increase by approximately the same percentage.

Growth rates of two sales categories (including durable wholesale sales) are negatively affected by the density variable. The more densely populated the state, the lower the growth rate realized by sales in these categories. On the other hand, percent urban has a positive effect on food, general merchandise and durable wholesale sales. Assets are again seen to have differing effects.

Table 11: Growth Regression Elasticities

	Dependent Variable (per capita \$ sales, 1982)											
	Retail									Wholesale		
	Total	Food Stores	Automotive Dealers	Eating & Drinking Places	Building Materials Dealers	Furniture & Appliances	Apparel & Accessories	General Merchandise	Gasoline Service Stations	Total	Durables	Nondurables
Nonagricultural Employment Growth (%)	.822	.825	.768	.899	.494	.663	.742	.240				
Personal Income growth (%)												.949
Population Growth (%)								.673				
Sales Tax Rate Change (percentage points)			-.005					-.007				
Housing Starts Change (%)	.046		.160	.036	.212	.154	.059					
Logarithm of Density*		.023					-.011	.044		.186	-.034	-.043
Real Estate Per Capita								-.109		-.097		.149
Other Assets Per Capita			.084	-.049				.107	.075	.166		.160
Percent Urban Population					.177	.104		.151				
Automobile Sales Growth (%)								.291				
Total Retail Sales Growth (%)										1.153	1.703	
Stock Per Capita										-.040		

Source: Computed from the regression results of Tables A-3 and A-5 of the Appendix.

*Independent variable is the natural logarithm of density (population/area). Since area remains constant, percentage change in density would be equal to percentage change in population. Elasticity is computed for density and answers the question: What percentage increase in the dependent variable would result from a one percent increase in density?

Actual vs. Predicted

The regressions of the Appendix explain differing percentages of the actual sales variations among states. This is evidenced by R²'s which vary from about 40 percent at the worst to about 90 percent at the best. It is instructive, therefore, to compare actual trade sector sales values with those predicted by the regression results. Table 12 gives the percentage differences between predicted and actual values for New Jersey. Negative percentages signify that predicted values fall below those

actually existing in the 1977-82 time period.

From Table 12 we can see that some of the regression predictions were quite close to actual New Jersey sales figures in 1977 and 1982. In particular, the model for total sales per capita predicted the 1982 amount almost without error the true error was only .04%. Predictions for other categories were off by considerable percentage rates. For example, the regression model for eating and drinking places over-predicted actual sales by 19.6 percent.

Table 12: Actual Vs. Predicted Sales
1977 and 1982

Sales Categories	Percentage Differences = Actual-Predicted x 100	
	1977 Per Capita Sales	1982 Per Capita Sales
<hr/>		
<u>Retail</u>		
Total	-4.5	0.0
Food	-1.5	4.8
Automotive	10.9	6.3
Eating & Drinking Places	-13.0	-19.6
Building Materials	5.8	1.2
Furniture and Appliances	5.2	7.3
Apparel and Accessories	8.0	3.4
General Merchandise	-5.1	-14.2
Gasoline Service Stations	-5.4	4.5
<hr/>		
<u>Wholesale</u>		
Total	15.2	15.3
Durables	24.6	10.7
Nondurables	13.8	14.0

Table 13 shows percentage point differences in growth rates. Once more, predicted total retail sales fell quite close to actual (+.2 percentage points). And again, the

wholesale prediction was less accurate (-7 percentage points); the durables prediction was close, but the New Jersey actual non-durables figures exceeded the prediction by 13.1 percentage points.

Table 13: Actual vs. Predicted Growth Rates, 1977-82

Sales Category	Actual (%)	Predicted (%)	Percentage Point Difference (Actual - Predicted)
<u>Retail</u>			
Total	50.9	50.7	.2
Food	49.8	47.8	2.0
Automotive	46.3	35.1	11.2
Eating & Drinking Places	53.0	69.4	-16.4
Building Materials	47.8	48.3	-0.5
Furniture & Appliances	56.4	52.6	3.8
Apparel & Accessories	61.6	70.6	-9.0
General Merchandise	20.7	13.6	7.0
Gasoline Service Stations	84.1	86.7	-2.6
<u>Wholesale</u>			
Total	29.0	36.0	-7.0
Durables	57.9	58.7	-0.8
Nondurables	64.8	51.7	13.1

Tables 12 and 13 now prompt several observations. If the models do a good job of describing the determinants of sales levels and growth, then New Jersey has done basically as well as expected in retail sales overall, with strong showings in most categories. The picture is mixed for some categories, notably general merchandise and apparel and accessories, and eating and drinking places did not live up to expectations with predictions consistently exceeding actual (e.g., growth fell 16.4% short of actual).

In the wholesale sector, total growth was actually less than predicted, while nondurables surpassed growth expectation. Wholesale sale levels were underpredicted in 1977 and 1982. (The growth regressions do

not seem to carry the same message as the level regressions. The level model underpredicts by about 15 percent in both 1977 and 1982, while the growth model overpredicts by 7 percentage points during the 5-year span. This seems to imply only that it would be better if the models could be more fully and accurately specified.)

It seems worth speculating on the reasons why New Jersey has exceeded expectations in automotive sales, while it has failed to live up to expectations in eating and drinking places. In large part, the State may have done well in automotive sales because of the switch to foreign cars. Since the State is advantageously located for importing cars, there may be greater increases

here than in land-locked areas. The relatively poor performance in eating and drinking places might be partially attributed to the State's long-standing high-income status. Perhaps much of the category's growth is behind us, having appeared earlier with income growth, and now some saturation has been achieved in the market. Such a negative influence would not be captured by an income variable since the net effect of increased income would be more sales.

SUMMARY AND CONCLUSIONS

New Jersey's employment growth in the trade sector fell slightly short of the national rate in the 1977-82 period. However, when the figures are deflated for population growth, the State's performance proved better than average in most retail categories as well as in wholesale durables and nondurables. A similar picture was seen when total dollar sales were examined. In the retail sector, the State has enjoyed large growth rate advantages in building materials, automotive dealer sales, gasoline service station sales, furniture and home equipment and drug -- categories which reflect the State's booming construction business and general economic health.

New Jersey experienced a percentage increase in retail sales per employee that exceeded that of the nation. However, wholesale sales per employee growth fell behind the national increase.

Compared to other states in the region, the New Jersey trade sector appears strong, but Connecticut leads the Garden State in wholesale trade in all but one retail category (food).

When examined vis-à-vis various regions of the United States, New Jersey fares better than the Midwest, the South, Southwest and South Atlantic; its own region including New York, Pennsylvania and Connecticut; but it falls well behind the West and New England except Connecticut.

Retail and wholesale trade levels and growth are shown to be generally directly related to economic development: per capita income, nonagricultural employment or population and housing starts; inversely related to sales taxes; and directly related to attractiveness to tourists. Asset holdings often have positive effects on sales. Urban population and population density have differing effects for different categories.

Table A-1: Retail Sales Regression Results
Levels, 1977

Explanatory Variables	Dependent Variables (per capita sales, 1977)								
	Total Retail	Food Stores	Automobile Dealers	Eating & Drinking Places	Building Materials Delaers	Furniture & Appliance Stores	Apparel & Accessory Stores	General Merchandise Stores	Gasoline Service Stations
Constant	1.629 (6.094)	.769 (33.766)	.363 (4.254)	.100 (2.873)	.248 (7.753)	.0827 (6.340)	.0313 (1.247)	-.0730 (-1.032)	.0308 (.424)
Per Capita Income (1977)	.00023 (5.336)		.0000320 (2.447)				.0000199 (5.409)	.0000587 (4.100)	.0000567 (5.154)
Sales Tax Rate (1977)	-.0732 (-3.788)	-.0178 (-2.713)		-.0101 (-2.193)	-.00742 (-1.809)*	-.00538 (-3.203)	-.00307 (-1.5453)**		
Housing Starts Per Capita (1977)	28.705 (4.526)		12.827 (5.245)		5.850 (4.665)	1.681 (3.414)			5.921 (4.121)
Real Estate Per Capita (1976)				.121 (3.603)	.125 (4.403)	.0210 (1.849)*			
Stock Per Capita (1976)								-.184 (-2.760)	
Other Assets Per Capita (1976)	.342 (1.653)**								
Tourist Attraction Dummy	.0498 (1.476)**	.0310 (3.231)	-.0327 (-3.015)	.0302 (4.041)	.012 (1.798)*				
Population Density (1977)		.0769 (1.747)*	-.173 (-3.207)					-.113 (-2.991)	
Population Percent Urban (1980)				.00252 (5.521)	-.00188 (4.869)	.000768 (4.826)		.00224 (3.147)	-.00242 (-4.008)
Food Tax (1977)		-.0129 (-2,686)							
Gasoline Tax (1977)									-.00624 (-1.113)
R ²	.764	.453	.665	.598	.698	.568	.396	.593	.505
-R ²	.737	.403	.634	.561	.662	.529	.370	.556	.460
F (d.f.)	27.881(5,43)	9.115(4,44)	21.818(4,44)	16.345(4,44)	19.834(5,43)	14.468(4,44)	15.091(2,46)	16.045(4,44)	11.212(4,44)

Source: See Table 2. Figures in parentheses are t-statistics. Significant at .05 level if no asterisk; .05 level one-tailed test or .1 two-tailed test if one asterisk; .1 one-tailed test if two asterisks; .2 if three asterisks.

