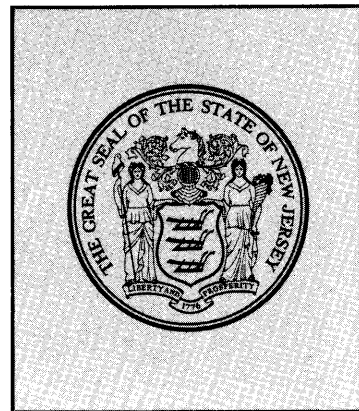
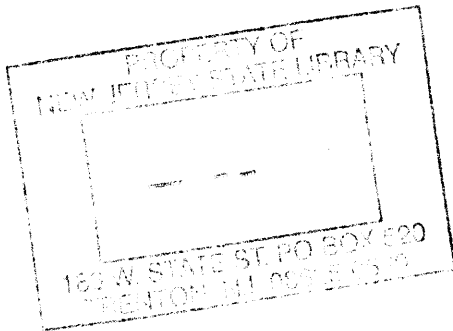


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# 10<sup>th</sup> Annual Report

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Economic Policy Council  
and Office of Economic Policy

Department of the Treasury  
State of New Jersey  
August, 1977



# 10<sup>th</sup> Annual Report

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Economic Policy Council  
and Office of Economic Policy

Department of the Treasury  
State of New Jersey  
August, 1977





STATE OF NEW JERSEY  
OFFICE OF THE GOVERNOR  
TRENTON

BRENDAN T. BYRNE  
GOVERNOR

August 15, 1977.

TO THE LEGISLATURE

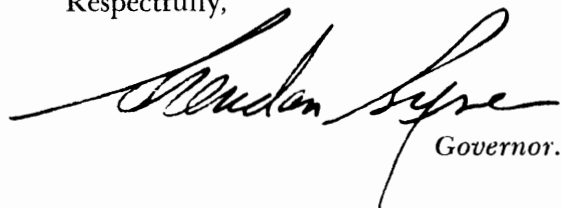
I am pleased to transmit the Tenth Annual Report of the Economic Policy Council and the Office of Economic Policy.

Economic growth last year has begun to erase some of the bleak memories of the 1973-75 national recession. The economic programs I instituted are now in operation and their impact on the economy is encouraging. Employment is increasing, incomes are rising, and New Jerseyans are optimistic and proud of their State.

Last year's achievements, however, will not ensure future prosperity. The dynamics of our economy are such that new programs and initiatives are continually needed. The Economic Policy Council is accepting this challenge by providing greater insights to the workings of the State's economy and formulating policies that will help shape the pattern of New Jersey tomorrow.

The end of the recession has not meant the end of all our economic troubles. Problems persist. Some solutions can be found next year. To this end, I urge closer ties between the Executive and Legislature in establishing economic policies that will encourage even higher standards of living for our residents.

Respectfully,

  
Governor.

## **ECONOMIC POLICY COUNCIL**

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

**DR. WILLIAM C. FREUND**, *Member*  
*Senior Vice President and Chief Economist, New York Stock Exchange*

**DR. DWIGHT M. JAFFEE**, *Member*  
*Professor of Economics, Princeton University*

## **OFFICE OF ECONOMIC POLICY**

**DR. ADAM BRONER**, *Director*

**DR. LAURENCE H. FALK**, *Economist*

**GEORGE R. NAGLE, M.S.**, *Economist*

**SUSAN A. FRANKS**, *Secretary*



State of New Jersey  
ECONOMIC POLICY COUNCIL  
142 WEST STATE STREET  
TRENTON, NEW JERSEY 08625

DR. JOSEPH J. SENECA  
CHAIRMAN

DR. WILLIAM C. FREUND  
DR. DWIGHT M. JAFFEE  
MEMBERS

August 1, 1977.

HONORABLE BRENDAN T. BYRNE  
*Governor, State of New Jersey*

DEAR GOVERNOR BYRNE:

The Economic Policy Council is pleased to transmit its *Tenth Annual Report* in accordance with Chapter 129 of New Jersey Public Law 1966.

A wide range of economic issues has occupied us over the past year and this report reflects some of the diverse and complex factors which affect the New Jersey economy.

Considerable national attention has been focused on the role of federal policies in regional economic development. New Jersey has been active in this debate and in leading regional efforts to restore a federal policy balance. Accordingly, we present an analysis of the Sunbelt/Snowbelt growth issues and evaluate the arguments for federal intervention (Chapter VII).

We develop interesting evidence on the relationship between the service sector and economic development (Chapter V). We conclude that employment growth in the service industry is directly related to a strong manufacturing sector.

Our interest in the broad trends of the New Jersey economy is continued with a detailed analysis of the impact of the two recent national recessions on the New Jersey economy (Chapter IV). The distribution of air quality in New Jersey is the subject of Chapter VI and an analysis of differences in air pollution control costs among states is provided in Chapter X.

In the policy area we offer several innovations in the traditional mortgage contract in order to ease the initial burden of home purchase and to stimulate construction employment (Chapter XIII). In addition, a new and efficient approach to industrial inducement policy is outlined in Chapter XIV.

We believe that fiscal stability is critically important for the growth and prosperity of the State's economy and we discuss this vital issue in the context of an analysis of alternatives to the personal income tax (Chapter XII).

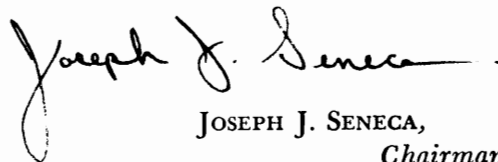
We also continue our tradition of including the annual economic outlook for New Jersey (Chapter II) and reviewing the year's economic legislation (Chapter III).

The Office of State Economic Planning discusses its activities (Chapter VIII) and provides studies on labor costs (Chapter IX), pollution control expenditures (Chapter X) and the rubber and plastics industry (Chapter XI).

The Economic Policy Council's involvement in a wide range of economic issues and problems this year was greatly facilitated by the support received from several departments and individuals. We wish to express our appreciation to Dr. Arthur O'Neal, Director of Planning and Research, Department of Labor and Industry for supplying the economic data for the study of business cycles in New Jersey; Ms. Vivien Shapiro from the same department revised and updated the Statistical Appendix. Peg Pestrak and Val Babecki from the legislative bill room carefully collected the legislation for our annual review. The staff of the New Jersey State Library continued to be a great help in locating and supplying reference material. This year's expanded Annual Report was made possible by the conscientious efforts of Raymond Petterson, Director, Office of State Economic Planning and his staff; Dr. Ira Kay studied labor costs, William Carmichael reviewed the State's rubber and plastics industry, and Arnold Landy added to our knowledge of pollution abatement costs. Sue Franks, Leah Ciarka, and Lynne Tammaro skillfully typed numerous manuscripts of contributing chapters and deserve our special thanks.

The Council and its staff appreciate your interest in our work and we look forward to continuing to assist in the development of economic policies to improve the economy of New Jersey.

Respectfully submitted,

A handwritten signature in cursive script that reads "Joseph J. Seneca". The signature is written in black ink and is positioned above the printed name and title.

JOSEPH J. SENECA,  
*Chairman.*

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# CHAPTER I

## THE ACTIVITIES OF THE ECONOMIC POLICY COUNCIL DURING THE 1976-77 FISCAL YEAR\*

This past year has been a very active one for the Council and its staff and numerous economic issues have received our attention. This chapter briefly reviews our activities during the preceding year. As an introduction we note that the increasing complexities of both the national and state economy imply that state economic policy is an increasingly important factor in determining the health and growth of New Jersey's economy.

### Policy Issues

—The Office and Council have been involved in the analysis of the regional impact of federal policies. This work included the preparation of proposals for the Coalition of Northeast Governors for a supplementary investment tax credit which varies with local economic conditions, changes in federal funding formulas, a regional energy development corporation and the federalization of unemployment compensation taxes and welfare assistance.

—Together with the Office of State Economic Planning, we analyzed the economic impact of casino gambling in Atlantic City. The large economic potential of casino gambling offers considerable promise to stimulate employment

and economic activity in New Jersey. This potential, however, is not only dependent on an orderly introduction of casinos but on provision of the appropriate supporting infrastructure—roads, housing, public services. The Council is continuing to work on this issue.

—We reported on the cost effects of alternative legislative proposals for a lifeline energy program.

—We made an evaluation of proposals for oil spill legislation.

—Our study on the potential for technical innovation in New Jersey has resulted in legislation (S-1648) which would establish an Office for Promoting Technical Innovation. Its objective is to realize for the State, a greater degree of commercial production, and hence employment, from the patents and product innovations which have always been developed in large numbers in New Jersey. The bill has passed the Senate and awaits action in the Assembly.

—Another bill developed by the Council establishes a Joint Economic Committee of the Legislature (S-1401). The bill has also been passed by the Senate and awaits further action by the Assembly.

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\* Prepared by Dr. Joseph J. Seneca, Chairman of the Economic Policy Council.

—We have continued work on business tax reform and note with approval the major progress that has been made in the past year. This includes the phase-out of the business personal property tax and the repeal of the sales tax on machinery and equipment—two proposals the council has long supported. In addition, we have proposed changes in the corporation income tax formula which would provide incentives for production and employment in New Jersey. We have also suggested improvements in tax incentives for the purchase of pollution control equipment.

—We provided assistance for the proposal request for the Outdoor Recreation Plan for New Jersey developed by the Department of Environmental Protection.

—We investigated the effects on New Jersey of federal deregulation of natural gas.

—Together with the Office of State Economic Planning, we have attempted to synthesize the numerous State programs which affect employment. The objective is to develop a coordinated, effective plan to improve employment in New Jersey.

### **Economic Studies**

This *Tenth Annual Report* represents the broad scope of the year's work. It demonstrates how the material described above, which was developed for daily policy problems, is related to on-going, long range economic studies. This section provides a brief review of some of these economic study chapters.

#### *Chapter IV* "Boom and Bust: Impact of Business Cycles on the New Jersey Economy."

The two most recent national recessions have had a severe impact on New Jersey. This chapter analyzes these effects in several dimensions and notes some of the subsequent fundamental changes in the State's economy.

#### *Chapter V* "The Potential for Employment in New Jersey's Service Sector."

An argument frequently invoked in the discussion of the economic problems of New Jersey and the entire Northeast region is that employment gains in the service sector will replace any secular loss in manufacturing jobs. Economic growth can then continue following such a shift in employment patterns. Unfortunately, this rosy view of economic development does not appear to be true. The evidence of this chapter indicates that much of the growth in the service sector is intimately dependent on a healthy and growing manufacturing base. It is unrealistic to expect service sector employment to expand greatly while absolute declines occur in the level of employment in manufacturing.

#### *Chapter VI* "The Distribution of Air Quality in New Jersey."

A neglected issue in the economics of pollution control concerns the distribution of pollution damages. This chapter examines the incidence of air quality in New Jersey for several air pollutants. It concludes that air pollution is regressively distributed, with the poorer cities in the State experiencing relatively higher levels of air pollution. Overall however, the air quality record of New Jersey is rather good and only carbon monoxide levels show a consistent violation of the federal ambient air quality standards. Significantly, carbon monoxide, an auto pollutant, has a somewhat different incidence pattern compared to the other pollutants examined.

#### *Chapter VII* "Regional Economic Development: The Sunbelt-Snowbelt Controversy."

Over the last decade regional economic growth patterns have differed dramatically. In part, this is caused by natural economic forces as the cost advantages of the original manufacturing areas are steadily eroded over time. National efficiency gains can then be achieved by a redistribution of economic activity to lower cost areas of the country. However, there are substantial social costs associated with any abrupt changes—unemployment, a deteriorating infrastructure, and various social and urban problems. Moreover,

to the extent that federal policies have artificially contributed to the cost differences among regions, then even the desirable efficiency gains are illusionary. This chapter provides an evaluation of recent arguments on the regional growth issue.

*Chapter IX* "An Examination of Labor Costs in New Jersey's Manufacturing Industry."

Labor costs are a major component of production costs in almost every manufacturing activity. This chapter provides a systematic analysis of labor cost differentials among states.

*Chapter X* "Relative Pollution Abatement Expenditures by Manufacturing Industries."

Another potential source of regional cost differentials in manufacturing is expenditures on pollution control equipment. This chapter gives evidence on differences in air pollution control costs between New Jersey and competing states.

*Chapter XI* "New Jersey's Rubber and Miscellaneous Plastics Products Industries: An Examination."

Each year the Annual Report attempts to include an analysis of one sector or industry of the New Jersey economy. This year, the Rubber and Plastics industry is reviewed. In addition to the specific conclusions for this industry, the chapter provides a general methodology to identify those industries within the State economy which are the most likely candidates for State policy initiatives to encourage their development.

*Chapter XII* "Economic Stability and the Income Tax."

For almost its entire ten years of existence the Council has been confronted by the economic problems of New Jersey's fiscal situation and in particular, the annual litany of the debate over a personal income tax. One common observation that impresses us from this decade of experience is that fiscal stability—the lack of uncertainty about what is going to happen to

corporate taxes, to property taxes, to local government budgets—is a vital factor in the orderly and continued growth of the State's economy. Last year's herculean efforts by the Legislature have placed New Jersey on a firmer and more equitable fiscal basis and have significantly improved the business tax climate. This chapter, initially released earlier this year, argues for a continuation of this dearly won fiscal stability and analyzes the available alternatives to the personal income tax.

*Chapter XIII* "Housing Finance and Structural Reforms."

Construction employment has been particularly hard hit by the last national recession. Simultaneously, many New Jersey families have experienced insurmountable difficulties in buying homes, particularly in the case of first-home purchase. This chapter outlines some exciting developments which modify the traditional mortgage contract. These innovations include a variable interest rate and a graduated mortgage payment plan. Both offer a potential stimulus to the construction sector as well as a means of removing some of the significant financial obstacles to home purchase.

*Chapter XIV* "Industrial Land Grants for Urban Revitalization."

In recent years New Jersey has adopted several industrial inducement programs. These programs are aimed at attracting new industry and include property tax abatement for blighted urban areas, low interest loans and other forms of financial assistance. This chapter suggests a new approach involving the use of land grants to improve the effectiveness of New Jersey's industrial inducement efforts, and, in particular to assist the State in its programs directed at halting or reversing urban decline.

### **Research Agenda**

A continued emphasis on employment creation will be the objective of our near term work. We hope to consolidate our attempt at a synthesis of the employment-creating opportunities

of various State programs. In particular, the employment and economic effects of the State's Energy Conservation Plan will be further developed. We also intend to analyze the employment implications of the State's capital expenditure program as well as to bring to fruition the several innovations in mortgage contracts suggested in Chapter XIII.

We wish to investigate the relatively unresearched employment potential of the State's tourism and recreation industry and the onshore economic impact of offshore oil production. We also intend to continue our work on understanding the regional cost differentials in manufacturing with the objective of suggesting additional policies to improve the competitive position of New Jersey industry.