Total retail sales regressions used all establishments data; payroll only data were used in the remaining regressions.

Table A-2: Retail Sales Regression Results
Levels, 1982

Explanatory Variables	D e p e n d e n t V a r i a b l e s (s a l e s p e r c a p i t a)								
	Total Retail	Food Stores	Automobile Dealers	Eating & Drinking Places	Building Materials Dealers	Furniture & Appliance Stores	Apparel & Accessory Stores	General Merchandise Stores	Gasoline Service Stations
Constant	2.137 (5.942)	.774 (7.498)	.541 (5.251)	.146 (2.371)	.295 (9.538)	.0251 (1.266)	.00536 (.150)	.381 (8.790)	.00982 (.104)
Per Capita Income (1982)	.000247 (4.770)	.0000188 (2.018)*	.0000338 (2.257)			.0000117 (4.763)	.0000189 (4.243)		.0000269 (2.776)
Sales Tax Rate (1982)	-.0644 (-2.210)		-.0164 (-1.923)	-.00912 (-1.208)***	-.00702 (-1.848)*	-.00619 (-3.750)	.00578 (-1.972)*	-.0198 (-3.333)	
Housing Starts Per Capita (1982)	48.448 (5.220)	12.557 (4.949)	18.703 (6.889)		4.607 (3.862)	3.216 (6.046)			
Real Estate Per Capita (1976)				.167 (2.815)	.0774 (1.945)*				
Other Assets Per Capita (1976)	.625 (1.894)*		.243 (2.581)		.0907 (1.925)*				
Tourist Attraction Dummy	.131 (2.610)	0.0396 (2.780)		.0423 (3.216)	.0159 (2.421)				
Population Density (1982)									-.104 (-1.751)
Population Percent Urban (1980)	-.00717 (-1.635)*		-.00356 (-2.765)	.00390 (4.868)	-.00191 (-4.404)	.000536 (2.164)	.0007576 (1.781)*	.00308 (4.863)	
Food Tax (1982)		-.0140 (-2.039)							
Automotive Dealers Sales Per Capita (1982)									.180 (2.079)
R ²	.742	.546	.668	.506	.616	.760	.561	.379	.336
\bar{R}^2	.705	.505	.629	.461	.561	.738	.531	.352	.291
F (d.f.)	20.117(6.42)	13.237(5.43)	17.304(5.43)	11.272(4.49)	11.206(6.42)	34.879(4.44)	19.131(3.45)	14.022(2.46)	7.572(3.45)

Source: See Table 2.

NOTE: See Table A-1 notes for significance levels and data information.

Table A-3: Retail Sales Regression Results
Growth, 1982/1977

Explanatory Variables	Dependent Variables (1982 sales / 1977 sales)								
	Total Retail	Food Stores	Automobile Dealers	Eating & Drinking Places	Building Materials Dealers	Furniture & Appliance Stores	Apparel & Accessory Stores	General Merchandise Stores	Gasoline Service Stations
Constant	.198 (2.581)	.449 (2.949)	.0319 (.214)	.350 (2.191)	.146 (.486)	.111 (.593)	.238 (1.036)	1.138 (5.039)	-.0368 (-.146)
Nonagricultural Employment Change 1982/77	1.122 (14.404)	1.216 (9.768)	-.913 (5.818)	1.212 (7.203)	.594 (1.942)	.856 (4.471)	1.103 (5.299)	.294 (1.344)**	
Tax Rate Change 1982-1977			-.0317 (-1.460)**					-.0448 (-1.110)**	
Logarithm of Population Density 1982		-.0420 (-4.577)					.0209 (1.796)*	-.0814 (-4.905)	
Housing Starts Change 1982/77	.0866 (4.343)		.211 (5.379)	.108 (2.559)	.360 (4.649)	.273 (5.641)	.120 (2.315)		
Population Change 1982/77									1.120 (4.125)
Population Percent Urban 1980					.00347 (2.095)	.00219 (2.106)			.00400 (3.518)
Real Estate Per Capita 1976								-.383 (-2.542)	
Other Assets Per Capita 1976			.263 (3.659)	-.215 (-2.789)				.345 (1.949)*	-.319 (-3.209)
Automotive Dealer Sales Change 1982/77									.368 (3.566)
Tourist Attraction Dummy							.0363 (2.527)		
R ²	.915	.768	.828	.755	.627	.779	.794	.468	.655
\bar{R}^2	.912	.758	.812	.738	.602	.765	.775	.406	.623
F (d.f.)	248.360(2,46)	76.061(2,46)	52.759(4,44)	46.152(3,45)	25.169(3,45)	53.003(3,45)	42.277(4,44)	7.569(5,43)	20.873(4,44)

Source: See Table 2.

NOTE: See Table A-1 notes for significance levels.

All sales data used for the above regressions were for establishments with payroll only.

Table A-4: Wholesale Sales Regression Results
Levels, 1977 and 1982

Explanatory Variables	Year of Data	Dependent Variables (per capita sales, 1977)			Year of Data	Dependent Variables (per capita sales, 1977)		
		Total Wholesale	Durables Wholesale	Nondurables Wholesale		Total Wholesale	Durables Wholesale	Nondurables Wholesale
Constant	—	-4.142 (-2.217)	-2.968 (-2.628)	-2.285 (-1.774)	—	-5.775 (-2.432)	-3.908 (-3.632)	-2.175 (-1.237)
Per Capita Income	1977	.00144 (5.299)	.000691 (2.975)	.000617 (3.074)	1982	.00138 (6.248)	.000595 (3.825)	.00686 (3.772)
Sales Tax Rate	1977	-.200 (-1.392)**			1982	.423 (-2.173)		-.382 (-2.541)
Real Estate Per Capita	1976			2.100 (2.623)	1976			1.788 (1.357)**
Other Assets Per Capita	1976		-1.925 (-2.345)		1976		-2.600 (-2.661)	
Population Percent Urban	1980		.0217 (2.047)		1980		.0238 (1.872)*	
Tourist Attraction Dummy	—	-.998 (-4.157)	-.484 (-3.637)	-.495 (-2.804)	—	-.1.293 (-3.763)	-.548 (-3.547)	-.751 (-2.798)
Dens	1977		-1.042 (-1.763)					
R^2		.462	.433	.433		.522	.555	.475
\bar{R}^2		.426	.367	.395		.490	.514	.427
F (d.f.)		12.881(3,45)	6.573(5,43)	11.435(3,45)		16,375(3,45)	13.705(4,44)	9.955(4,44)

Source: See Table 2.

NOTE: See Table A-1 for significance levels.

Table A-5: Wholesale Trade Regression Results
Growth 1982/1977

Explanatory Variables	Dependent Variables (1982 sales/1977 sales)		
	Total Wholesale ^a	Durables Wholesale ^a	Nondurables Wholesale
Constant	-.144 (-.645)	-1.210 (6.159)	.454 (1.029)
Total Retail Sales (1982/1977)	1.233 (9.206)	1.647 (13.575)	
Personal Income (1982/1977)			.986 (4.181)
Stock Per Capita (1976)	-.261 (-1.556)**		
Real Estate Per Capita (1976)	-40.4 (-3.356)		-.792 (-3.559)
Other Assets Per Capita (1970)	.626 (3.986)		.668 (2.589)
Logarithm of Population Density (1982)	-.0343 (-2.530)	.0439 (3.715)	-.0797 (-3.009)
Tourist Attraction Dummy		.0382 (2.118)	
R^2	.793	.838	.542
\bar{R}^2	.769	.827	.501
F (d.f.)	33.961(5,43)	77.398(3,45)	13.037(4,44)

Source: See Table 2.

NOTE: (a) Two-stage least squares regression was used because of simultaneity between dependent variable and total retail sales growth rates. Instrumental variables: independent variables shown except Total Retail Sales (82/77) plus Nonagricultural Employment (82/77).

Also, see Table A-1 for significance levels.

IV.

GROWTH OF SERVICE INDUSTRIES IN NEW JERSEY AND THE UNITED STATES*

1. Overview

Recently, experts and laymen have all observed that the United States economy is transforming from a goods-producing economy into a service-oriented economy.** Opinions differ, however, as to whether or not America needs "reindustrialization" in order to revive the traditional manufacturing industries to their previous preeminence in the world market. Some propose national industrial policy as a means to lean against the wind and reindustrialize the American economy while others think it is wiser to go with the wind and prepare the work force for a service-oriented economy.*** These debates are based on a premise that the transition of the U.S. economy from a goods-producing one to a service-delivery one is a recent phenomenon.

Although the pace of such transition has accelerated in recent years, this trend is by no means a recent phenomenon. Figure 1 indicates that the share of services in the Gross National Product, which was 34.7 percent in 1929, rose to 38.3 percent in 1960 and to 48.2 percent

in 1984. During the same period, the fraction of the nation's total non-agricultural employment engaged in goods-producing (manufacturing, mining and construction) declined from 42.5 percent in 1929 to 37.7 percent in 1960 and to 26.4 percent in 1984. Within the broad definition of services, Selected Services (SIC 70-89) have been growing faster than any other group. As shown in Figure 1 and in Table 1, the employment growth rate of this group exceeded those of all other groups since 1929, except for the government sector from 1929 to 1949, the period of the New Deal and war-related expansion of the government sector. As a result of such rapid growth, the share of Selected Services (hereafter Service industries or Services) in the nation's total nonagricultural employment doubled since 1929 (21.9% in 1984 vs. 10.93% in 1929).

Statistics also indicate that Service industries are nearly immune to recessions. For example, the employment in goods-producing sector declined by 6.6 percent from 1981 to 1982, and in the service-producing sector, excluding Services, it de-

*Prepared by Jong Keun You, Office of Economic Policy.

**See, for example, Daniel Bell, The Coming of Post-Industrial Society, (New York: Basic Books, Inc., 1973), 127-29.

***For an interesting analysis of these views, see Eli Ginzberg and George Vojta, "The Service Sector of the U.S. Economy," Scientific American, vol. 244, No. 3 (March 1981), 48-55.

Figure 1
Output & Employment Share of Services
1929 - 1984

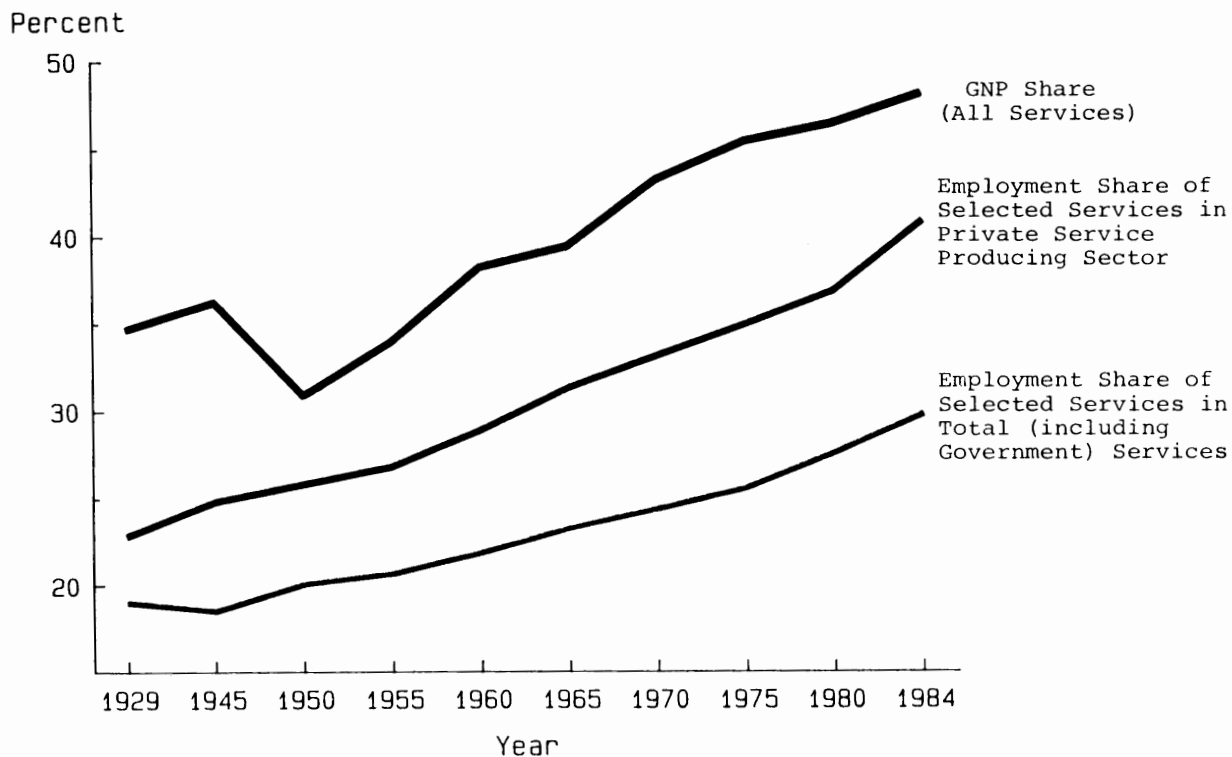


Table 1: United States Employment Growth by Sector
(percent per annum)

Period	Manu- facturing	T.P.U.	Retail & Wholesale Trade	F.I.R.E.	Services	Govern- ment	Total
1929-49	1.51	0.11	2.09	1.01	2.15	3.29	1.69
1949-69	1.68	0.52	2.34	3.32	3.86	3.74	2.41
1969-79	0.42	1.46	3.22	3.54	4.36	2.72	2.47
1979-84	-1.42	0.13	1.53	2.63	3.84	0.03	0.95

Source: Employment & Earnings, United States, 1909-78, U.S. Department of Labor, Bureau of Labor Statistics.
Economic Indicators, Council of Economic Advisers, March 1985.

clined by 0.7 percent. In contrast, Services gained employment by 2.2 percent during the same period.

The fact that Services have grown most rapidly regardless of business cycles does not imply that they are a group of monolithic industries. Within this group, some industries are exploring new frontiers, some are maturing, and others are declining or dying. For example, Data Processing, Programming and Other Computer Related Services, which grew very rapidly from 1972 to 1977 (60.05% gain in employment), grew even faster during the next five years, 1977-1982, (73.43%). Others following this pattern are Management Consulting and Public Relations Services (45.81% and 69.30%, respectively) and Equipment Rental and Leasing Services (43.42% and 56.72%).

An example of maturing industries is Automotive Rental and Leasing Services (20.41% and 24.79%) and examples of dying industries are Barber Shops (-27.49% and -24.60%), Motion Picture Theaters (-11.93% and -7.80%) and Shoe Repair, Shoe Shine, and Hat Cleaning Shops (-16.28% and

-2.58%). Some industries have lost momentum while others have reversed the downward trends. Examples of the former are Motels, Motor Hotels and Tourist Courts (12.58% and -9.99%), Electrical and Electronic Repair Shops (27.96% and -8.24%) and Reupholstery and Furniture Repair Shops (16.23% and -4.94%) and examples of the latter are Trailer Parks and Camps (-23.87% and 27.89%) and Direct Mail Advertising Services (-5.41% and 38.55%).

2. Service Industries in New Jersey

Service industries in New Jersey showed a 29.9 percent gain in employment during 1977-82 compared to 24.4 percent in the U.S. (Table 2). This is in sharp contrast with the 16.4 percent increase in New Jersey during the preceding five years, which was substantially lower than the 24.7 percent change in the U.S. during the same period. This means that while the Service employment growth in the U.S. from 1977 to 1982 was virtually the same as that in the preceding five year period, New Jersey's Service employment growth rate during 1977-82 was almost twice as high as that in the 1972-77 period.

Table 2: Recent Trends in Service and Total Employment
United States and New Jersey

	Service (SVC) Employment (000)		Total Nonag. (TNA) Employment (000)		TNA Less SVC Employment (000)		SVC/TNA	
	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.
1972	12276	437.9	73675	2674.4	61399	2236.5	16.7%	16.4%
1977	15303	509.8	82471	2836.9	67168	2327.1	18.6	18.0
1982	19036	662.1	89566	3091.3	70530	2428.4	21.3	21.4
	Growth		Growth		Growth		Change	
72-77	24.7%	16.4%	11.8%	6.1%	9.4%	4.1%	1.9 pts	1.6 pts
77-82	24.4%	29.9%	8.6%	9.0%	5.0%	4.4%	2.7 pts	3.4 pts

The acceleration of Service employment growth in New Jersey was the main reason for the acceleration of total nonagricultural employment growth. As shown in Table 2, total nonagricultural employment excluding Services was growing slower than its national counterpart during the two five-year periods, although the difference in growth rates between the United States and New Jersey was narrowing over time. However, due to strong a surge in Services in the State, total nonagricultural employment grew faster in New Jersey during 1977-1982 than in the U.S., reversing the trend in the previous five year period.