## II

# A REVIEW OF THE ECONOMY AND AN OUTLOOK FOR FISCAL YEAR 1977-78\*

The economic conditions both nationally and in the State continued to improve during the last fiscal year. This chapter provides a brief review of the past year's developments and attempts to predict the likely state of the economy in the next year. The first section reviews the national economy. It is followed by an examination of the State economy. The final section draws some conclusions and anticipates economic conditions in the near future.

### I. THE NATIONAL ECONOMY\*\*

The Economic Policy Council believes that a robust national economy is an essential prerequisite to improved economic health in our State. The momentum behind the nation's business upswing, after the deepest recession since the 1930's is considerable. The economic comeback after two years of expansion is showing few signs of running out of steam as real GNP increased at annual rates of 7.5% and 6.1% for the first two quarters of 1977. The rate of growth of nominal GNP was 10.5% during the 1976-77 fiscal year. After adjusting for inflation, real GNP grew at a 5% annual rate during that period.

### Consumers

During 1976 and the beginning of 1977 the business expansion was fueled mainly by the greater incomes and willingness to spend of consumers. Sales of durables, particularly automobiles, were at record levels. In addition, consumer expenditures for housing have soared after the dry spell of 1974 and 1975. Outlays for residential construction rose by \$19.6 billion in fiscal year 1977 compared to fiscal year 1976.

-More recently, and as was widely predicted, consumer spending has increased more slowly. Retail sales, after reaching an adjusted \$59.9 billion in March, have remained at that level up to June. At the same time the ratio of savings over disposable income rose to 5.5% in the second quarter from 4.1% in the first.

### Investors

As we enter the third year of the economic recovery, the lopsidedness of the expansion so far has to be recognized. There has not been a previous business upswing so dependent on the consumer and so lackluster on the side of business. Indeed, the sluggishness of business capital

\* Prepared by Dr. William C. Freund, member of the New Jersey Economic Policy Council; Senior Vice President and Chief Economist of the New York Stock Exchange.

\*\* Data are from: Council of Economic Advisors, *Economic Indicators*, July 1977; U. S. Dept. of Commerce, *Survey of Current Business*; *Business Week*, Aug. 22, 1977.

outlays gives ground for concern. By the standards of earlier business cycles, capital investment for new plant and equipment should now be booming.

During the recession of 1975, capital investment skidded 13%. A year later, it rose by 4%, but since that rate fell below the rise in prices, real expenditures for new plant and equipment actually declined in that year. During calendar year 1977, we expect the nominal increase to come to 12-14%, but after adjusting for inflation, that would mean a real gain of only 5-7%. Furthermore, since a significant part of expenditures is for pollution abatement, the expansion and modernization of physical capacity will fall even below these modest rates.

The reason for paying such close attention to capital spending is not merely that it could spark total GNP and prolong the expansion cycle; it is that unless major industries plan now to add to their capacity, we may be faced with selected shortages or bottlenecks in particular products, perhaps as early as 1978 or 1979.

As best we can measure, the nation is currently (June 1977) using about 83.5% of its manufacturing capacity. That is a long way below 100%, which is the absolute maximum capacity utilization rate. But we know from the past that business does not operate efficiently anywhere near that absolute peak. It is inefficient and costly to do so. The preferred rate of operation lies somewhere between 85% and 90% of capacity.

Back in 1973, American industry was operating close to 88% of capacity on the average. That year we experienced shortages in such key industries as paper, steel, textiles, plastics, and chemicals.

Unless business capital investment now starts to pick up, a recurrence of such selected shortages is not farfetched.

There is a further consideration worth noting. Capital spending is absolutely essential to combat inflation, to raise productivity, to avoid the excesses of a consumer spending boom, to

sustain a solid stable rate of growth, to provide jobs for the rising labor force, and to sustain a rising standard of living.

Fortunately, there are signs of a strengthening of business confidence and capital spending intentions. These should be encouraged by national policies.

Business capital spending has a lot of ground to make up and could become the source sustaining the economic recovery for a considerable time to come. There is reason for optimism that the long awaited upturn in capital spending is finally on the horizon. As a matter of fact, most recent information suggests that investment is increasing in the national economy. Nominal investment in *producers' durable equipment* grew by 18.3% from the first quarter 1976 to the first quarter 1977 and by 18.4% from the second quarter 1976 to the second quarter 1977. *Total* real investment by businesses grew by 11.7% in the latter period. This second figure is lower due both to inflation and to the relatively slow growth of investment in business structures. Business investment in construction grew by only 7.9% in nominal terms between the second quarter 1976 and the second quarter 1977.

### Productivity

Productivity has not increased as much as expected during the recovery phase. In fact, productivity fell at a 1.8% annual rate in the second quarter of 1977, bringing the pace of advance to just 2% for the first half of 1977. This has created concern among businesses which focus attention on their unit labor costs. It has given rise to two hypotheses. The first one is that this represents the beginning of a new trend in the U.S. economy possibly caused by the higher cost of energy. This hypothesis suggests that businesses have slowed and even reversed their substitution of labor by capital. If total output is kept constant, this increased use of labor will have as an effect a lowering of the unemployment rate. The second hypothesis is that this measured decrease in productivity is

simply the mirror image of the lag in the investment boom of the present recovery. According to this hypothesis productivity will increase again as soon as the recently built plants are put into production.

### Interest Rates

The last 12 months have been a period of relatively low and stable interest rates. The prime rate on commercial paper has hovered between 4.8% and 5.5%. These low rates have coexisted with a relatively slow rise in the monetary aggregates due to the dampened demand for money in the second half of 1976. Demand for loans didn't rise significantly even with low interest rates because of the poor expectations on the future of the economy. During the last months, however, as expectations became more favorable, interest rates have become an important propellant of increased investment.

## II. THE NEW JERSEY ECONOMY\*

The State's economy improved considerably during the last fiscal year. Job gains are evident in all the State's major industries. Employment for the past 12 months (June 1976-May 1977) was 1.7% above that of the previous year.\*\* Slower growth of the State's labor force (0.6%) over the same period has pushed the unemployment rate downward.

Even the State's troublesome manufacturing sector has begun to rehire displaced workers, albeit at a painfully slow 0.7% rate of growth over the past year. In absolute terms, an additional 25,000 manufacturing employees have been added to the payrolls since the end of the recession. The broadly defined service sector (trade, transportation, communication, utilities, health, education and other services and government) has grown somewhat faster, 2.4%, over the same period.

The construction sector remains the sore spot of the State's employment picture despite a

relatively strong year for new housing which is matching the national rate of recovery. Authorizations for new dwelling units are up 38.1% above permits issued a year earlier. Reflecting the spirit of new residential construction is the value of mortgage loans acquired by New Jersey Savings and Loan Associations which have grown 25.4% during the past year. Despite these growth trends, the number of employed construction workers during the entire year has actually declined by 3.7%. Overall, the industry has lost 34,000 jobs, or more than 25% of its employed work force since the onset of the 1973-75 recession. Other, nonresidential building, such as highways, industrial expansion, public facilities construction, etc. has not responded to the cyclical upswing in the economy.

The level of output of goods and services can be inferred from the amount of energy consumption by commercial and industrial users. Energy use over our frame of reference increased 4.4%, well beyond the growth in manufacturing (.7%) or total nonagricultural employment (1.7%). Some of the increase can be explained by a lengthening of the manufacturing workweek (to 41.7 hours in June 1977) but most importantly, energy use reflects increased productivity of New Jersey businesses, a necessary prerequisite for maintaining a competitive position for New Jersey business.

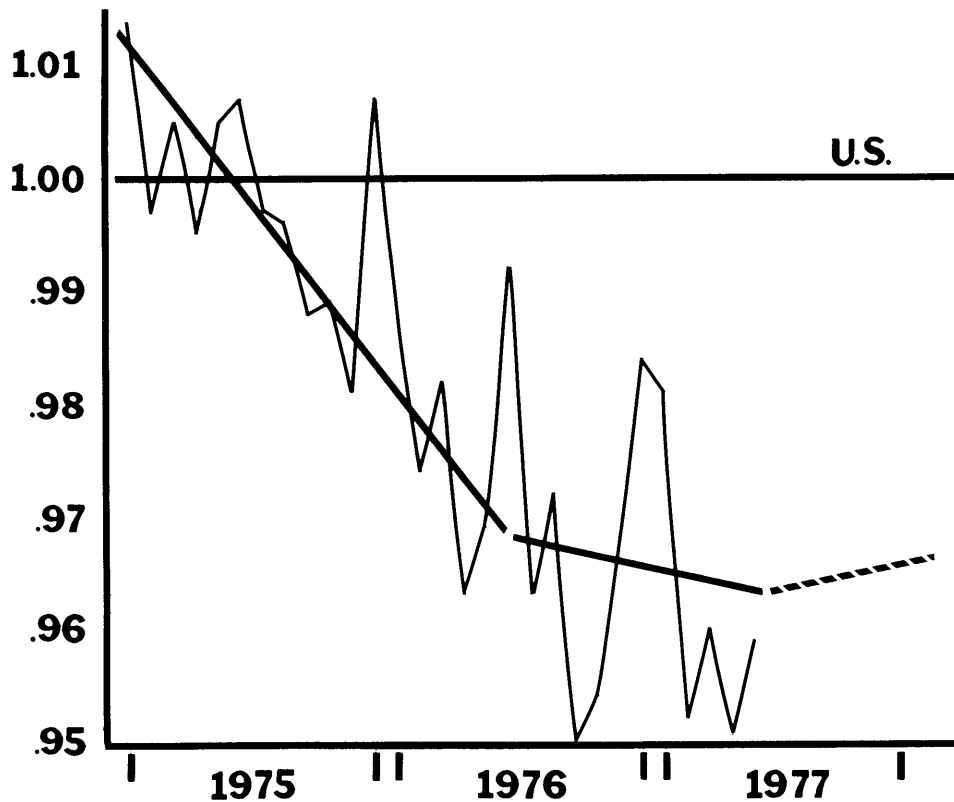
Other business indicators such as new business incorporations and the number of business telephones are increasing and reinforce our optimism for a continuing economic recovery.

Additional bright spots for the New Jersey economy include personal income which increased at the rate of 10.5% in nominal terms, or 4.3% in price adjusted terms to closely parallel the national trend. Higher incomes have boosted this year's retail sales which are up 6.7% in current dollars, or 2.7%, in constant dollars. A major contributor to increased trade are new car sales which were 9.3% higher than in a similar period a year ago. The slower rate of

\* All data are from *New Jersey Economic Indicators*, Dept. of Labor and Industry.

\*\* In the remainder of this section all statistics compare the period June 1976-May 1977 with the same period one year earlier.

FIGURE 2.1  
COMPARATIVE ECONOMIC INDEX  
(1974=1.00)



sales compared to personal income growth can be explained by relatively higher expenditures on housing, utilities, and services.

### Comparative Economic Index

The Office of Economic Policy's economic indicators can assess the State's overall business situation in more detail. The Comparative Economic Index, shown in Figure 2.1, tracks New Jersey's performance relative to the nation in terms of employment, personal income, retail sales, and electric power consumption.\*

Recovery in New Jersey lagged the U.S. from the outset as the Comparative Economic Index fell below the 1.00 level in mid-1975. Rapid

growth nationally, which was not paralleled in New Jersey, caused the New Jersey index to decline steadily to 0.950 in the third quarter of 1976 as illustrated by the heavily shaded trend line. This slippage indicates that even the robust recovery achieved at that point was not sufficient to ameliorate the conditions of the New Jersey economy. One measure sums up New Jersey's problems. Last year, while U.S. unemployment averaged 7.7%, unemployment in our State was 10.4%—the highest of any state in the nation.

Subsequent indicators, however, reveal a new path for the New Jersey economy—one that has ceased to decline and now parallels the U.S. economy. This recent development forms the

\* The New Jersey Comparative Economic Index (CEI) is a composite of changes in four broad-based economic indicators: total non-farm employment, personal income, retail sales, and electric power use by commercial and industrial establishments. A base year is selected (i.e., 1974) and a rate of change index is calculated for each indicator for subsequent periods. The components are summed and the composite is divided by a similar U.S. index. Thus, a CEI equal to 1.00 indicates that both the State and national economy are growing at the same pace. The index was first developed and published in Chapter II of the 9th Annual Report, Economic Policy Council and Office of Economic Policy, Department of the Treasury, State of New Jersey, September, 1976.

basis for our 12 month outlook for similar State and national growth rates.

Recently, unemployment in the State has responded to the cyclical upturn in business as indicated by the second segment of the trend line.\* Current estimates place New Jersey unemployment close to 8½%. Although this reflects an improvement in labor market conditions, it still means an unemployment rate more than one and a half percentage points above the national average.

During the past year (June 1976-May 1977) total non-farm employment nationally grew by 2.47 million. Since New Jersey's share of the national labor force is roughly 3.4% we would "expect" the State to gain 84.1 thousand new jobs. Actual employment growth—65.9 thousand, fell short of this goal by 18.2 thousand jobs. If New Jersey shared equally in national job expansion, the State's unemployment rate would have fallen an additional one half percentage point.

Since New Jersey shares its employment problems with its neighbors, a regional comparison provides an interesting perspective. Expected employment growth in Connecticut, a close regional competitor, fell short by 24.1 thousand jobs, Massachusetts by 22.8 thousand, and Pennsylvania by 105.0 thousand. Thus, given the economic troubles of the entire Northeast region, the job growth performance of New Jersey is encouraging vis-à-vis surrounding states.

However, in light of recent economic performance over the last recession, even an average rate of recovery is simply not enough for New Jersey. Along with the entire Northeast region, New Jersey has suffered long-term economic problems. These long-term problems must be addressed in order to return New Jersey business to a robust growth pattern.\*\*

\* The third segment (the dotted line) represents our forecast.

\*\* For a detailed discussion of regional problems see Chapter VII of this report.

### III. OUTLOOK FOR FISCAL YEAR 1977-78

#### The National Economy

The nation's gross national product is expected to rise by 5% in real terms over the next twelve months.

Essentially, we expect a more balanced growth in the future. In particular, investment in structures should rise to catch up with the other components of GNP. A survey by the Department of Commerce indicates businesses' intentions to invest heavily in the coming year. It concludes that overall planned investment for 1977 is 12% above the level of investment of 1976. In the next fiscal year the rate of growth of investment should exceed that rate.

Unfortunately, inflation will continue to be troublesome, hovering around the 6% level. This is a rate which appears to be close to the irreducible minimum for the U.S. economy. Inflation used to be able to be reduced to the 2% or 3% level during recessions but the institutionalization of wage and price rigidities seems to make that level now unattainable. On the other hand, we do not expect the double digit inflation which plagued us in 1973 to recur. That devastating rate of inflation was brought about by a combination of adverse factors not now on the horizon, including a quadrupling of oil prices, a worldwide economic boom, and widespread severe agricultural shortages.

As usual, interest rates will react to the boom. With some modest rise in inflation rates and some tightening of the money supply, some small increase in the interest rates, particularly among short-term maturities, seems likely.

Unemployment will decline nationally to the range of 6-6.5%. Corporate profits should continue at their present high levels as output continues to rise.

#### The New Jersey Economy

During the next twelve months we expect nominal State product in New Jersey to rise

about 12%, with about half the result of inflation and the other half constituting an improvement in real output. Thus, New Jersey's rate of recovery will approximate the rate nationwide.

There are, however, a number of forces that could propel the State's economy somewhat faster than the national rate of recovery. With the legal and administrative apparatus in place, Atlantic City gambling will become a reality within the next year. We expect great strides in new construction, both residential and non-

residential, as local businessmen and government prepare for the influx of tourists.

Construction will experience an additional shot-in-the-arm as the second round of federal public works grants inject funds into the market providing a much-needed incentive to the non-residential building subsector.

A series of new initiatives aimed at providing additional jobs now being considered by the Administration should also contribute to a brighter economic perspective.

# III

## REVIEW OF LEGISLATION WITH SIGNIFICANCE FOR THE NEW JERSEY ECONOMY\*

This chapter continues our annual practice of reviewing new State laws and proposed legislation that will have a significant impact on the State's economy. In effect, this summary examines a few of the many legislative bills approved or discussed last year. We hope to continue evaluating and contributing to those items and ideas whose potential economic significance is greatest.

### **Economic Planning**

The economic and social problems resulting from the past two recessions have highlighted the need for coordinated economic planning and policy making.\*\* Proposals have been made to centralize these processes in both the Executive Office and the Legislature.

S427 creates a Department of State Planning by consolidating disparate planning offices. The new department would be responsible for preparing a State development plan, a five year capital program, and an annual capital budget. Most importantly, the proposal would coordinate the often conflicting planning and policy objectives of different State departments.

Proposed legislation to establish a Joint Economic Committee (S1401) will improve the legislative apparatus for discussing new bills with an impact on the State's economy. This bipartisan committee would review the Governor's Annual Economic Report, and most importantly, coordinate programs to further public policy to encourage economic growth. This new committee would complement the proposed Department of State Planning and provide a more consistent process for economic policy making in the State.

### **Tax Reform and Economic Development**

Perhaps no other issue in the history of New Jersey has absorbed as much time and energy of the State's Legislature as the debate over financing the constitutional mandate for a thorough and efficient education (T&E). The issue was further complicated by efforts to reform existing state and local taxes in conjunction with funding the T&E mandate. The outcome was a modestly progressive personal income tax, property tax relief, tenants tax rebate, a renewed state/local revenue sharing program, and a package of business tax reforms.†

\* Prepared by George R. Nagle, Economist, Office of Economic Policy.

\*\* See Chapter IV for a review of New Jersey's comparative economic performance during and after the past two recessions.

† See Chapter XII for a review of the income tax in relation to the State's economic climate.

Several measures were enacted to redistribute tax burden and provide local property tax relief. A share (\$266 million) of the income tax is devoted to a property tax rebate program (Homestead exemption, P.L. 1976, Chapter 72), which provides direct local tax relief based on the assessed value of the homeowner's dwelling. Owners of multiple unit dwellings must share the homestead rebate with tenants (P.L. 1976, Chapter 63). A supplemental bill provides for \$100 million in State revenue sharing to local governments (P.L. 1976, Chapter 73). The result of these programs is to redistribute a substantial share of income tax revenues to local governments and residents. However, to enforce property tax relief and prevent municipalities from adding these funds to existing expenditures, a 5% expenditure cap was imposed (P.L. 1976, Chapter 68).

Some restructuring of State business taxes was accomplished in the same legislative package. The business personal property tax is being phased out (P.L. 1977, Chapter 4), sales tax exemptions for manufacturing equipment and machinery were instituted (P.L. 1977, Chapter 18), while the retail gross receipts and unincorporated business taxes were repealed (P.L. 1976, Chapters 80 and 81). The capital gains tax on individuals was also repealed (P.L. 1976, Chapter 47).

In a nutshell, the gross income tax package led to property tax relief, resolved the school finance crisis, averted a deterioration in the State's credit ratings, and removed serious obstacles to New Jersey's industrial growth. The income tax has relieved the business community from the constant threat that inadequate State revenues would lead to higher business taxes. Moreover, the expenditure ceilings have eliminated uncertainties associated with recurring fiscal problems and have helped restore the highest credit rating to the State.

Despite the property tax-reducing effect of the income tax package, the rates of local levies are still very high in many of New Jersey urban

centers. The result is that investors, small businesses, and industry find it more feasible to abandon aging urban facilities rather than improve them and consequently be faced with what is effectively a substantial tax penalty for such improvements. A recent 1977 law (P.L. 1977, Chapter 12) extends local property tax exemptions and abatements on commercial and industrial structures in specified blighted areas in need of rehabilitation. Quite often, however, those municipalities most in need of industrial rehabilitation are financially pressed and cannot forego future property tax receipts while continuing to supply needed municipal public services. Studies have also shown property tax exemptions to be very inefficient; that is, the per dollar cost to the municipality far exceeds the per dollar benefit to the property owner.\*

Increasingly, State government is recognizing the effect declining urban centers have on the State's economy and the standard of living of its residents. The State's Economic Development Authority was established with a mandate to provide financial assistance to existing enterprises to remain and expand in New Jersey and to promote new enterprise location. This year, the Legislature passed a bill to appropriate funds to the EDA for feasibility studies necessary to develop urban industrial parks (P.L. 1977, Chapter 50). The EDA, with a broad range of financial inducements, will now have the necessary information to approach the core of New Jersey's economic malaise.

Subsequent legislation (S1712), not yet signed into law, will grant the EDA the authority to acquire and develop commercial and industrial properties within specially designated "urban growth zones". Thus, State government will assist directly in urban revitalization which is in stark contrast to its traditional role of piecemeal subsidies and block grants to local urban centers.

It is a recognized fact that business costs in urban centers are high. One legislative proposal (A2272) would provide financial relief in Corporate Income Tax liabilities in order to en-

\* For a proposal for a more "efficient" approach to urban industrial development, see Chapter XV.

courage an enterprise to locate in an urban municipality. A more broad-based bill (A1975) would offer business firms a 2% investment credit without the urban location restrictions.

Before investment credits are mandated, however, some estimate of the effect the credit will have on business decisions needs to be calculated. Although investment credits are more efficient than property tax abatement programs, there is no consensus on their effectiveness. That is, to what extent do investment credits encourage "new" investments? Also, government officials must weigh the potential benefits against program costs. In order to create an additional job, a manufacturer typically must invest anywhere from \$25-40,000 in plant and equipment.\* If the State were to set a modest goal of 1,000 new manufacturing jobs, the investment credit would have to be strong enough to induce \$25 to \$40 million in new investment. Clearly, the cost of employment-creating tax credits quickly approaches budgetary constraints. In any event, any investment credit, in order to be effective, should be integrated into a long-term development program.

Researchers often find little relation between tax incentives and industry investment and location decisions; businessmen are influenced by other cost factors, such as labor, which dominate the firm's expense account. For an investment credit to be successful in redirecting new investment, it must be substantial to overcome a significant part of these other factors.

Another legislative proposal directly faces this problem by providing a corporate business tax credit for a newly organized firm in an amount equal to its withholding of New Jersey gross income tax and unemployment compensation contribution on behalf of its employees (S3090). The credit which would be given for the first five years of the firm's operation would effectively lower the firm's labor costs. An existing

firm could qualify for a supplemental credit if it *increases* employment by 10% or more over the previous year.

One important dimension of business tax reform is fiscal stability; that is, the tax structure should not exacerbate the pronounced cyclical fluctuations in business net income and profits. An attempt to smooth the effects of business cycles is incorporated in a bill that would allow a firm to carry forward and back a capital loss or a net operating loss as a deduction from the taxpayer's net income (S228-229). In effect, the proposal would extend to the State's tax laws the carryover benefit allowed most corporations under federal law.

New Jersey is often alleged to enforce somewhat stricter environmental standards than what federal regulations require.\*\* Rather than lower environmental standards, which are argued to be in the public's interest, a legislative bill would offset these expenditures somewhat by allowing a 50% corporate income tax credit against the cost of constructing or acquiring air pollution equipment (S1291). A second bill would exempt pollution control equipment from the sales and use tax (A3195).

### Encouraging New Enterprise

As mentioned earlier, the public sector's conduit for industrial development is the State's Economic Development Authority. The original EDA mandate, limited to aid for manufacturing and commercial firms, was recently broadened to authorize financial assistance to the motion picture and television industry (P.L. 1977, Chapter 43). This industry has historical ties to New Jersey, and with EDA financing, it is hoped its future will be as lucrative to the State as its past.

Relative to the economic boom of the 1960's, New Jersey has now entered a period of moderate economic growth. The State's share of manufacturing employment is shrinking and, despite continued recovery from the 1973-75 business

\* These ratios were calculated from an estimate of fixed capital in New Jersey (in 1972 prices). See "New Jersey's Manufacturing Industries: A Long-run Overview", 8th Annual Report, Office of Economic Policy, 1975.

\*\* Chapter X clarifies some of the myths and misconceptions regarding pollution abatement expenditures by New Jersey manufacturers.

cycle, there is little optimism for attaining the prerecession level of factory jobs. Also, it is questionable if the State's future lies in a service-oriented economy.\* Nevertheless, old industrial states do enjoy several economic advantages. The State still constitutes a large market because of its population, income level, and industrial concentration. Outlet to foreign markets is a positive asset. Most importantly, the State's accumulation of know-how, human capital, and scientific and financial resources are attributes of utmost importance if properly exploited. New Jersey can counteract industrial decline by retaining and strengthening its leading position in the area of technological innovation. New Jersey is second in the nation in terms of scientific patents per capita and has a highly developed corporate research and development sector.

A current legislative bill would involve the State in promoting full use of this resource by establishing lines of communication and cooperation between all parties interested in new products and processes—inventors, venture capitalists, production and market managers, legal and financial experts, etc. (S1648). The proposed Office for Promoting Technical Innovation will rely on individual initiative of the interested parties, induce new entries, and stir competition. The office will assist the development of new products or processes, will actively participate in seeking financial assistance for the new venture and provide management expertise.

The "newest" New Jersey industry, recently promulgated by legislative action is casino gambling (P.L. 1977, Chapter 110). Intended as a unique tool for urban redevelopment in Atlantic City, casino gambling will facilitate the redevelopment of existing blighted areas and refurbish and expand existing hotel, convention, tourist and entertainment facilities. Casino gambling will attract major new investment in Atlantic City which will provide additional employment opportunities both in the casino/hotels and in supporting establishments. At the same time it will impose a wide range of socio-economic pressures such as traffic and parking

congestion; housing for displaced low income and elderly residents, adequate supply of water and sewage, compulsive gambling, etc. These problems must be faced and solved through careful intergovernmental planning and coordination if gambling is to be successful in Atlantic City.

Another area with potential employment and other social benefits is the resource recovery or recycling industry. In order to encourage its development, one legislative bill would grant corporation income tax credits against the purchase of any equipment used in recycling (S1813).

### **Planned Economic Development**

Although there has been considerable effort to stimulate State industrial development, there is an underlying concern that such development may threaten the existence of desirable natural resources. Thus, the Governor and Legislature have proposed several approaches that would geographically constrain new development or would require an objective development review process.

Special consideration is set forth in a proposal that creates a review authority for large-scale developments which transcend the boundaries of a single municipality (S1013). The proposed agency will weigh the regional consequences of economic growth, energy resource management, demand on public facilities, and the supply and siting of energy facilities. The bill, in effect, encourages the affected local municipality to conduct a social cost-benefit analysis of the proposed development under planning guidelines established by the agency. Although the initial decision is made by the local community, the developer may appeal to the Review Agency. This bill, if approved, would overrule, to a degree, local rule. But since large-scale developments often impose spillover costs on other municipalities, local development controls can be to the benefit of the region or the State as a whole.

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\* See Chapter V for a review of this subject.

A different approach taken to recognize the need for a balance between New Jersey's industrial growth and environment requires the State Department of Labor and Industry to issue an economic impact statement on legislative proposals when directed by the majority of the legislative committee considering that bill. Similarly, the Commissioner of Environmental Protection when so directed is to issue an environmental impact statement. This bill (A2000) will provide both the short- and long-term economic/environmental impacts of future legislation.

Another piece of legislation (S1145) would create an advisory board which would, among other things, investigate any proposed closing or transfer of a business establishment with more than 50 employees. In addition, a firm would be required to file two years in advance intention to close or transfer a business, an economic justification for such action, and an assessment of the potential economic loss to employees and the affected community. Although this legislation promotes such laudable objectives as assistance to displaced employees, assistance to communities suffering the loss of business, and technical assistance to business contemplating a move, additional government interference in the operations of the private firm will adversely affect the State's business climate. One must seriously question the efficacy of a law that would require an entrepreneur whose product market is subject to the vagaries of the consumer to plan his operations at least two years in the future. Few communities like to lose industry and jobs but legislation cannot be relied on to discourage corporate moves. In fact, this bill may encourage an employer to file periodically an intent to move just to be on the safe side if business conditions begin to deteriorate. The stated goals of the relocation advisory board would be better accomplished by the creation of an attractive business climate, which might include further reforms in business taxation, programs to insure an adequate skilled labor supply, available energy supplies, etc.

For the most part, legislative bills controlling economic development do so by government fiat. An alternative approach is the "Municipal Development Rights Act" (S1252). This bill lends recognition that the right to own land is separate from the right to develop land and that the development right may become a negotiable instrument. A development rights bill would permit municipalities to set aside portions of publicly and privately owned land in permanent preservation zones where new development would be prohibited. However, the legislation would require some municipalities to establish growth zones where the right to develop permanently preserved land may be transferred through the sale and exercise of certificates of development rights. This proposal does not prevent development as such but allows local governments to redirect new development based on local planning decisions.

### **Labor and Employment**

One paradox of the 1973-75 recession was that often there appeared in local newspapers long columns of classified advertisements for job openings in spite of record levels of unemployment. There are several theories attempting to explain this mismatch of jobs and job seekers. One concludes that an unemployed person is reluctant to accept a new job because it might not meet his salary expectations, especially if the wage is incommensurate with his former job. A legislative bill proposes to remedy this situation by providing a subsidy to persons who accept new jobs at lower wages (A3161). A so-called underemployed person will collect a subsidy paid from the unemployment compensation trust fund equal to the difference in wages between the new job and the old job. By restricting this program to periods of high unemployment, this proposal seeks to relieve some of the financial pressures on the unemployment insurance system as well as encouraging new employment opportunities.

High labor costs in New Jersey are thought to be related to the degree of unionization. An Assembly Concurrent Resolution would submit

to public referendum an amendment to the State's Constitution to prevent a person from being denied employment because of refusal to join or affiliate with a labor organization (ACR25). Even though individual choice should prevail, there is little evidence this measure would lead to a decline or moderation in labor costs. For example, the percent of unionization in New Jersey is only slightly higher than the national average. Moreover, high wages often attributed to union bargaining power are also directly related to educational attainment and skill achievements, which are somewhat higher in New Jersey than in the nation.