Until recently, the New Jersey economy relied relatively more on goods-producing industries than service-producing. For example, the employment share of service-producing industries in 1960 was only 54.8 percent in New Jersey, compared to 62.3 percent in the U.S. However, as a result of the decline in manufacturing in New Jersey and the recent surge in Services, the employment share of service producing industries in New Jersey has steadily increased and surpassed, for the first time, its national counterpart in 1984 (74.1% in New Jersey vs. 73.6% in the U.S.). Thus, it is plausible to think that the recent acceleration of Service employment growth in New Jersey is due to catching up with national shares. However, as shown in Table 2, the elimination of the gap was completed by 1982 and, therefore, the growth in New Jersey's Service employment since 1982 ought to be about the same as that in the U.S., according to the catching-up hypothesis. Since New Jersey's Service employment continued to grow faster than its national counterpart (14.0% vs. 8.5% in 1982-84), it is

believed that closing the gap was not the main reason for the recent boom in the State's Service industries and, hence, the determinants of Service employment growth will be explored in the next section.

Although the rates of employment growth in New Jersey differ, sometimes substantially, from those in the U.S.,* most of the New Jersey Service industries tend to be governed by the national trend. Thus, of the 76 industries for which comparable data are available, 64 of them showed the same signs (both positive or both negative) when the New Jersey employment growth rates are compared pairwise with those for the U.S. To look at this pattern another way, of the 16 industries for which employment growth rates were negative in the U.S., 13 of them also showed negative growth rates in New Jersey, while 51 of the remaining 60 industries, for which the national employment growth rates were positive, showed positive growth rates in New Jersey.

While New Jersey's Service industries tend to follow, in general, the national trends observed above, there are, nevertheless, some interesting differences. For example, Hotels in New Jersey increased total employment by 480.7 percent during the five year period 1977-82, compared to 46.1 percent for the United States. Even more remarkable is the fact that total receipts of New Jersey's Hotels increased by 1,569.7 percent during this period, while the national total rose by 125.1 percent (which was a fairly good record compared to 89.3% for all Services). Others that have shown significantly faster employment growth in New Jersey than in the U.S. are Utility Trailer and Recreational Vehicle

*For the employment growth rates by individual service industry for New Jersey, U.S., New York and Pennsylvania, see the Appendix.

Rental Services (147.1% in N.J. vs. 2.2% in the U.S.), Other Personal Services (115.0% vs. 37.7%), Employment Agencies (114.9% vs. 75.9%) and Bands, Orchestras, Actors, and Other Entertainers (59.9% vs. -2.6%).

In contrast, some of New Jersey's Service industries lagged significantly behind their national counterparts. These are Racing, including Track Operation, (-56.1% in N.J. vs. 10.9% in the U.S.), Truck Leasing except Finance Leasing (-1.5% vs. 50.9%), Amusement Parks (-21.4% vs. 25.5%), and Passenger Car Leasing except Finance Leasing (-37.8% vs. 5.4%).

Many of New Jersey's Service industries which grew faster than their national counterparts, tended to grow much faster. For example, the number of New Jersey industries which showed higher growth rates than the national averages was 39, only one more than the expected value (50% of total) under the assumption that there is no systematic difference between New Jersey and the U.S. (Table 3). However, if the sample is limited to those industries which show a difference of 15 percentage points or more, New Jersey's ad-

vantage over the United States is 23 to 10, which is statistically significant at the five percent level.

When the two neighboring states are compared to New Jersey, the State still comes out ahead.* The number of New Jersey industries which posted higher employment growth rates than the U.S. as well as New York and Pennsylvania was 28 out of 73 industries for which comparable data were available. This figure was significantly higher than the expected value under the null hypothesis that all states have an equal chance of experiencing a higher growth rate than in other states. Similarly, the number of New Jersey industries which showed lower growth rates than the two neighboring states and the U.S. was only 10, which was significantly lower than the expected value under the null hypothesis.

3. Determinants of Employment Growth

As observed above, the employment growth rates differ among industries and between states for the same industry. What are the factors which cause these differences? An answer to this question will shed light on the related question: "Can the State

Table 3: Number of New Jersey Service Industries Showing Higher or Lower Employment Growth Rates (1977-82)

	N.J. Higher	N.J. Lower	Total	N.J. 10 Pts. Higher	N.J. 10 Pts. Lower
N.J. vs. U.S.	39	37	76	23	10
N.J. vs. U.S., N.Y. or PA	28	10	73 ⁺	18	6

⁺ 35 of the 73 industries showed N.J. employment growth rates which were higher than those for one or more, but not all, of the comparison group (U.S., N.Y., PA).

*Total employment for all services grew from 1977 to 1982 by 20.5 percent in New York and 17.3 percent in Pennsylvania, compared to 27.4 percent in the U.S. and 42.8 percent in New Jersey.

specialize in Service industries?" this issue attracted interest in the 1970's and was examined in an earlier study by Falk.* In that study, Service employment growth was explained by population growth, income growth, manufacturing employment growth, etc., using what may be considered to be reduced-form estimations. In this section, simultaneous structural models of employment and wage increases are estimated as a first step. The model equations to be estimated are:

$$\begin{aligned} \text{EMP}_i &= f(\text{WAGE}_i, \text{REV}_i), \\ \text{WAGE}_i &= g(\text{EMP}_i, \text{PROD}_i), \end{aligned}$$

where EMP, WAGE, REV and PROD stand for the 1977-1982 growth rates (percent) of employment, earnings per employee, total revenues, and productivity, respectively, and the subscript i refers to individual industry. Since output data are not available for these industries, the productivity growth rates are approximated by the growth rates of revenues per employee. While revenues per employee cannot be compared among industries as a measure of productivity, the growth rate in revenue per employee may be a reasonably good proxy for the growth rate of productivity in a given industry.

The above model implies that the growth of employment in an industry is influenced by increases in average wage (negatively) and total revenues

(positively). However, increases in average wage in an industry are also influenced by increases in total employment (positively) and productivity (positively). Thus, there is a simultaneous relationship between the employment growth and wage increases; the higher the employment growth rate, the higher the wage increases, which, in turn, work as a counterbalancing force and limit employment growth.

According to the model, when the simultaneity between EMP and WAGE is accounted for, both EMP and WAGE are ultimately determined by REV and PROD.** However, this model does not explain what factors are responsible for the differences in REV and PROD. It may be reasonable to assume that the productivity growth rates are more or less exogenous, i.e., they are not influenced by other variables that affect, directly or indirectly, EMP and WAGE. However, the same cannot be assumed regarding the growth of revenues. Accordingly, an attempt will be made in the next section to find determinants of revenue growth.

The model is estimated using two stage least squares and data from the Census of Service Industries, 1977 and 1982, U.S. Department of Commerce, Bureau of the Census.*** The data consist of 76 selected Service industries. Equations were estimated for both the United States and New Jersey. The regression results are as follows:

 *See Laurence H. Falk, "Specialization in Services as State Development Policy," 13th Annual Report, Economic Policy Council and Office of Economic Policy, 43-52, Trenton, 1980.

**The reduced-form equations are:

$$\text{EMP}_i = h_1(\text{REV}_i, \text{PROD}_i) \text{ and } \text{WAGE}_i = h_2(\text{REV}_i, \text{PROD}_i).$$

***Because of the two-way relationship, an attempt to explain the employment growth by estimating the first equation alone using the Ordinary Least Squares method will result in estimates which are subject to simultaneous-equations bias. This is why both equations must be taken together in the model. The Two Stage Least Squares estimates are preferred because their biases get smaller as the sample sizes increases.

$$(1) \text{ EMP}_{us} = 44.3940 - 1.8338\text{WAGE}_{us} + 0.6994 \text{ REV}_{us}$$

$$(4.6989) \quad (-7.1971) \quad (16.201)$$

$$R^2 = 0.7256 \quad F(2,73) = 96.4949 \quad \text{SER} = 16.6438$$

$$\text{Mean of Dependent Variable} = 24.9078$$

$$(2) \text{ WAGE}_{us} = 18.7249 + 0.0097\text{EMP}_{us} + 0.5013\text{PROD}_{us}$$

$$(6.4337) \quad (0.2965) \quad (8.1573)$$

$$R^2 = 0.4771 \quad F(2,73) = 33.3030 \quad \text{SER} = 8.8174$$

$$\text{Mean of Dependent Variable} = 39.7904$$

$$(3) \text{ EMP}_{nj} = 37.9466 - 1.2070\text{WAGE}_{nj} + 0.4809\text{REV}_{nj}$$

$$(5.2983) \quad (-6.1580) \quad (13.804)$$

$$R^2 = 0.7850 \quad F(2,73) = 133.29 \quad \text{SER} = 35.4143$$

$$\text{Mean of Dependent Variable} = 39.8081$$

$$(4) \text{ WAGE}_{nj} = -3.5548 + 0.1848\text{EMP}_{nj} + 0.8495\text{PROD}_{nj}$$