Businessmen often accuse the State's workmen's compensation statutes as being a major contribution of high labor costs. Certainly, revamp of the 20-year-old system is long overdue. A bill which would increase the value of benefits and reduce significantly the caseload of so-called nuisance claims as well is currently assigned to an Assembly committee (A381).

Lack of formal education or vocational training often prevents a person from obtaining a skilled job. A proposal to grant low interest loans for a wide range of educational training is also in a legislative committee (S1157). Although the flexibility of the proposal is commendable, it fails to recognize the loss of benefits due to spillovers to other states. As individuals graduate from the program, if they cannot find jobs in New Jersey, they will migrate. In effect, New Jersey would be subsidizing the training costs for other areas of the nation. Such progress would be cost effective only if preconditions limit the volume of spillovers (such as in State residency requirements).

An underutilized source of experience and knowledge lies within the State's population of senior citizens. Legislation currently introduced would create a specialized placement service to help provide meaningful work for older citizens (S767).

### **Public Finance and Intergovernmental Relations**

Several legislators demanded adequate expenditure safeguards as a precondition to a vote on

the gross income tax bill. A supplemental bill (P.L. 1976, Chapter 67) was added to the school finance package that limits the growth in State expenditures to the increase in per capita personal income. In effect, the "cap" legislation will prevent State government from growing faster than the economy as a whole. If there is demand for new spending programs that would exceed the cap, such as increased higher education subsidies, the issue goes to public referendum, not the Legislature or the Executive. Since this measure reestablishing fiscal stability has been enacted, investors have restored the highest credit rating to the State which will mean a reduction in the cost of credit.

Another State law (P.L. 1976, Chapter 82) emanating from the school finance package appropriates State funds to municipalities to replace lost revenues from the repeal and/or phase-out of several business taxes, whose proceeds were earmarked for local government.

State and local governments and school districts have been exposed to skyrocketing credit costs. Whether it is the result of inflation, the 1973-75 recession, the financial collapse of New York City, or uncertainty over funding a thorough and efficient education, the outcome is the same: borrowing costs have reached all-time highs. One way to reduce the interest cost of debt is to reduce the risk and uncertainty of default.

A new program mandated in June 1976 creates a financial instrument known as the municipal qualified bond (P.L. 1976, Chapter 38). A participating municipality now submits a request for a debt issue to the State's Local Finance Board which analyzes the need for the proposed facility, the ability of the municipality to supply other essential services in light of the increase in debt, and the reasonableness of the project cost. Once approved, the State Treasurer will withhold from the municipality certain State aid funds sufficient to pay the debt service on the qualified bonds. By pledging local State aid funds to pay debt service, investor risk is effectively reduced. As a result, borrowing costs to municipalities have fallen appreciably. A sepa-

rate but similar program applies to local school districts (P.L. 1976, Chapter 39).

The trend toward more and more inter-governmental transfers and block grants presents a unique problem to municipalities; namely, that they must manage these funds until they are needed. For the most part, local financial authorities are not well equipped to invest these funds in the most effective manner. State officials, however, are well experienced in managing large scale cash flows. A proposal would share this expertise with municipalities by creating a State Cash Management Fund in which temporary surplus funds may be deposited (S3223). By pooling the funds of many municipalities, the Cash Management Fund should increase the return on investments. Such an option is not available to small investors. Also, a single, large investment fund will allow for diversification of the portfolio leading to a reduction in risk.

The cumulative effects of two recessions have slowed the growth in local tax bases while expenditures, in nominal terms, continue to rise. While all municipalities share this problem, some areas with large shares of tax exempt property are particularly affected. State and federally owned property, institutions of higher learning, and religious and charitable establishments all consume costly public services yet do not contribute to their cost. Similarly, low and moderate income housing or senior citizens housing built with federal assistance are often granted partial or full exemption from local property taxes in order that such housing may be constructed at reasonable prices (rentals). Those municipalities allowing such development carry a disproportionate share of the State housing burden. A bill recently approved by the Assembly aids affected municipalities by granting "in lieu" of property tax payments. The proposal (A930) seeks to reimburse these few localities for the cost of municipal services. Although the "in lieu" payment is only a percentage of the local tax bill, the legislation will help encourage other communities to accept a share of tax exempt development.

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\* See Chapter XIII for a critical review of this point.

## Banking

One of the principal obstacles to urban redevelopment is the absence of private mortgage funds. The lack of such funds for housing investment has accelerated the physical decline of affected neighborhoods and has undermined publicly supported programs for the preservation and revival of urban neighborhoods. So called "redlining" by financial institutions often results in the arbitrary denial of loans even to credit-worthy borrowers.

Although the State has no intention to force banks to make unusually risky loans, the State government does recognize the responsibility of banks to serve the municipality in which they are located, especially when that community is a source of the lender's funds. The State's new anti-redlining law (P.L. 1977, Chapter 1) prevents lending institutions from discriminating on a basis that is unsupported by a reasonable analysis of the lending risks associated with either the applicant or the condition of the property to be financed. The law also requires detailed lending disclosure reports, grants a person discriminated against the right to sue, and prescribes fines against violators.

It should be noted that the supply of urban mortgages from private lenders is only a step toward an effective urban development program. If coordinated with other **job-producing** programs, such as EDA's urban industrial park project, the prospects become realistic. One needs only to look at the revitalization of Hoboken as a vivid demonstration of coordinated public/private development efforts.

New Jersey is one of many states imposing a maximum limit on mortgage interest rates. From time-to-time, the statutory usury ceiling is adjusted to conform to changing market conditions. Occasionally, market rates exceed the statutory ceiling leading to a reduced supply of mortgage money to New Jersey residents,\* especially high risk borrowers. A legislative bill (A574) indexes the "ceiling" rate to available economic indicators so the ceiling will not contradict current money market conditions.

The availability and cost of automobile insurance typify the problems of another State-regulated industry. Auto insurers must seek approval for rate increases, but in order to control the cost to residents, the State recently has refused to approve many of the industry's requests. The result has been cancellation of policies, especially in high risk neighborhoods.

Currently, there are two distinctly different approaches—one repeals the State's authority to govern rate changes (A103), the other proposes a study to create a wholly State-operated auto insurance plan (AJR9).

### **Housing**

Residential housing activity was given a much needed "shot-in-the-arm" in 1976 with legislative approval (P.L. 1976, Chapter 133) to appropriate \$8 million to the New Jersey Housing Finance Agency to construct low and moderate housing units from the \$25 million Mortgage Assistance Bond Act in 1976 (P.L. 1976, Chapter 94).

Another new law (P.L. 1976, Chapter 51) authorizes the New Jersey Mortgage Finance Agency to purchase home improvement loans. When credit is tight, the Agency raises funds from private investors and makes those funds available through mortgage lending institutions for new residential loans by purchasing existing residential mortgages and home improvement loans.

### **Energy**

New Jersey's exposure to disruptions in energy supplies have intensified over the years. The Arab oil embargo and natural gas curtailments last winter fostered a number of bills dealing with this issue which, if enacted, should distinguish New Jersey as a leader in energy policy.

One reason for inaction on energy matters has been the absence of a cohesive State agency to plan, develop, and implement energy research and policies. However, recent legislation (P.L. 1977, Chapter 146) combines several unaffiliated energy offices into a single cabinet-level Energy

Department. The department will implement the State's new energy conservation plan and attempt to minimize health and economic disruptions during times of energy shortage. Planning will include reviews on the siting of energy facilities, the development of programs to ensure a fair and equitable distribution of existing energy supplies, and a balancing of environmental goals with projected energy demands.

Two bills seek to encourage further energy conservation by exempting solar energy equipment sales from the sales and use tax (S1427), and exempting solar heating and cooling equipment from local property taxation (A1801).

Since the 1973 oil embargo, the temporary fuel adjustment charges on monthly electric bills have, in effect, become permanent rate increases for consumers. The initial price increase was severe enough to encourage a number of legislative proposals to either reduce or redistribute the cost of electric power. There are, however, two conflicting goals. One is how to encourage conservation of all forms of energy; the other addresses equity issues; that is, the incidence of the costs of energy consumption.

One bill would mandate a State energy coupon program similar to HEW's food stamp system (S3062). Households could purchase energy stamps with the cost based on a sliding scale of discount rates correlated with the family's adjusted gross income. A separate bill to finance energy coupons would be created by allocating a share of the State's public utility tax receipts (S3015).

There are several bills (A1830, S1447, S3014) proposing reduced rates for certain subscribers of gas and electric service. Generally, there are two categories of so-called lifeline proposals. The first restricts its benefits to a specified set of people with certain age-income characteristics, while the other grants them to all users of small amounts of electricity.

The bills that restrict their attention to a specified set of people are quite acceptable from an economic point of view. They simply imply

a transfer of resources to the people selected under the particular proposal. Even though economists favor lump sum transfers over discounts on specific prices as means of redistributing income, the latter alternative is a quite respectable second-best solution. This sort of proposal is less costly than the one which involves changes in the overall rate structure. In fact, these transfers to the needy could probably be funded in part with tax revenues from the Atlantic City casinos.

The change in the rate structure implied by the second type of lifeline proposal is more drastic. If lifeline prices are designed to discriminate on the basis of (low) volume use, then some poor families and senior citizens who consume larger amounts of electricity for reasons beyond their control will not benefit fully from this proposal. Reasons for substantial variation in the consumption of different consumer groups, aside from age and income characteristics, include regional differences in weather patterns, differences in the design and efficiency of home heating units, and the size of the consumer's home. This is the reason why the lifeline law in California includes a variety of rates for different locations, etc.

Under the present utility structure of declining rates for increasing usage a very large number of small users are subsidizing a few large customers. Proposals to aid all users of small amounts of electricity *implies* inverting this rate structure so that large users will pay higher rates. This will involve a massive redistribution in electricity costs. For example, in 1976 the users of high tension electricity purchasing service from Public Service Electric and Gas (or Jersey Central Power and Light) would have had to pay an average of \$435,000 more per month if they had been charged the average price of electricity in the State.

If inverted rate schedules are not common in other states, New Jersey stands a chance to lose additional manufacturing jobs to these states. One likely benefit from an inversion of electric rates, however, is that it will create an incentive to conserve electricity.

Programs to reduce substantially industrial energy consumption require extensive capital investment, but the return on that investment may be realized only after an extended period of time. The risk and uncertainty involved in such investments often results in their postponement. In order to encourage homeowners, business and industry, and government to undertake energy-saving investments, a recently introduced bill (S3196) would create an Energy Finance Authority which would provide long-term, low-interest energy loans. By selling bonds, the Authority could raise funds for insulation projects, solar energy conversions, recycling, as well as public transportation projects. A related proposal would require the State's public utilities to establish a low cost "home insulation plan" for its customers.

#### **Environment/Open Space**

The imminent prospects for offshore oil drilling have resulted in a strong constituency stressing environmental dangers. The State's natural resources, clean water, and beaches are the backbone of a vital recreation and tourism industry in New Jersey. There is a potential conflict between offshore drilling and the environment quality that supports a thriving tourism industry.

Early this year, the Spill Compensation and Control Act (P.L. 1976, Chapter 141) was created to regulate the transfer and storage of hazardous substances and to provide liability for damage resulting from accidents. A tax of \$.01 per barrel of transferred oil will create a \$25 million compensation fund which would defray the cost of cleanup and removals, the cost of restoring or replacing damaged personal property, and reimbursing persons suffering a loss of income due to such damage.

A recently approved bond issue (P.L. 1976, Chapter 92) will provide \$120 million for developing and constructing water supply and waste water treatment facilities.

The funds will not only create construction jobs, but will also serve to improve the develop-

ment climate of many New Jersey municipalities suffering from building moratoriums resulting from inadequate or overloaded treatment facilities.

A companion bill appropriates \$25 million from a 1974 Green Acres bond issue for the purpose of acquisition and development of open space (P.L. 1976, Chapter 29).

The State's agricultural sector has steadily succumbed to demands for land for residential and industrial development. Temporary stop-gap measures have slowed the conversion of farm land, but have been inadequate to insure the permanence of agriculture. Land use proponents have recommended the purchase of development easements to create permanent agricultural preserves. Last year, the Legislature created a demonstration project (P.L. 1976, Chapter 50) by appropriating \$5 million for the purchase of development rights to approximately 5,000 acres.

The voluntary program will provide vital data on whether a statewide development easement program would be an effective land use policy tool.\*

### **Conclusion**

This review is certainly not exhaustive. After the school finance/income tax issue was resolved, the Legislature was free to deal with many bills that directly or indirectly affected the State's economy. A complete evaluation of economic legislation, however, would require data collection, selection of appropriate research techniques, and a good deal of applied economic analysis.

Current economic indicators imply that the State will continue to recover from the 1973-75 recession. The Economic Policy Council will, next year, intensify its efforts to involve itself in economic issues at all stages of discussion.

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\* This program is evaluated by William Carmichael, "New Jersey Agriculture: An Assessment", *9th Annual Report*, Chapter 10, Office of Economic Policy.

# IV

## BOOM AND BUST: IMPACT OF BUSINESS CYCLES ON THE NEW JERSEY ECONOMY\*

Studies of business cycles all but disappeared during the late 1960's as the U.S. economy prospered through eight years of continuous economic growth. In contrast, the next six years (1970-75) were characterized by two consecutive recessions, the second beginning before some sectors of the economy recovered from the first contraction.

During earlier post-war recessions, business activity in New Jersey closely followed national patterns, both during the contractionary and recovery phases of the cycle. The 1969-70 recession changed that pattern. Some New Jersey businesses failed to recover at all, while others only grudgingly reemployed laid-off workers. The slow rate of recovery following the 1969-70 recession was soon interrupted by the 1973 recession. The cumulative effect of these two recessions have cost the State almost 175,000 manufacturing jobs. Also, slower growth rates in the non-manufacturing sector have failed to provide adequate job opportunities for dis-

placed workers. As a result, New Jersey's unemployment rate has remained well above the national average.

The following review attempts to analyze the State's economy during the past two recessions in relation to national economic performance. Our conclusion is that during this time certain structural changes have occurred and have given the State a "different" economic identity.

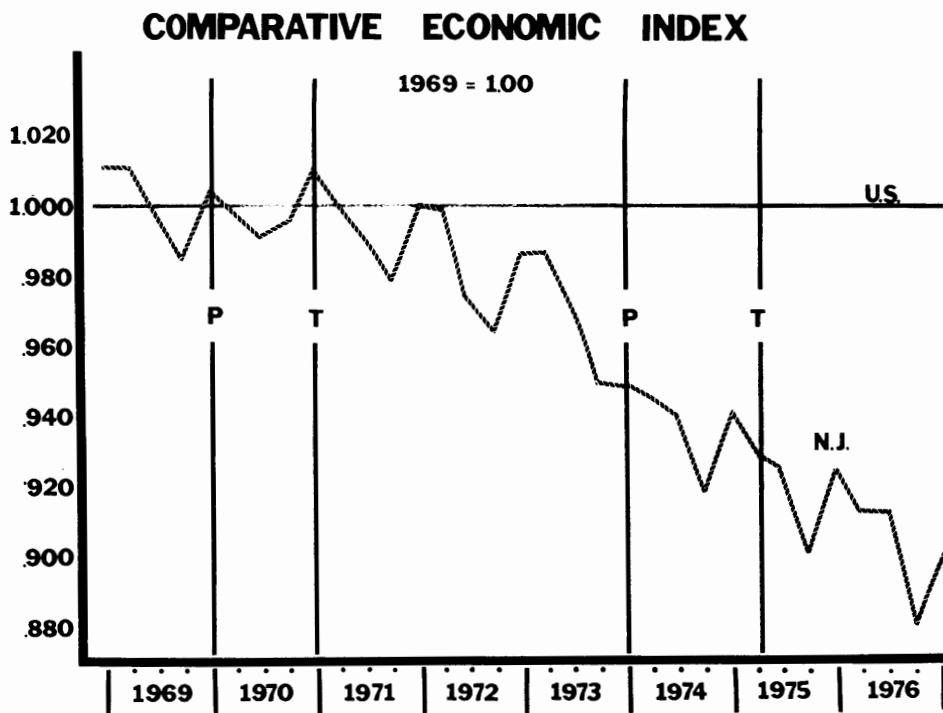
### **How Do We Assess The State's Economy?**

The path of the national economy is reflected by statistics on Gross National Product—the most comprehensive measure of aggregate economic activity. A shortage of data, however, precludes development of an equivalent Gross State Product statistical series. Instead, we are forced to rely on individual economic indicators which register the performance of only a small segment of the economic system. However, by systematically generalizing over groups of indicators, a clear pattern of developing trends should emerge.

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\* Prepared by George R. Nagle, Economist, Office of Economic Policy.

FIGURE 4.1



One approach to measuring the State's *relative* economic performance has been the development of a Comparative Economic Index (CEI).\*

Figure 4.1 illustrates the relative performance of New Jersey's economy before, during, and after the past two recessions, which are indicated by a peak (P), the highest level of economic activity, and a trough (T), the lowest point of a business cycle.\*\*

Before the 1969-70 recession, the New Jersey economy closely followed the pattern of the U.S. economy. Month-to-month variations in component indicators caused the index to move somewhat above or below the U.S. norm, but the prevailing trend was of coinciding rates of change. This pattern continued through the

1969 recession. After the trough of the 1969-70 cycle, New Jersey's current economic problems began to surface.

In early 1971, the slope of the CEI shifted to reflect a new downward trend. This does not mean, however, that the New Jersey economy was sinking deeper into a sea of economic gloom, but rather that the growth rate of the State's economy was now consistently slower than that of the U.S. This "new" trend continued through the 1973-75 recession and well into the recovery phase in 1975 and 1976.

Since the decline in the New Jersey CEI is obviously of longer duration than a normal business cycle, there is evidence of a more permanent (or structural) change in the State's economy.

\* The New Jersey Comparative Economic Index (CEI) is a composite of changes in four broad-based economic indicators: total non-farm employment, personal income, retail sales, and electric power use by commercial and industrial establishments. A base year is selected (i.e., 1969) and a rate of change index is calculated for each indicator for subsequent periods. The components are summed and the composite is divided by a similar U.S. index. Thus, a CEI equal to 1.00 indicates that both the State and national economy are growing at the same pace. The index was first developed and published in Chapter II of the *9th Annual Report*, Economic Policy Council and Office of Economic Policy, Department of the Treasury, State of New Jersey, September, 1976.

\*\* The dates of the two recessions, as identified by the National Bureau of Economic Research, are as follows: The peak of the 1969-70 recession was November 1969; its trough was November 1970. The peak of the 1973-75 recession was November 1973 and its trough was April 1975.

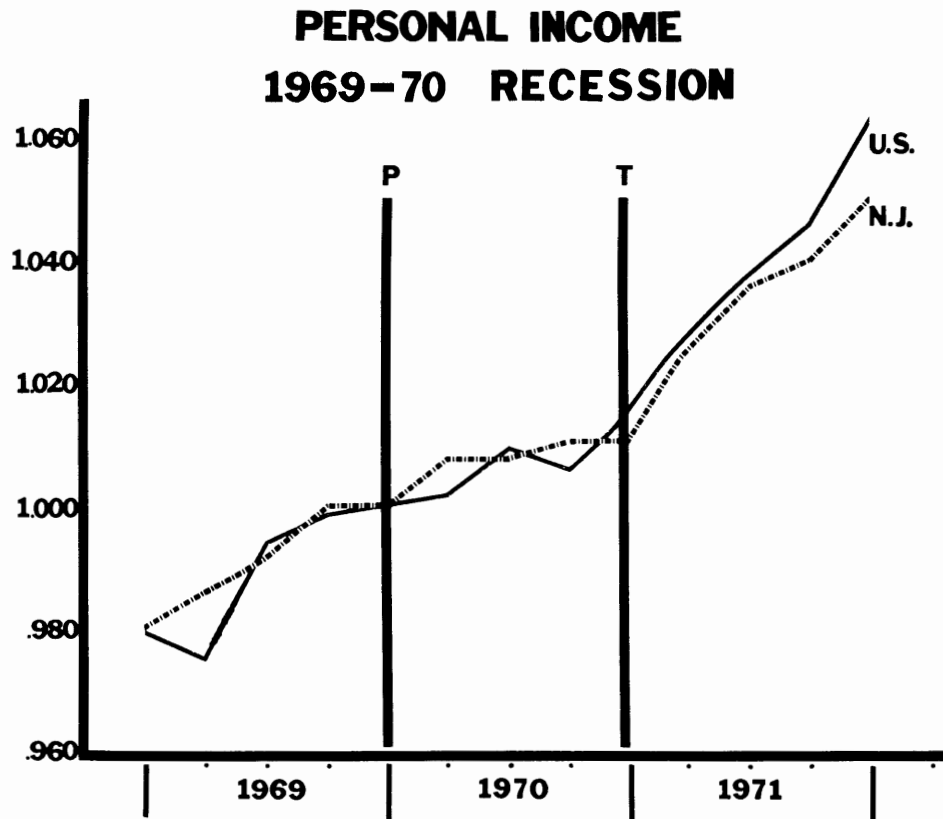
The following discussion disaggregates the CEI into detailed sectors and compares their performance during the two recessions.\* This provides evidence to test the hypothesis that business cycles, though temporary national phenomena, are imposing long-term harmful effects on the State's economy.

### The 1969-70 Recession

1. *Real Personal Income*—Total personal income is a broad financial indicator which represents a major share of Gross State Product (Figure 4.2).\*\* Before the recession officially started, U.S. personal income was growing by

3.3% per year, after removing the effects of rising prices. During the recession, real personal income did not decline but continued to increase, although at a somewhat slower 1.4% annual growth rate. This is understandable since the decline in employment was moderate and to an extent was offset by increased claims for unemployment compensation. Although the recession may have affected families differently, especially those with laid off workers, the economy as a whole did not experience a real loss in purchasing power. After the recession reached its trough in November 1970, income growth resumed at an annual adjusted rate of 2.8% in 1971 and 6.2% in 1972.

FIGURE 4.2



\* All data on the State's economy were obtained (or derived) from *New Jersey Economic Indicators*, Division of Planning & Research, New Jersey Department of Labor and Industry. Comparable U.S. data were found in the *Survey of Current Business*, U.S. Department of Commerce.

\*\* Several steps were taken in order to provide a consistent, systematic comparison of similar indicators:

- The NBER recession reference dates are used in all comparisons even though the indicator being discussed may have reached its own peak (or trough) several months before or after that date.
- The indicators are plotted as percentage relatives computed so that the official date of *peak* activity is set at 1.00.
- The indicators are plotted at quarterly intervals in order to smooth out erratic month-to-month movements often reflected in State data series.

2. *Retail Sales*—Quite often, the pattern of retail sales bears little relation to the pattern of personal income during a business cycle. If consumers believe a recession is approaching, they will reduce their purchases even if incomes are still rising. In both New Jersey and the U.S., retail sales reached a peak and started to fall one full year before the 1969-70 recession began. Thus, the level of retail sales was an early indicator of the impending recession but a poor indicator of its magnitude. Retail sales (adjusted for price change) fell more than 13% in New Jersey during 16 months of decline, while nationally retail sales had dropped only 2.8% during a similar period. However, sales in New Jersey reached a low point and started to recover early in the recession. Complete recovery was achieved after 31 months in the U.S. (March 1971), while the New Jersey market required 47 months before sales achieved the prerecessionary peak level (October 1972).

3. *Employment*—New Jersey and U.S. total non-farm employment patterns were remarkably

similar through the 1969 recession (Figure 4.3). In fact, employment in New Jersey fared slightly better reaching a peak two months after employment had started to decline nationally. The recession caused total employment to fall only .99% in New Jersey, despite greater relative losses in particular industry groups. The U.S. suffered a 1.4% decline in jobholders. The mildness of the 1969-70 recession is reflected in the fact that employment declined for only 8 months nationally and 11 months in New Jersey. After reaching its trough (November 1970), employment in New Jersey attained the *prerecessionary* peak five months later (April 1971). Since the decline in U.S. employment was somewhat greater, it took 10 months before prerecessionary job levels were reattained.

However, one industry suffering greater recessionary losses was the State's manufacturing sector. Although the goods producing industries are cyclical in nature, New Jersey has been experiencing a gradual loss in its national *share* of manufacturing jobs from 5.0% in 1949 to

FIGURE 4.3

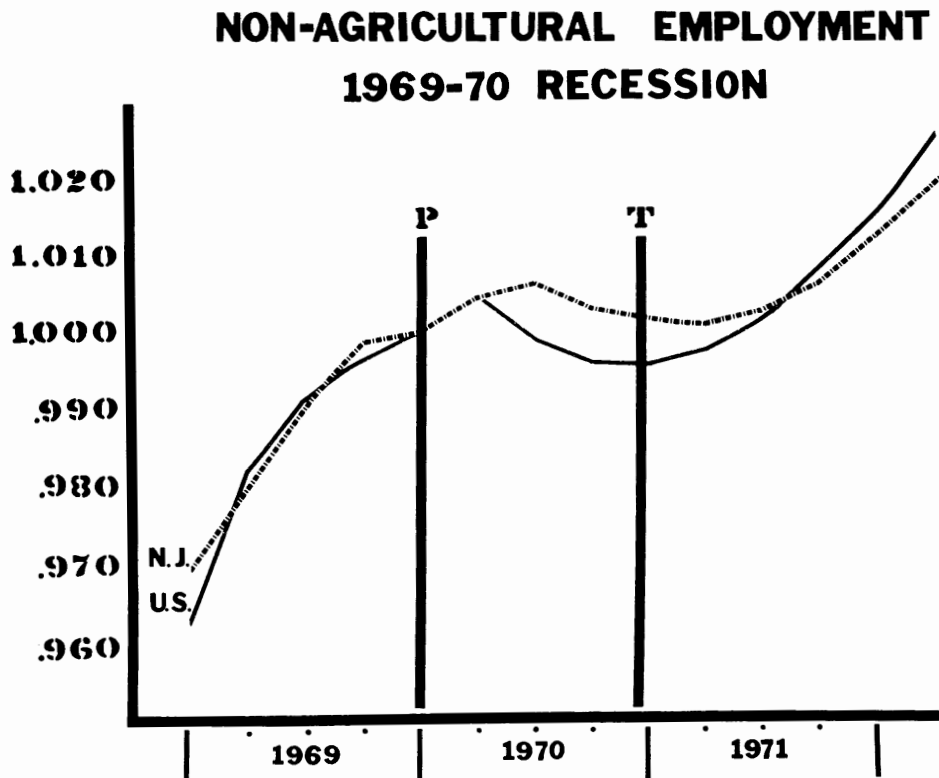
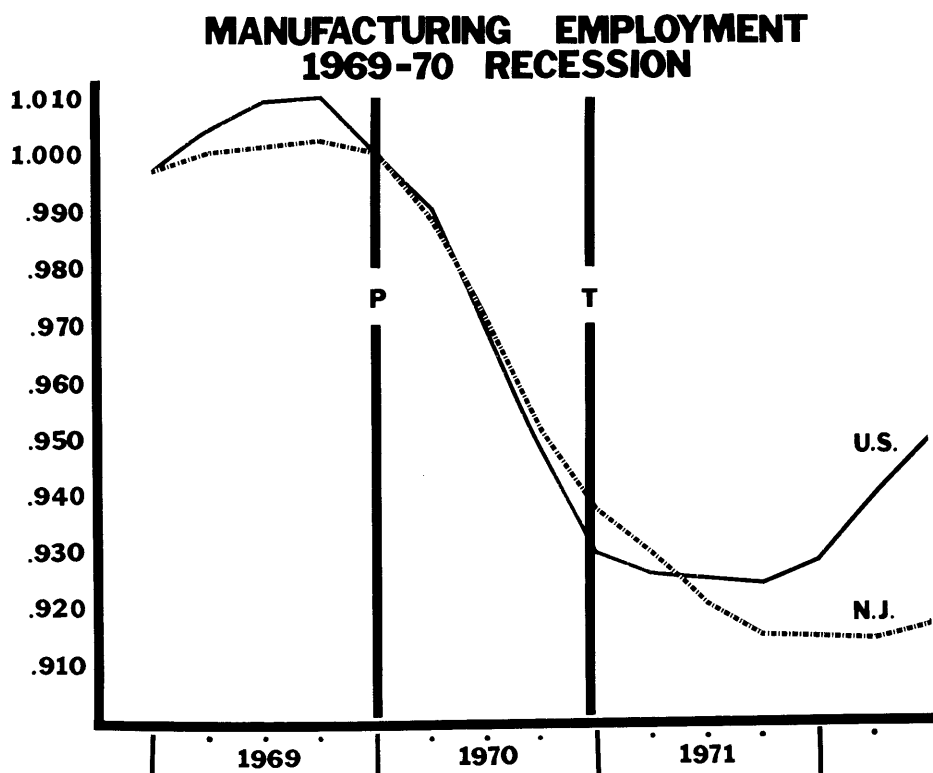


FIGURE 4.4



4.1% in 1976. The 1969-70 recession imposed cyclical job losses on this fundamental declining trend. The result was an *absolute* loss in manufacturing employment which diverges from the “typical” loss–recovery recession pattern in the U.S.

Nationally, the number of factory workers reached a peak and started to decline four months (August 1969) before the recession started (Figure 4.4). This lead period probably marked the end of inventory stockpiling by firms and the start of plant closings. Manufacturing unemployment increased for 25 months thereafter until almost 9% of all previously employed factory workers were without jobs. Once the downward trend had ended (September 1971) it took an additional 26 months of business expansion before manufacturing employment recovered (November 1973).