$$(-0.7201) \quad (4.0619) \quad (10.3024)$$

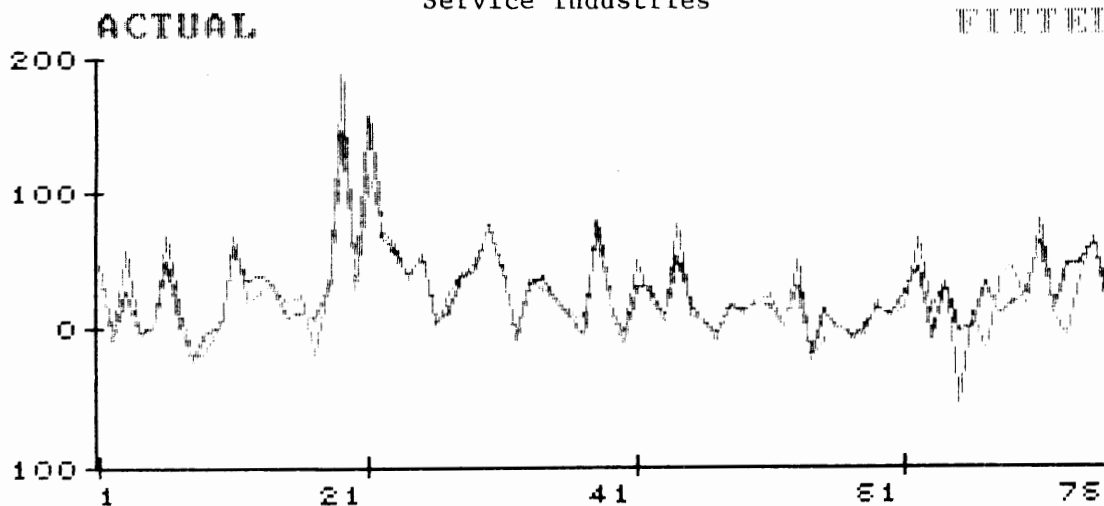
$$R^2 = 0.7034 \quad F(2,73) = 86.5694 \quad \text{SER} = 26.7095$$

$$\text{Mean of Dependent Variable} = 46.4863$$

where subscripts "nj" and "us" stand for, respectively, New Jersey and the United States, and figures in parentheses are the ratios of the coefficients to their standard errors.*

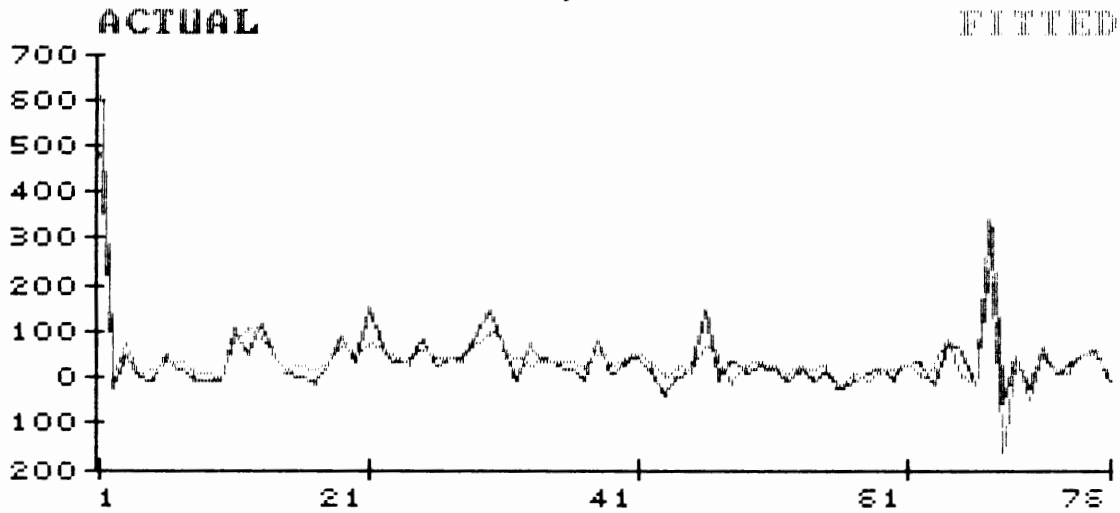
Figures 2 and 3 show the actual employment growth rates and their predicted values using equations (1) and (3), respectively.

Figure 2: Actual and Fitted Values of Employment Growth Rates: United States Service Industries



*These ratios are often mistaken for t-statistics. However, in TSLS estimation, these ratios have asymptotic normal distribution. Since the TSLS method is valid for large sample sizes, the distinction between the t and asymptotic normal distributions may not be necessary in applications.

Figure 3: Actual and Fitted Values of Employment Growth Rates:
New Jersey Service Industries



The regression results are consistent with the model hypothesis; all estimates are highly significant except the coefficient of EMP in the WAGE equation for the U.S., and R-squares are reasonably high considering that the variables are growth rates. According to the model estimates, increases in WAGE have a strong negative effect on employment growth.* As expected, revenue growth has a positive effect on employment growth. While the employment growth had a statistically significant and positive effect on wage increase in New Jersey, the same effect was negligible in the U.S. On the other hand, the effects of productivity increases are highly significant both in the U.S. and in New Jersey. However, the coefficients of PROD are significantly less than unity in both equations. This may be because of errors in variables (revenue increase per employee is not a precise measure of productivity growth) and because benefits of productivity increases

are shared by workers of other industries due to the tendency for wage equalization in a competitive labor market.

Since the regression results show that both the U.S. Service industries and New Jersey Service industries can be explained by the same model, it is possible to extend the model to explain the differences in EMP or WAGE between U.S. and New Jersey. Thus,

$$\text{EMPDIF} = f(\text{WAGEDIF}, \text{REVDIF}),$$

$$\text{WAGEDIF} = g(\text{EMPDIF}, \text{PRODDIF}),$$

where: $\text{EMPDIF} = \text{EMP}_{\text{nj}} - \text{EMP}_{\text{us}}$, etc. Similarly, differences in the two dependent variables between New Jersey and any other state can be explained by this model.** The regression results for the differences between New Jersey and the United States are as follows:

*Since all variables are expressed in growth rates, the regression coefficients can be interpreted as elasticities.

**The regression results for the differences between New Jersey and New York and between New Jersey and Pennsylvania are not reported here because they are very similar to those presented here. The estimates and other statistics are available upon request.

$$(5) \text{ EMPDIF} = 2.7068 - 0.8693\text{WAGEDIF} + 0.4086\text{REVDIF}$$

$$(0.593) \quad (-7.1954) \quad (18.347)$$

$$R^2 = 0.8753 \quad F(2,73) = 256.219 \quad \text{SER} = 24.1459$$

$$\text{Mean of Dependent Variable} = 14.9004$$

$$(6) \text{ WAGEDIF} = -3.9690 + 0.1264\text{EMPDIF} + 0.9052\text{PRODDIF}$$

$$(-1.0956) \quad (2.6115) \quad (11.970)$$

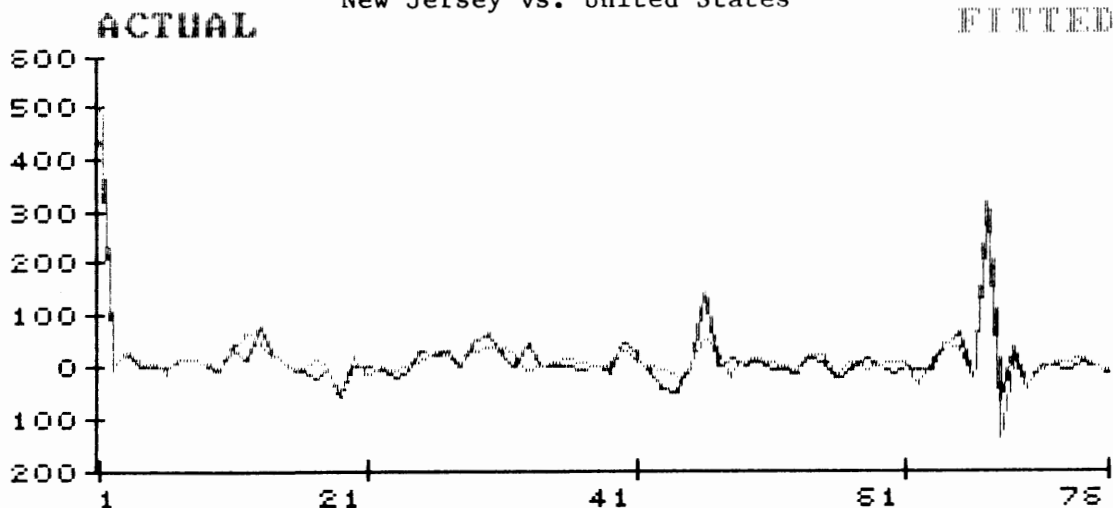
$$R^2 = 0.7631 \quad F(2,73) = 117.586 \quad \text{SER} = 23.6571$$

$$\text{Mean of Dependent Variable} = 6.6960$$

These estimates are, as expected, very similar to those of equations (1) - (4). Figure 4 shows the actual

and fitted values of the employment growth differential between N.J. and the U.S. based on equation (5).

Figure 4: Actual and Fitted Values of Employment Growth Rate Differences
New Jersey vs. United States



The implications of the model estimates are as follows. First, the estimates shown by equations (1) - (4) imply that, either, within a state or in the entire national economy, some industries experience faster employment growth than others because of slower wage increases and/or faster revenue increases. However, industries experiencing faster than average employment growth, other things being equal, are forced to offer higher than normal wage increases in an attempt to attract employees. The latter situation tends to slow the pace of employment growth and thus keep the fast growing industries from unrestrained expansion.