In New Jersey, manufacturing job losses started two months later (October 1969) but were relatively larger in magnitude and lasted

longer than the national experience. Most important was the failure of manufacturing employment in New Jersey to recover cyclical job losses as well as its *share* of total U.S. manufacturing jobs. Two years after the recession’s trough, manufacturing employment was still 6% less than its 1969 peak level. This is the first indication that a major change had taken place in New Jersey during the 1969-70 recession.

Moreover, within the manufacturing sector, there are certain industries which are more prone to business cycles than others. Even on a national level, some manufacturing industries experienced absolute job losses. If New Jersey is particularly dependent on “cyclically sensitive” manufacturing industries, then the failure to recover from the 1969-70 recession becomes easier to explain.

Figure 4.5 compares two-digit manufacturing industries in New Jersey and the U.S. in terms of cyclical timing and severity. Nationally, those manufacturing industries in which employment

**FIGURE 4.5**  
**1969-70 RECESSION: MANUFACTURING EMPLOYMENT**

Industry	Timing: N.J. Leads (-) or Lags (+) the U.S. (In Months)	Duration of Contraction (In Months)		Difference In Length of N.J.'s Decline (Months)	Percent Decline In Indicator Peak-to-Trough		Recovery to Prerecession Peak		Months Until Peak Recovery	
		N.J.	U.S.		N.J.	U.S.	N.J.	U.S.	N.J.	U.S.
Total Manufacturing .....	+ 1	31	25	+ 6	9.6	8.9	No	Yes	..	51
U.S. Industries Which Did Not Recover										
Food .....	+ 1	14	20	- 6	6.0	3.8	No	No	..	..
Primary Metals .....	- 2	32	22	+10	19.8	16.2	No	No	..	..
Fabricated Metals .....	+ 3	19	22	- 3	15.1	14.9	No	No	..	..
Transportation Equipment .....	+ 1	15	16	- 1	29.8	28.3	No	No	..	..
Paper .....	0	5	17	-12	2.8	6.3	Yes	No	11	..
Industries Which Recovered In The U.S. But Not In New Jersey										
Apparel .....	+ 9	19	26	- 7	13.1	5.6	No	Yes	..	36
Rubber and Plastics .....	- 7	39	12	+22	17.7	6.6	No	Yes	..	25
Electrical Equipment .....	- 4	31	21	+10	18.2	15.3	No	Yes	..	49
Instruments .....	- 4	24	20	+ 4	9.5	9.6	No	Yes	..	41
Miscellaneous Manufacturing .....	- 2	25	15	+10	21.8	8.9	No	Yes	..	38
Industries Which Recovered In Both The U.S. And N.J.										
Printing and Publishing .....	+ 4	13	17	- 4	4.6	4.0	Yes	Yes	22	47
Chemicals .....	+11	16	30	-14	4.3	6.1	Yes	Yes	30	62
Stone-Clay-Glass .....	+ 1	18	16	+ 2	7.5	4.9	Yes	Yes	46	31
Machinery (Except Electrical) .....	- 6	34	15	+19	17.1	13.1	Yes	Yes	56	38

failed to recover from the recession included food, primary metals, fabricated metals, transportation equipment, and paper.\* As expected, all these industries, except paper, suffered greater percentage losses in New Jersey.\*\* Consequently, these employment losses were permanent.

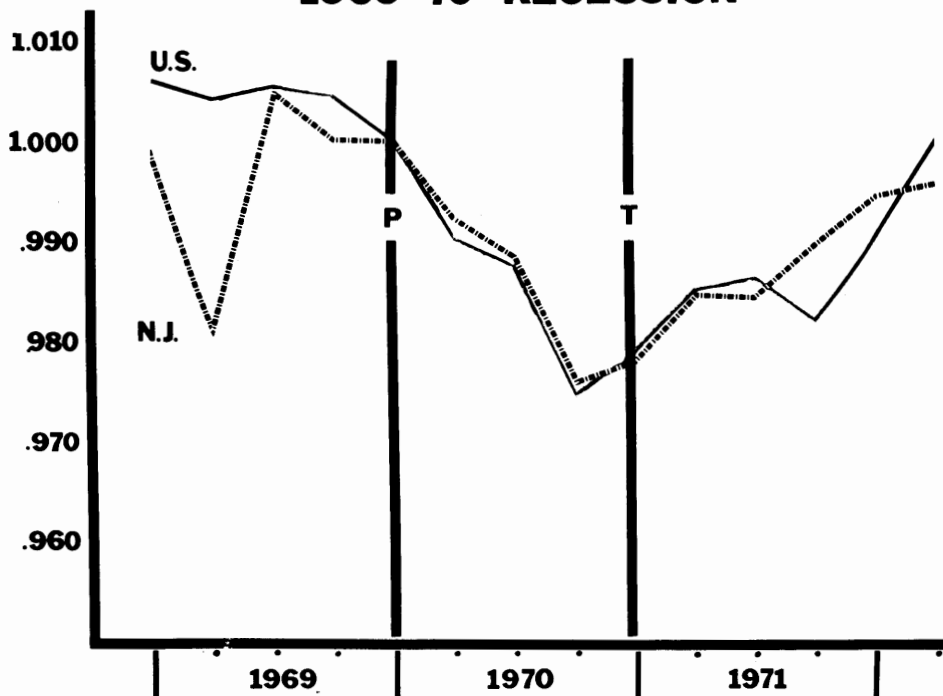
Some manufacturing industries recovered nationally but did not recover in New Jersey. This group included apparel, rubber and plastics, electrical equipment, and instruments and in these activities New Jersey industries were generally more severely affected by the recession than their national counterparts. For example, rubber and plastics in New Jersey declined

17.7%, while in the U.S. the decline was only 6.6%; the New Jersey apparel industry lost 13.1% of its employment, while the decline nationally was 5.6%. This phenomenon would seem to indicate a further *shift* in these industries away from New Jersey during and after the 1969-70 recession.

The remaining manufacturing industries recovered both in New Jersey and nationally. This group included printing and publishing; chemicals; stone, clay and glass; and machinery (except electrical equipment). In all cases, except chemicals, New Jersey firms suffered greater relative declines in employment and required longer periods of time to rehire laid-off workers.

FIGURE 4.6

### MANUFACTURING WORKWEEK 1969-70 RECESSION



\* The discussion defines a declining industry as one which experiences declining employment. However, resource substitution or productivity gains may allow that same industry to increase total output.

\*\* An earlier study published by the Office of Economic Policy ("New Jersey's Manufacturing Industries A Long-Run Overview", 8th Annual Report, New Jersey Economic Policy Council, 1975) found that the rate of manufacturing investment in the State, on the average, has lagged behind the rate of capital formation in the U.S. since 1947. Thus, New Jersey's existing capital stock, by implication, should be somewhat older than the national average. Since New Jersey manufacturing might generally have a larger share of outmoded plant and equipment with high costs of production, the State may face an even greater competitive disadvantage in those industries which experienced absolute job losses on a national level.

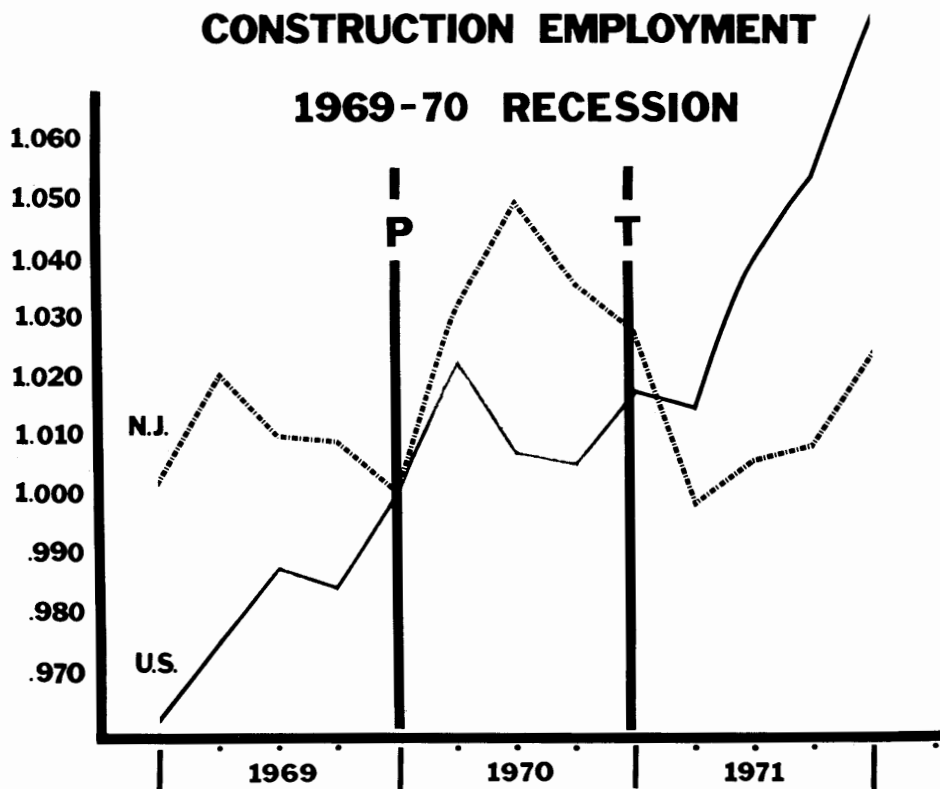
The length of the manufacturing workweek is a leading indicator of changes in employment. Prior to a business downturn, the workweek might be extended as existing employees work overtime to rebuild inventories. As the economy falters, the workweek shortens and layoffs follow. During a recovery, as production increases, the workweek expands to a point where it becomes insufficient to meet output requirements with overtime payments and additional labor is hired. Thus, there is an inverse relationship between hours worked and changes in manufacturing employment; i.e., if the workweek expands, then there will be fewer employees working. Conversely, if we witness a shrinking workweek during the recovery we would expect to see a corresponding increase in manufacturing employment.

Despite the effect of the 1969 recession on New Jersey's manufacturing sector, there is an apparent contradiction when the New Jersey

manufacturing workweek is compared to its national counterpart (Figure 4.6). Although New Jersey suffered greater relative losses in manufacturing employment during the recession, the hours worked by factory job holders remained somewhat higher than in the nation. This means that existing job holders were working a slightly longer workweek.\*

Although considered an integral component of the goods producing sector, construction often follows a somewhat different "building cycle," which does not necessarily coincide with the business cycle. Also, the contributing causes of the recession may not have much effect on prior planned construction projects (Figure 4.7). The New Jersey construction sector continued to grow reaching a peak midway through the recession (September 1970). During the next eight months of decline, 5.2% of all employed construction workers lost their jobs; however, peak employment levels were reattained 13 months

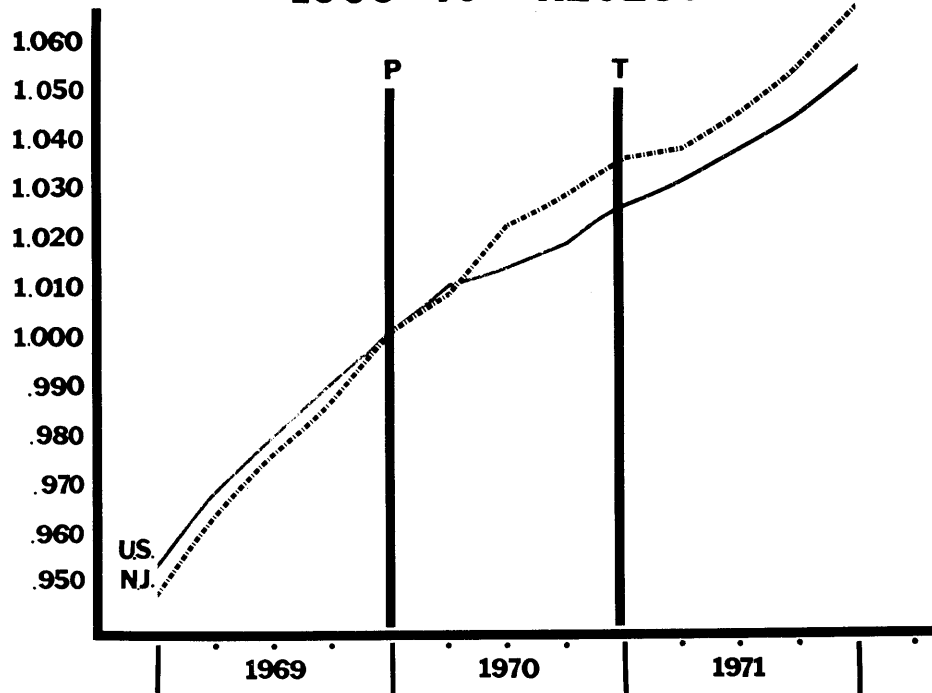
FIGURE 4.7



\* We can only speculate that perhaps employers were reluctant to release experienced, highly productive laborers.

FIGURE 4.8

## SERVICES EMPLOYMENT 1969-70 RECESSION



later (June 1972) during the expansionary phase of the business cycle.

Nationally, the growth in construction activity slowed during the recession, with only 3.1% of the workforce temporarily losing their jobs. Increased demand after the recession quickly restored prerecessionary employment levels.

Employment in legal, educational, health, business, and personal services were largely unaffected by the 1969 recession (Figure 4.8). Neither New Jersey nor the U.S. experienced job loss or curtailed growth in new job opportunities. For this reason, the service sector was considered to be exerting a stabilizing force against the pro-cyclical goods producing sector.

In retrospect, the 1969 recession had exerted only a temporary halt to the State's expanding economy. There was no discernible reduction in real personal income, and prerecessionary levels of total non-agricultural employment were restored somewhat quicker than in the nation.

However, when employment is disaggregated, there is an indication of a shift away from goods producing industries to the service industry. In particular, we should note the apparent permanent loss of employment in certain manufacturing industries. The principal reasons for this loss might include the age and relative obsolescence of the State's manufacturing sector, slower regional population growth, and the emergence of new markets in other areas of the nation—issues which were to become even more dominant during the next downturn.

### The 1973-75 Recession

As noted previously, New Jersey's Comparative Economic Index was declining relative to the U.S. for three years prior to the 1973-75 recession.

1. *Real Personal Income*—During the 1969-70 recession personal incomes were hardly effected, but the dual impact of sharply rising prices and

the 1973-75 recession forced real income to decline 8% in New Jersey and 4.5% for the rest of the country (Figure 4.9). The severity of the income loss is reflected in the duration of the cycle. In the U.S., real income surpassed pre-recession peak levels 26 months later (January 1976), whereas New Jersey was still below its previous peak level 37 months later (December 1976) despite additional extensions to regular unemployment compensation and other governmental transfer payments and countercyclical assistance.

The fact that personal incomes in 1977 are now rising briskly in New Jersey in the absence of employment gains means there is a trend toward greater disparity in the State's income distribution between those who are now working and those who cannot find jobs. With programs such as extended unemployment benefits soon to expire, there may be a widening economic gap further polarizing the State's population into "haves" and "have nots."