In contrast to the interindustrial growth differences, equations (5) and (6) explain interregional growth differences of the Service industries. Thus, equation (5) implies that those New Jersey industries in which wage increases are lower than the national averages for the same industries tend to show higher employment growth rates than the national employment growth rates of the same industries. However, as equation (6) shows, these New Jersey industries must offer wage increases that are higher than the national averages, which tends to reduce their advantage over the same industries in the rest of the nation. Once again, the latter process keeps fast growing

states from running away from the rest of the nation. Thus, interactions of market forces tend to keep relative balances both among industries and among states and make it difficult for a state to specialize in Services.*

When the interactions between the two endogenous variables, EMP and WAGE, are accounted for, the solutions or the reduced form equations of each pair of equations are expressed as functions of the exogenous variables, REV and PROD. For example, the reduced form equations of equations (5) and (6) are:

$$(7) \text{ EMPDIF} = 4.8426 + 0.3682\text{REVDIF} \\ - 0.7090\text{PRODDIF}$$

$$(8) \text{ WAGEDIF} = -2.4569 + 0.0465\text{REVDIF} \\ + 0.8156\text{PRODDIF}$$

Equation (7) implies that the employment growth differentials are positively affected by the revenue growth differentials and negatively by the productivity growth differentials. The coefficient of the revenue growth differential in equation (7) is smaller than the coefficient of the same variable in equation (5) because the revenue growth differentials, through their effects on employment growth differentials, affect positively the wage growth differentials. Thus, the indirect negative effect somewhat reduces the net effect. The negative coefficient of the productivity growth differential in equation (7) is due to its effect on wage growth differentials. In any case, a rise in productivity

without an increase in sales revenue must result in an employment reduction.

Equation (8) implies that revenue growth differentials have positive effects on wage growth differentials. This is because revenue growth has a positive effect on employment growth, which in turn has a positive effect on wage increase. The coefficient of the productivity growth differential in equation (8) is also somewhat smaller than the coefficient of the same variable in equation (6) because of its negative effect on employment growth. These feedback effects, once again, make specialization difficult, if not impossible.

4. Determinants of Revenue Growth

As explained above, the employment growth and the wage increases are both determined, directly or indirectly, by the revenue growth and the productivity growth. Therefore, in order to understand the determinants of the interindustrial and interregional differences in the employment growth rates, determinants of the revenue growth must be understood. While it may be reasonable to assume that the productivity growth is, to a large extent, exogenous, i.e., determined outside the system, it would be unreasonable to make the same assumption about the revenue growth. In this section, an attempt will be made to explain the interindustrial and interregional differences in the revenue growth rates.

Revenues are, by definition, the products of prices and quantities. Both prices and quantities are determined largely by demand. Therefore,

 *Special circumstances may make it relatively easy to specialize in some service industries. For example, prohibition of casino gambling by other states makes it possible for New Jersey and Nevada to specialize in this industry.

variables believed to be determinants of demand are assumed to be the arguments of the revenue growth equation. Since these variables do not include the endogenous variables of the employment growth model, revenue growth equations may be estimated separately, although they must be viewed as part of the whole system.

In estimating the revenue growth equation, the explanatory variables representing the determinants of demand are common to all industries of a state or the U.S. Accordingly, cross-section data for 37 of the continental states were used to estimate a revenue growth equation for each industry. For many states, data for some industries were not available due to disclosure problems. However, experiments show that the revenue growth rates of the service industries are mostly explained by the same set of variables. Therefore, nine industries representing fast growing, moderately growing, and declining industries are chosen for illustration.

The data for the explanatory variables are obtained from the U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States. Variable definitions are as follows:

POP = percent change in population from 1977 to 1982,

PCINC = percent change in per capita personal income from 1977 to 1982,

LDENS = natural logarithm of population density in 1977,

URB = percent of total population in urban areas in 1977,

TXRT = percentage point change in sales tax rate from 1977-1982.

The regression results are presented in Table 4.

The regression equations reveal that the revenue growth rates of the Service industries are mostly determined by population growth and per capita income growth.* One exception among the nine selected industries is Computer and Data Processing Services. For this industry, none of the explanatory variables was found to be statistically significant. This may be because the industry is a newly emerging and rapidly growing one which has found new markets in all regions of the U.S. In other words, as a young industry, its supply may not have caught up with the demand and, consequently, the growth in demand has not yet been an important factor determining the growth of the industry.

Another exception was New Jersey's Hotel industry. For reasons that could not be identified statistically, New Jersey's Hotel industry grew more than ten times as fast as the national average for that industry.** Having failed to fit a reasonably good equation for this industry, including that of New Jersey, it was decided to exclude N.J. from the sample as an outlier. The regression equation for the Hotel industry, based on a sample of 36 states, is very similar to those for other industries.

*These results are very similar to those of an earlier study by Falk.

**A significant part of this growth is due to new casino hotels in Atlantic City.

Table 4: OLS Equations for Revenue Growth Rates

Industry	Constant	POP	PCINC	LDENS	URBAN	TXRT	R2	F(d.f.)
Hotels (excl. N.J.)	-47.9818 (-0.8831)	3.7183 (3.0691)	1.9804 (2.3951)	7.3813 (1.2801)		-25.5023 (-2.0106)	0.3493	4.1597(4,31) SER = 36.7361
Laundry & Garment Svc. except coin-op. laund. & dry cleaners	-8.7295 (-0.4706)	1.5387 (4.7460)	1.1014 (4.0387)		-1.1724 (-1.1724)		0.5242	12.1178(3,33) SER = 12.2844
Miscellaneous Personal Svc.	-42.8290 (-1.0250)	0.9349 (1.1642)	2.4898 (3.4974)				0.2790	6.5792(2,34) SER = 32.1629
Advertising Agencies	95.1774 (3.0084)	4.6876 (3.7629)		20.5160 (3.2154)	-1.5339 (-2.6877)		0.3111	4.9683(3,33) SER = 34.000
Computer & Data Proc. Svc.	No satisfactory equation.							
Management, Consulting & P.R. Svc.	137.786 (14.8621)	3.8841 (3.7565)					0.2873	14.1112(1,35) SER = 41.4811
Equipment Rental & Leasing	-68.2481 (-1.2737)	3.3893 (2.2799)	5.5811 (4.4632)		-2.0292 (-2.7121)		0.4509	9.0325(3,33) SER = 56.3280
Auto Repair	-22.0898 (-1.2737)	1.3660 (4.0981)	1.1411 (3.8617)				0.4685	14.9850(2,34) SER = 13.3495
Motion Picture Theaters	28.8764 (7.6012)	1.5083 (3.5598)					0.2658	12.6725(1,35) SER = 16.9976

The motivation for this section has been to identify the determinants of revenue growth of Service industries, because the employment growth of these industries was found to be explained by the growth of productivity and that of revenues. For the eight industries for which regression equations are presented in Table 4, population growth is, without exception, a statistically significant factor explaining revenue growth. Per capita income growth is also found to be an important determinant of revenue growth; its coefficients are highly significant in five of the eight industries. Other variables (population density, percent of urban population, and changes in sales tax rate) also help explain the revenue growth of some industries. The findings of this section, therefore, imply that population growth and per capita income growth (or, together, total income growth) are the most important factors which determine the rates of growth of many Service industries.

5. Summary and Conclusion

Service industries have been the fastest growing group of industries since 1949 and the same trend is likely to continue. However, not all Service industries are fast growing, some of them are in the process of being eliminated from the market (e.g., Barber Shops by Hair Stylists); others are losing their previous glitter (e.g., Temporary Help Supply Services), while some are in the new frontiers of high-technology services (e.g., Computer Programming and Related Services) or personal services (e.g., Membership Sports and Recreational Clubs).

An attempt was made to explain the interindustrial as well as inter-

regional differences in the rates of growth of the Service industries. A simultaneous equation model showed that, first, employment growth and wage increases are interrelated and, second, these variables are influenced, directly or indirectly, by revenue growth and productivity growth. Revenue growth is, in turn, determined by population growth and per capita income growth, among other variables. Therefore, the employment and wage growth rates of Service industries are ultimately determined by the growth rates of population, per capita income, and productivity.

In a more complete model, the feed-back effects of employment and wage growth on the growth of population, income and productivity must be accounted for. To do so, however, requires a large-scale econometric model which is beyond the scope of this study. Since Services are an important part of the entire economy, their feedback effects cannot be completely ignored on the ground that Services are only a part of the whole. Nevertheless, our estimates may yield reasonable approximations. This is because the positive effects of the employment growth on population growth and on wage increase are likely to have small net feedback effect since population growth has a positive, and wage increases a negative influence on employment growth. When feedback effects due to interrelationships among many economic variables are balanced, there remains an endogenous mechanism which tends to keep relative balances both among industries and among states. This implies that specialization in Services as a state development strategy is a formidable task unless special circumstances (e.g., prohibition of casino gambling in other states) warrant it.