2. *Retail Sales*—With falling real incomes, consumers quickly reduce their expenditures. As a result, national retail sales peaked nine

months (March 1973) before the recession began and declined for 20 months before improving. Sales dropped 10% in real terms nationally but had recovered fully 25 months later (December 1976). In New Jersey sales fell 19.2% and have not yet (as of April 1977) reached their 1973 peak.

3. *Employment*—As expected, total non-agricultural employment in New Jersey reached a cyclical peak three months before (June 1974) the national average (Figure 4.10). Employment declined by almost 6% and 165,000 persons lost their jobs for some period of time. Nationally, the magnitude of employment loss was not as great and only 3.2% had lost their jobs at the recession's deepest point (June 1975). Ten months later (April 1976), total U.S. employment exceeded the prerecession peak level.

Two factors stand out in New Jersey's lackluster performance—the State suffered relatively greater job loss during the recession, and the cyclical recovery was quite weak (from an employment standpoint). To date, total employment in New Jersey is *less* than it was three

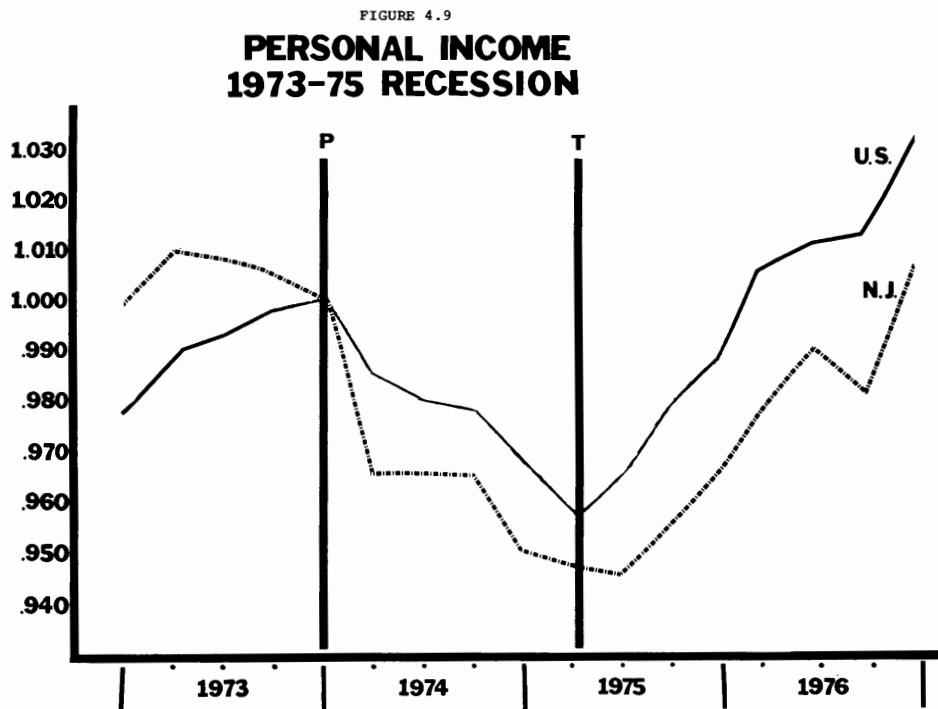
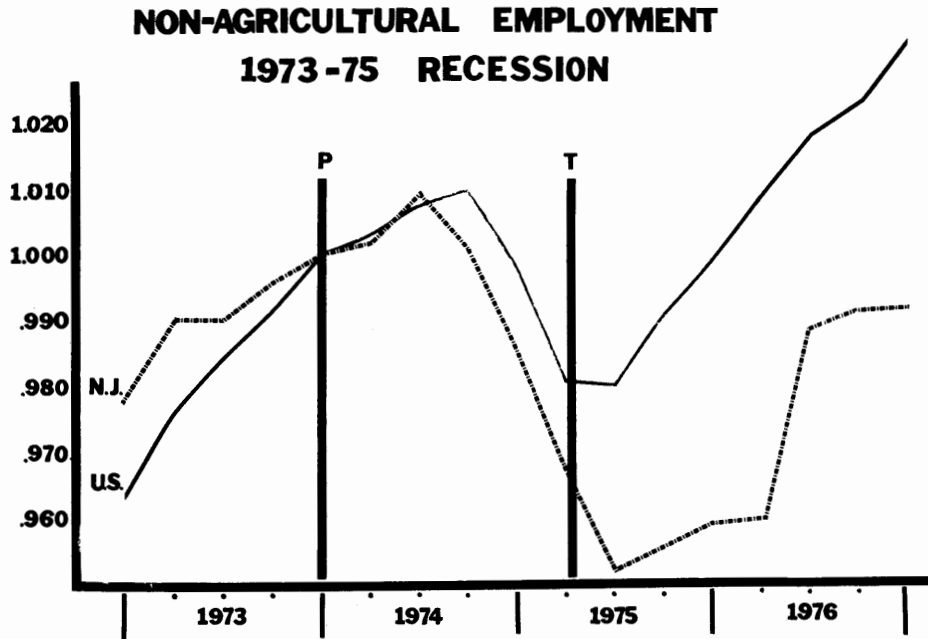


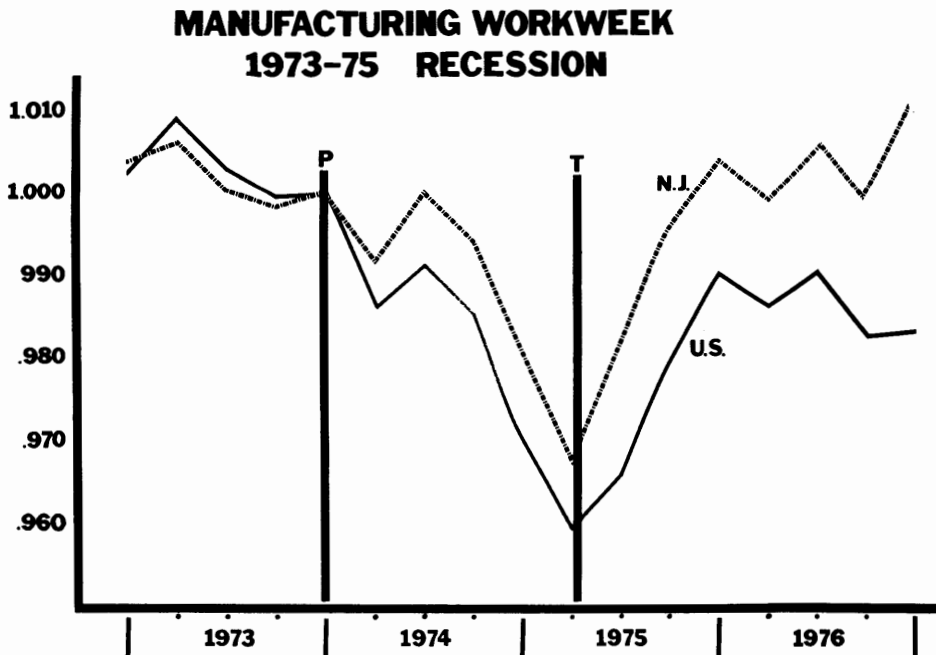
FIGURE 4.10



years ago despite a growing population and a growing labor force. With the current national recovery now into its third year, it is clear that New Jersey is failing to gain its share of new jobs.

The decline in demand during a recession means less work and fewer jobs for the goods producing sector. One early indicator of an approaching business cycle is the length of the factory workweek (Figure 4.11). In both New

FIGURE 4.11



Jersey and the U.S. the manufacturing workweek peaked 10 months before (February 1973) the recession officially started. This period marked the height of inventory accumulation and the beginning of reductions in the manufacturing workforce. Although New Jersey and the U.S. average workweek moved closely together, New Jersey fared slightly better (a 4.6% decline compared to 5.6% in the U.S.). The workweek recovered more quickly in New Jersey reaching its prerecession high in 35 months (March 1976), whereas the U.S. workweek was still recovering after 46 months (as of December 1976).

When the manufacturing workweek declines, job lay offs are close behind. In New Jersey manufacturing employment reached its highest point eight months before (April 1973) the NBER defined the peak of the business cycle (December 1973), whereas in the U.S. the peak in manufacturing employment coincided with the start of the recession. One explanation for this observation is that the OPEC oil embargo, a contributing cause of the recession, was felt

earlier in the Northeastern states which depend heavily on imported oil.

New Jersey lost almost 15% of its manufacturing jobs or 123,000 during a contractionary period lasting 27 months (Figure 4.12). Comparable losses in the U.S. amounted to 11.3% or 2.3 million workers. Indications of New Jersey's continuing problem in manufacturing becomes more apparent during and after the recession. Manufacturing in the U.S. fell for 18 months, reached a trough in mid-1975 and began to recover. New Jersey's manufacturers continued to reduce employment, finding conditions appropriate to rehire in September 1975. The subsequent road to recovery has been both slow and erratic. After two years of recovery, the State is still missing almost 100,000 manufacturing jobs. The result is a widening gap between the stagnant New Jersey manufacturing sector and its national counterpart.

During the 1969-70 recession, manufacturing job loss could be attributed to certain manufacturing industries, but the severity of the 1973-75 recession obscures a similar observation (Figure 4.13).

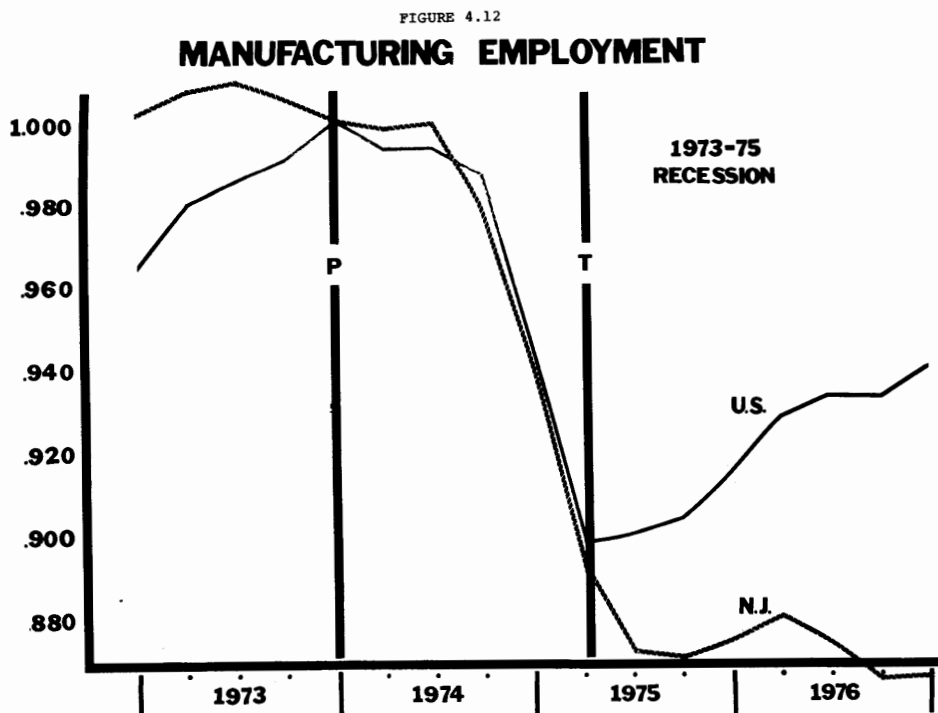


FIGURE 4.13  
1973-75 RECESSION: MANUFACTURING EMPLOYMENT

Industry	Timing: N.J. Leads (-) or Lags (+) the U.S. (In Months)	Duration of Contraction (In Months)		Difference In Length of N.J.'s Decline (Months)	Percent Decline In Indicator Peak-to-Trough		Recovery to Precession Peak (As of December 1976)	
		N.J.	U.S.		N.J.	U.S.	N.J.	U.S.
Total Manufacturing . . . . .	Peak — 7	27	18	+ 9	14.56%	11.13%	No	No
New Jersey Industries Which Declined About The Same As The U.S.								
Printing and Publishing . . . . .	— 5	23	10	+13	7.1	4.3	No	No
Chemicals . . . . .	— 2	11	9	+ 2	9.1	6.4	No	No
Stone-Clay-Glass . . . . .	0	19	19	0	17.6	14.8	No	No
Fabricated Metals . . . . .	— 5	23	19	+ 4	16.4	14.0	No	No
New Jersey Industries Which Declined More Than The U.S.								
Food . . . . .	— 8	25	12	+13	15.7	4.5	No	No
Apparel . . . . .	0	27	23	+ 4	26.4	16.8	No	No
Paper . . . . .	—10	28	17	+ 9	18.4	11.8	No	No
Rubber and Plastics . . . . .	—12	30	14	+16	24.9	18.1	No	No
Primary Metals . . . . .		*	19	*	26.5	16.4	No	No
(at least)								
Machinery (Except Electrical) . . . . .	— 4	20	10	+10	18.4	10.8	No	No
Electrical Equipment . . . . .	— 4	26	18	+ 8	22.5	17.8	No	No
Instruments . . . . .		*	14	*	14.8	8.4	No	No
(at least)								
Transportation Equipment . . . . .	— 7	24	18	+ 6	42.0	16.5	No	No
Miscellaneous Manufacturing . . . . .	—10	32	15	+17	23.0	13.3	No	No

\* Primary Metals and Instruments (in N.J.) were still on a downward trend as of December 1976 therefore a cyclical trough (and length of contraction) could not be identified.

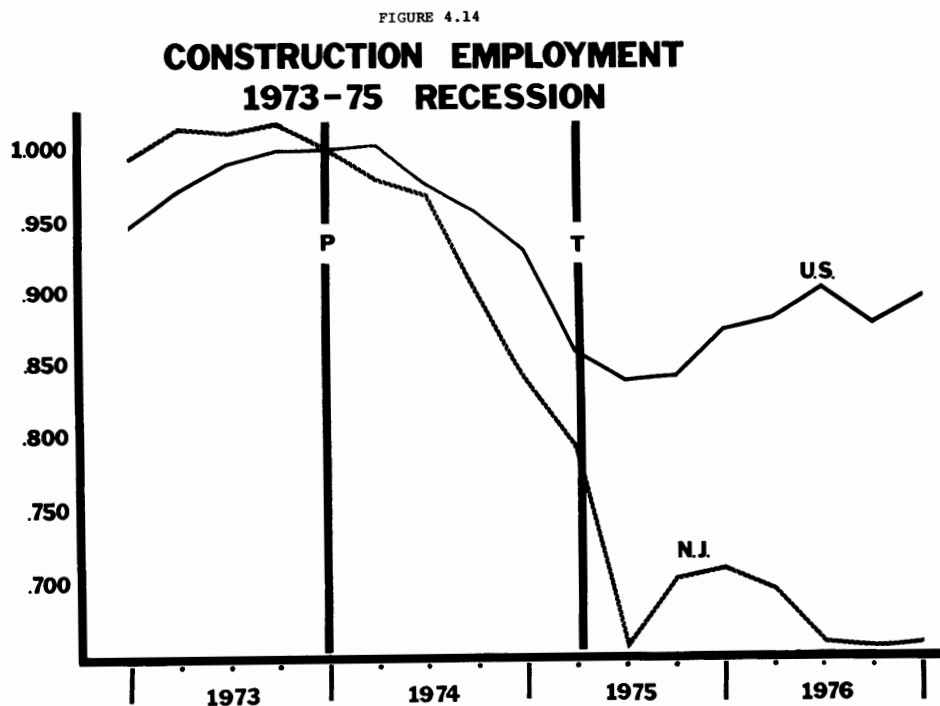
In all the major manufacturing industries, New Jersey's firms suffered greater losses both in terms of employment and length of contraction. Even the State's most dependable industries; i.e., chemicals and printing and publishing, were out-performed by their national counterparts. Although none of the U.S. industries had recovered by the end of 1976, several were close to reaching previous peak employment levels and should do so sometime during 1977.