APPENDIX
 SERVICE INDUSTRY EMPLOYMENT GROWTH RATES IN THE UNITED STATES, NEW JERSEY,
 NEW YORK AND PENNSYLVANIA
 Percent Change From 1977 to 1982

SIC	Industry	U.S.	N.J.	N.Y.	PA
7011 pt.	Hotels	46.1	480.7	21.6	55.4
7011 pt.	Motels, Motor Hotels, and Tourist Courts	-10.0	-20.4	-13.3	-21.9
703	Trailer Parks and Camps	27.9	48.0	-19.1	32.1
7215	Coin-operated Laundries and Dry Cleaning	-4.3	-0.9	-5.2	-21.2
721 ex. 7215	Other Laundry, Cleaning & Garment Services	-1.5	-4.3	-8.0	-9.2
722	Photographic Studios, Portrait	48.0	46.2	51.9	52.6
723	Beauty Shops	1.5	12.9	-3.3	10.0
724	Barber Shops	-24.6	-8.1	-29.9	-20.1
725	Shoe Repair, Shoe Shine & Hat Cleaning	-2.6	-4.2	0.8	-6.7
726	Funeral Service and Crematories	3.2	-4.9	-7.9	3.3
729 pt.	Reducing Salons & Health Clubs, exc. Resorts	60.7	105.5	66.7	55.0
729 pt.	Tax Preparation Services	35.8	52.6	71.7	21.1
729 pt.	Other personal Services, n.e.c.	37.7	115.0	62.9	5.8
7311	Advertising Agencies	29.4	50.5	19.4	6.3
7312	Outdoor Advertising Services	6.5	4.7	-29.9	3.5
7313	Radio, TV, Publishers' Advertising Rep.'s.	11.1	3.5	1.1	-3.4
7319	Advertising, n.e.c.	5.7	-16.3	18.2	-30.0
734	Services to Dwellings and Other Buildings	26.6	23.5	17.7	19.2
7372	Computer Programming & Other Software Services	146.9	89.9	110.1	207.0
7374	Data Processing Services	35.1	37.1	16.3	37.0
7379	Computer Related Services, n.e.c.	158.4	155.9	38.7	325.3
7392	Management, Consulting, & P.R. Services	69.3	63.5	50.2	70.9
7394	Equipment Rental and Leasing Services	56.7	32.9	38.7	25.5
7331	Direct Mail and Advertising Services	38.5	30.2	38.6	87.2
7332	Blueprinting and Photocopying Services	52.0	81.5	21.3	16.6
7333 pt.	Commercial Photography	6.2	26.9	-11.7	37.5
7333 pt.	Commercial Art	13.8	43.2	3.2	20.6
7333 pt.	Graph. Arts & Rel. Design & Com. Photo, n.e.c.	37.8	39.0	0.8	27.9
7339	Stenographic Svc's; Reproduction Svc's, n.e.c.	44.5	92.2	20.3	59.5
7361	Employment Agencies	75.9	144.9	89.0	28.1
7362	Help Supply Services	41.9	68.6	43.0	-20.0
7369	Facilities Management Services	-8.2	-7.5	-63.0	n.a.
7391	Research and Development Laboratories	32.1	72.9	-1.5	-3.9
7397	Testing Laboratories and Facilities	38.5	37.9	34.9	33.2
7393	Detective Agencies and Protective Services	21.6	24.5	13.4	-1.9
7395	Photofinishing Laboratories	11.5	14.0	2.6	-32.5
7399 pt.	Sign Painting Shops	-5.3	-10.6	-25.5	-35.0
7399 pt.	Interior Designing	78.6	78.6	59.6	104.8
7399 pt.	Telephone Answering Services	18.9	6.4	0.9	42.8
7399 pt.	Water Softening Services	-10.2	35.2	16.2	-20.8
7399 pt.	Packaging and Labeling Services	30.2	50.6	29.5	67.7
7512 pt.	Passenger Car Rental, Without Drivers	29.2	19.1	6.9	36.8
7512 pt.	Passenger Car Leasing, except Finance Leasing	5.4	-37.8	-9.1	-3.3
7513 pt.	Truck Rental, Without Drivers	50.9	-1.5	40.0	21.3
7513 pt.	Truck Leasing, except Finance Leasing	18.1	20.9	1.8	4.8
7519	Utility Trailer & Recreat'l. Vehicle Rental	2.2	147.1	77.8	-70.0
7523	Parking Lots	-6.3	-4.9	-12.3	8.1
7525	Parking Structures	15.4	32.1	0.4	13.6

APPENDIX (continued)

SIC	Industry	U.S.	N.J.	N.Y.	PA
7538	General Automotive Repair Shops	12.2	11.6	3.1	0.6
7531	Top and Body Repair Shops	17.6	23.7	3.3	8.4
7534,5,9	Other Autootive repair shops	17.1	13.1	16.2	3.7
7542	Car Washes	-0.6	-6.8	-13.2	-26.9
7549	Other Automotive Services	28.3	16.2	1.1	24.3
7622	Radio and TV Repair Shops	-23.2	-6.0	-20.5	-25.8
7623	Refrigeration & Air-conditioning Repair Shops	12.1	19.0	19.0	11.0
7629	Electrical & Electronic Repair Shops, n.e.c.	-0.3	-21.7	-11.7	-3.1
764	Reupholstery and Furniture Repair	-4.9	-5.3	1.3	-17.2
763	Watch, Clock, and Jewelry Repair	-0.4	11.6	18.6	21.4
7692	Welding Repair	11.8	14.5	30.5	-5.8
7694	Armature Rewinding Shops	6.9	-6.3	-18.2	-22.4
7699	Repair Shops and Related Services, n.e.c.	24.9	25.9	10.3	13.9
781,2	Motion Picture Prod., Distribution & Svc.'s	43.9	36.3	8.9	-0.8
783	Motion Picture Theaters	-7.8	-12.1	-18.3	-9.3
7922	Theatrical Producers & Misc. Theat. Services	31.7	72.6	56.5	n.a.
7929	Bands, Orchestras, Actors, Other Entertainers	-2.6	59.9	51.2	n.a.
793	Bowling Alleys & Billiards & Pool Estabmts.	0.8	-19.6	0.0	-13.8
7941	Professional Sports Clubs, Managers, Promoters	32.2	346.9	6.3	-2.8
7948	Racing, including Track Operation	10.9	-56.1	11.9	38.5
791	Dance Halls, Studios, and Schools	17.9	51.1	24.8	15.5
7996	Amusement Parks	25.5	-21.4	61.8	79.3
7997	Membership Sports & Recreational Clubs	62.4	63.2	11.9	86.6
8072	Dental Laboratories	10.4	6.9	-8.8	4.5
81	Legal Services	45.2	36.7	30.4	36.3
891 pt.	Architectural Services	46.7	51.1	35.6	23.6
891 pt.	Engineering Services	63.0	60.4	42.3	49.6
891 pt.	Surveying Services	13.9	-7.4	36.9	-1.0

Note: "pt." stands for "part" and "n.e.c." for "not elsewhere classified."

V.
STATISTICAL TABLES

Table 1
POPULATION AND EMPLOYMENT, NEW JERSEY, 1960 - 1984

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(r)	2,859.0(r)	138.0(r)	4.6	4.4
1971	7,282.0	3,012.0(r)	2,840.0(r)	172.0(r)	5.7	5.4
1972	7,337.0	3,117.0(r)	2,935.0(r)	182.0(r)	5.8	5.1
1973	7,335.0	3,190.0(r)	3,011.0(r)	180.0(r)	5.6	4.7
1974	7,335.0	3,226.0(r)	3,023.0(r)	204.0(r)	6.3	5.7
1975	7,341.0	3,264.0(r)	2,929.0(r)	334.0(r)	10.2	7.8
1976	7,344.0	3,318.0(r)	2,973.0(r)	346.0(r)	10.4	6.4
1977	7,342.0	3,383.0(r)	3,065.0(r)	317.0	9.4	5.6
1978	7,356.0	3,457.0(r)	3,209.0(r)	248.0(r)	7.2	5.1
1979	7,373.0	3,570.0(r)	3,323.0(r)	247.0(r)	6.9	4.7
*1980	7,365.0	3,594.0(r)	3,334.0(r)	260.0(r)	7.2	4.7
1981	7,407.0	3,593.0(r)	3,330.0(r)	263.0(r)	7.3	4.3
1982	7,428.0(r)	3,632.0(r)	3,306.0(r)	326.0(r)	9.0	4.7
1983	7,464.0(r)	3,673.0(r)	3,385.0(r)	288.0(r)	7.8	3.8
1984	7,515.0(p)	3,829.0	3,592.0	236.0	6.2	3.1

*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 1971 to 1979 and for 1981 and 1982 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 1984 are published data obtained directly from the Current Population Survey conducted for the U.S. Department of Labor.

(r) - revised.

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

Table 2
WAGE AND SALARY WORKERS IN NONAGRICULTURAL ESTABLISHMENTS, MAJOR INDUSTRY DIVISIONS,
New Jersey, 1957-1984 (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
1957	1,968.3	835.0	4.4	96.4	154.3	349.1	85.2	222.7	221.2
1958	1,911.8	776.0	3.7	88.9	148.2	351.0	86.4	230.5	227.0
1959	1,970.9	801.9	3.6	96.3	147.0	360.3	86.7	241.6	233.5
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	3,098.6(r)	771.2(r)	2.3	108.7	196.5	690.6	161.8	638.5	529.0
1982	3,091.3(r)	729.7(r)	2.1	107.3	197.1	701.2	167.1	662.1	524.7(r)
1983	3,148.8	712.1	2.0	112.1	203.0(r)	735.3(r)	172.7(r)	701.0(r)	521.2(r)
1984	3,338.7	729.4	2.2	132.6	215.9	795.9	182.8	754.7	525.3

Series have been adjusted to March 1984 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, 1957-1984 (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	Transportation Equipment	Instruments & Related Products	Miscellaneous Manufacturing Industries
1957	457.3	6.3	9.2	33.9	46.9	56.7	65.5	125.6	55.9	29.4	27.9
1958	412.5	5.6	8.7	31.9	40.9	51.5	57.0	115.0	48.7	27.4	25.8
1959	431.1	5.9	9.2	33.1	41.7	54.3	57.8	121.4	50.5	30.2	27.0
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(r)	6.1	9.6	30.9	25.4	58.8	72.5	91.6(r)	17.5	37.1	25.3
1982	350.1(r)	5.5	9.9	27.1	21.8(r)	54.3	66.5	90.9(r)	14.7	35.7	23.6
1983	341.6(r)	5.9(r)	10.5(r)	26.8(r)	20.7(r)	50.9(r)	60.9(r)	93.1(r)	15.1(r)	34.2(r)	23.5(r)
1984	346.7	6.4	13.0	26.4	21.7	51.4	60.3	94.0	16.1	33.3	24.1

Series have been adjusted to March 1984 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, 1960-1984

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(r)	47.7(r)	.3(r)	15.4(r)	50.5(r)	31.2	58.0(r)	119.1(r)	10.3(r)	36.2	4.7(r)
1984	382.7	47.1	.5	15.0	51.5	32.0	62.7	120.7	10.1	38.9	4.2

Series have been adjusted to March 1984 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, 1950-1984

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(r)	39.9	345.53	8.66
1983	457.1(r)	40.6	369.87	9.11
1984	461.8	41.1	390.45	9.50

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

Data have been adjusted to a 1983 benchmark.

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

Table 6
CONSUMER PRICE INDEXES*
FOR URBAN WAGE EARNERS AND CLERICAL WORKERS, 1950-1984
(1967 = 100.0)

Year	United States	New York SCA**	Philadelphia SMSA***
1950	72.1	71.2	71.3
1951	77.8	76.5	77.9
1952	79.5	77.7	79.5
1953	80.1	78.2	79.8
1954	80.5	78.7	80.7
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

*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, 1950-1984

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
1950	8,685	225,684	1,783	1,492	2,502	2,069
1951	9,883	252,485	1,974	1,647	2,557	2,117
1952	10,681	268,983	2,084	1,728	2,651	2,174
1953	11,479	284,866	2,195	1,800	2,778	2,247
1954	11,688	286,953	2,181	1,781	2,737	2,212
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	31,252	747,536	4,405	3,714	3,983	3,383
1970	34,061	803,922	4,737	3,945	4,001	3,392
1971	36,527	861,904	5,016	4,167	4,022	3,435
1972	39,469	944,852	5,380	4,515	4,164	3,603
1973	42,906	1,058,902	5,849	5,010	4,251	3,764
1974	46,521	1,162,203	6,342	5,448	4,140	3,689
1975	49,832	1,258,643	6,788	5,842	4,104	3,624
1976	54,082	1,385,201	7,364	6,367	4,224	3,734
1977	58,878	1,534,708	8,019	6,984	4,346	3,848
1978	64,680(r)	1,726,185(r)	8,792(r)	7,772	4,506(r)	3,980(r)
1979	71,580(r)	1,942,650	9,708(r)	8,651	4,542(r)	3,974(r)
1980	79,753(r)	2,156,810	10,811(r)	9,494	4,511(r)	3,844(r)
1981	89,356(r)	2,420,091(r)	12,064	10,544	4,581(r)	3,872(r)
1982	97,209(r)	2,575,847(r)	13,089(r)	11,113	4,738(r)	3,851(r)
1983	104,548(r)	2,734,464(r)	14,000(r)	11,687	4,873(r)	3,930(r)
1984	114,837	3,000,827	15,282	12,707	5,107	4,131

Personal income data revised as of August 1984.

- 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, 1965-1984

Year	ELECTRIC POWER SALES Total	Large Industrial and Commercial Users (kilowatt hours in thousands)	Small Industrial and Commercial Users	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	49,585,000	16,345,000	16,446,000	1,010,084	3,789,979	34,077(r)	396,150	56,390
1981	49,400,000	16,283,000	16,741,000	1,022,130	3,568,772	35,658(r)	327,051	39,093
1982	47,790,000	16,866,000	14,926,000	1,003,694	3,675,524	37,414(r)	305,568	38,649
1983	50,924,000(r)	15,380,000(r)	18,176,000(r)	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

*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.

p - preliminary estimates (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, 1955-1984

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	38,543	714	49,071	10,172	35,584	49,083
1961	28,825	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	12,038	55,340	78,205
1969	73,211	343	53,141	13,168	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	98,553
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(r)	346,598(r)	22,401	129,922	132,932
1983	*	689(r)	315,383(r)	26,215	139,895	143,855
1984	*	1,003**	458,000(p)	27,646	151,913	156,029

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
AGRICULTURE, NEW JERSEY, 1950-1983

Year	Number of Workers on Farms (thousands)	Cash Receipts From Farm Marketings		
		Total	(thousands of \$) From Livestock and Products	From Crops
1950	66	292,430	188,694	103,736
1951	65	348,831	229,976	118,855
1952	61	342,447	215,156	127,291
1953	58	346,187	223,750	122,437
1954	59	314,259	194,605	119,654
1955	58	307,674	200,178	107,496
1956	53	330,372	202,117	128,255
1957	51	314,627	193,991	120,636
1958	51	304,569	191,946	112,623
1959	45	288,814	170,273	118,541
1960	44	296,510	166,126	130,384
1961	42	285,007	154,547	130,460
1962	41	276,598	143,854	132,744
1963	39	267,965	134,962	133,003
1964	37	259,477	124,079	135,398
1965	33	268,493	118,031	150,462
1966	27	269,839	120,262	149,577
1967	23	250,927	102,337	148,590
1968	23	252,599	100,797	151,802
1969	21	248,982	103,694	145,288
1970	20	246,631	98,962	147,669
1971	19	244,045	90,679	153,366
1972	20	240,784	90,910	149,874
1973	19	302,035	111,204	190,831
1974	20	339,876	113,269	226,607
1975	21	325,998	102,915	223,083
1976	22	335,534	109,599	225,935
1977	23	348,793	98,237	250,556
1978	23	398,555	121,370	277,185
1979	20	413,732	127,632	286,100
1980	21	434,575	123,457	311,118
1981	n.a.	501,747	135,402	366,345
1982	n.a.	519,873	132,171	387,702
1983(p)	n.a.	502,575	136,358	366,217

(p) - preliminary estimates.

SOURCES: United States Department of Agriculture; New Jersey Department of Agriculture.

Prepared by New Jersey Department of Agriculture.

Table 11
RESIDENT POPULATION FOR NEW JERSEY COUNTIES
1970, 1980

County	C e n s u s		Provisional Estimates* July 1, 1984
	April 1, 1970	April 1, 1980	
Atlantic	175,043	194,119	200,900
Bergen	897,148	845,385	844,500
Burlington	323,132	362,542	377,700
Camden	456,291	471,650	485,100
Cape May	59,554	82,266	89,000
Cumberland	121,374	132,866	134,000
Essex	932,526	851,304	841,500
Gloucester	172,681	199,917	205,600
Hudson	607,839	556,972	558,600
Hunterdon	69,718	87,361	91,800
Mercer	304,116	307,863	314,700
Middlesex	583,813	595,893	617,800
Monmouth	461,849	503,173	522,400
Morris	383,454	407,630	417,100
Ocean	208,470	346,038	371,300
Passaic	460,782	447,585	457,700
Salem	60,346	64,676	65,700
Somerset	198,372	203,129	208,900
Sussex	77,528	116,119	118,900
Union	543,116	504,094	506,200
Warren	73,960	84,429	85,300
STATE TOTAL	7,171,112	7,365,011	7,515,000

*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
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