The prospects for New Jersey's manufacturing firms are not as bright. For those industries that declined about the same as their U.S. counterpart (chemicals, printing-publishing, stone-clay-glass, fabricated metals), we expect them to recover at approximately the same rate. However, most of New Jersey's manufacturing sector declined more than the national average before starting to improve and two industries (primary metals and instruments) were still on a downward trend as of the end of 1976. Since the prospect for regaining prerecession employment declines over time, there is additional evidence

that these initially cyclical losses will result in permanent, structural changes to the New Jersey economy. Moreover, the failure for the State's manufacturing sector to improve has been a major factor inhibiting the recovery of total non-agricultural employment.

The other principal component of the goods producing sector, construction, was even harder hit with more than 39% of New Jersey's construction workers out of work before the industry reached its trough (June 1975) (Figure 4.14). The employment loss was less severe nationally at 17.6%. The prospects for the State's recovery remains bleak with demand for new industrial construction non-existent and little capital spending by the public sector.\*

During the 1969-70 recession, the services industry grew steadily providing a stable source for new jobs. However, the expectation that a services economy would be countercyclical was unfulfilled in 1974. Services employment in New Jersey grew until mid-way through the recession (September 1974) but then experienced



\* The Economic Policy Council has recommended the establishment of a countercyclical capital construction program to deal with such problems. This type of program would not interfere with spending 'cap' restrictions as bond financed capital expenditures are exempted.

absolute job losses. As a contrast, however, nationally, services employment continued to expand throughout the recession (Figure 4.15).

If the services sector is broadened somewhat to include other service-producing industries such as retail and wholesale trade, finance, transportation, real estate, insurance, etc., a more severe decline in New Jersey service employment is observed. Although only 5% of total service jobs were lost during the recession, service firms were slow in rehiring laid off workers. After two years of cyclical recovery, employment in New Jersey's service producing sector finally exceeded its prerecessionary peak level (November 1976).

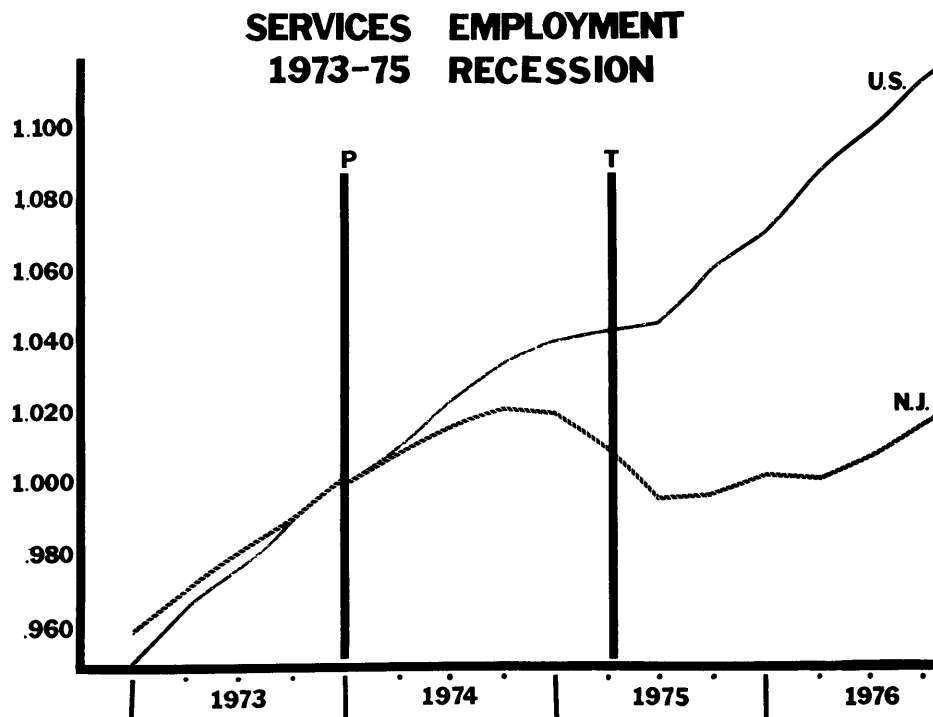
Without more evidence it is difficult to explain the loss of service jobs in New Jersey in light of the continued national expansion in this area. Some tentative explanations would include lower population growth and sharp declines in real disposable income which would reduce the demand for "services."\*

Another theory states that the reason for New Jersey's rapid service growth during the early 1970's was related to the spin off of service establishments from the large metropolitan centers (New York and Philadelphia) into the New Jersey suburbs. This flow may now be completed and a new equilibrium reached in the spatial location of metropolitan service establishments. Therefore, prospects for continued service growth from this source are minimal.

It is also possible that the absolute loss in manufacturing employment has affected services employment. The typical manufacturing firm today is supported by numerous services which were once indigenous to the firm. These may include accounting and consulting services, security, trucking, computer services, etc. With widespread losses in manufacturing, employment losses in supporting service activities are likely to follow.

Whatever the reasons, the poor performance of services in the 1970's raises a serious question about the commonly-held notion that New Jer-

FIGURE 4.15



\* Declining school enrollment is one example.

sey's economic future lies in a service oriented economy.\*

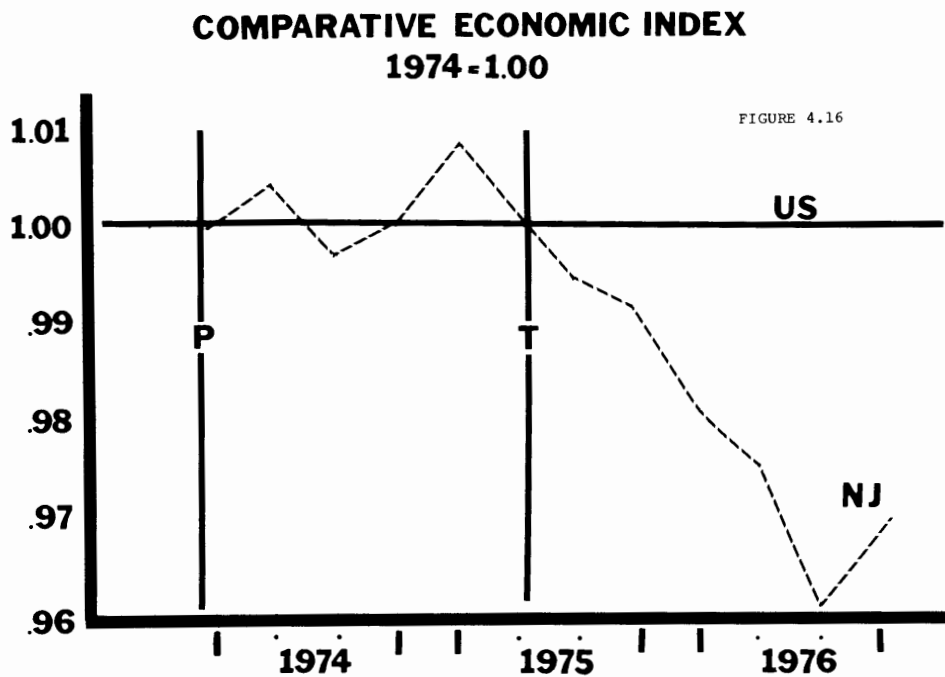
When New Jersey's economic indicators are plotted relative to national indicators, the depths to which the State economy plummeted become acutely apparent. The nature of the 1973-75 recession caused earlier and greater losses to New Jersey as well as the other Northeastern states. However, the important distinction lies in the lagging recovery of the State's economy. Now three years after the recession's trough, nationally, there are few New Jersey signs of recovery in manufacturing or construction and services employment grows only marginally.

### Conclusion

The experience of two closely timed recessions, according to the evidence presented, has seriously weakened the State's economy. Although total employment in New Jersey quickly recovered from the 1969-70 recession, the Comparative Economic Index began to decline relative to the nation. For the most part, the permanent loss in manufacturing jobs during the business cycle was responsible.

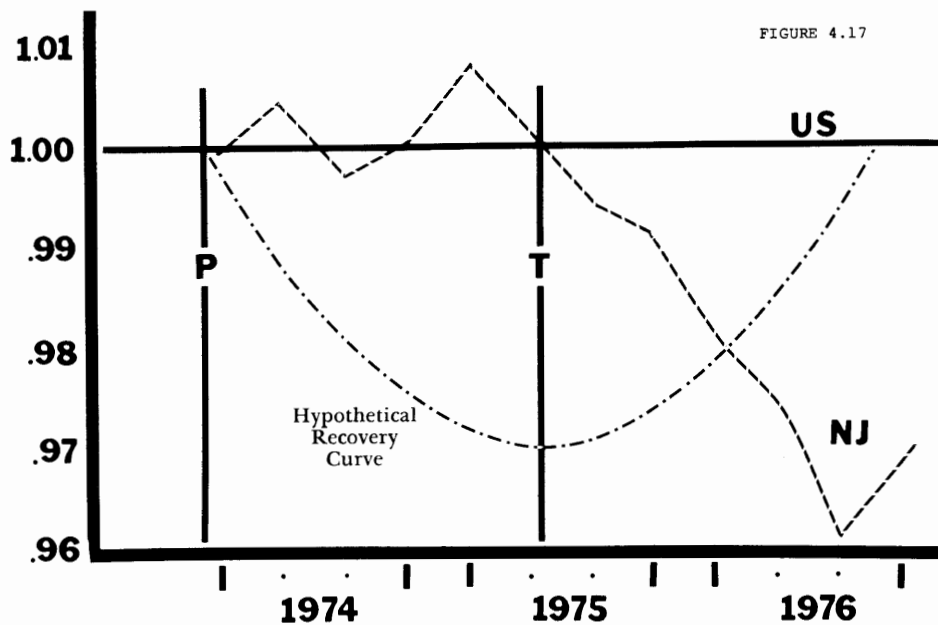
Comparatively speaking, the New Jersey economy was still declining relative to the national economy when the 1973-75 recession struck. How New Jersey fared during and after the recession can be seen more clearly by changing the base of the CEI to 1974 (=1.00) (Figure 4.16). During the 1973-75 recession, the New Jersey economy oscillates above and below the U.S. average, which is precisely the same pattern observed during the 1969-70 cycle. However, when the U.S. economy started to recover in 1975, New Jersey once again lagged behind and consequently the CEI began to decline. It appears that these two recessions are the underlying cause of some fundamental changes in the State's economy. Perhaps the contradiction between a usual recession/recovery and what we have observed can be explained in the following way:

In old industrialized states a larger share of productive capacity is obsolete and costs of production tend to be higher than in states where industrialization is more contemporary. When demand falls during a recession, a proportionately larger share of old plants are closed. Therefore, we may observe a deeper and perhaps longer recession. From the manufacturing em-



\* See Chapter V of this report for a study of the determinants of services employment in the U.S.

## COMPARATIVE ECONOMIC INDEX 1974 = 1.00



ployment data of Figures 4.5 and 4.13 there is reason to believe this is the case for some New Jersey industries. Following this reasoning, an economy at such a low level should experience a stronger rate of recovery; that is, when demand increases during a recovery period, an old industrialized state should at some point reintroduce proportionately more productive capacity. Schematically, this pattern is superimposed on the CEI (Figure 4.17) and labeled "hypothetical recovery."

The difference between the observed pattern and the hypothesized curve is evidence that we are not dealing with a cyclical phenomenon that will dissipate simply with a longer recovery period, but rather a long-run process of structural economic change.

Structural adjustments in industry mix are constantly taking place. In times of economic prosperity, the shifts were gradual. Prior to 1969 demand was strong and even the older, less efficient plants in the Northeast were fully employed. Although growth rates may have been slower, manufacturing employment continued to grow in New Jersey to 899,000 in mid-1969.

The onset of recession triggers a similar chain of events in manufacturing establishments throughout the nation, although there may be some differences due to industry mix and the initial cyclical shock. (For example, if the recession is energy-related, then the automobile producing and related industries will suffer most. If it is a result of a tight money policy, the construction industry will be first and harder hit.)

A prolonged recession eliminates marginal firms which depend upon continued cash flow. Meanwhile, large multi-state firms without such liquidity problems may utilize this slack period to reassess existing capacity use. Decisions must be made whether to reopen the old, less efficient plants or scrap them altogether. With widespread losses in New Jersey manufacturing employment, it is apparent many such decisions have not been in favor of reopening the old plants.

If this is so, why aren't new facilities replacing the old ones or at least being constructed nearby? Rather this expansion is occurring in the South and Southwest. Why is the Sunbelt preferred?

Although no one can answer precisely the central and obvious question—how much cheaper is it to produce in the Sunbelt states—preliminary facts are beginning to surface.

We know that the cost of living at a comparable standard is approximately 12% lower in the South and this allows wages to be considerably lower than in the North. Another 3-5 percentage income differential might be attributed to lower wage rates resulting from right-to-work laws, less unionization, and possibly, the uneven spatial allocation of federal assistance and expenditure programs. Land is cheaper and more readily available. Social costs of State and local governments are lower and therefore taxes can be less of a burden. Other contributing causes include differentials in interstate environmental control costs, and uncertainties with respect to the State's fiscal status and the supply and price of energy.

Despite this imposing list of cost differentials, some industries remain competitive in New Jersey by reducing their unit labor costs through increased productivity.

What are our future prospects? One hypothesis, the "weedout" theory, claims the recessions eliminated a number of old, inefficient firms who would have died in due time. The remaining firms weathered the recessions and thus will provide the State with a stronger industrial base.

Whether there is some validity to this theory is questionable, but thus far, the crucially needed replacement jobs have not materialized, particularly from their expected source, service employment.

Without a clear explanation of future trends, the goals of state economic policy must be broad enough to confront all sectors of the economy, especially manufacturing. At the State and local government level much could be done. First, all obstacles to business expansion and development should be comprehensively removed. Second, State government should encourage labor/management cooperation aimed at improving productivity—our main weapon for overcoming a significant share of existing cost differentials. Improved educational and vocational training programs and facilities will help achieve this goal.

Most importantly, State government needs to assume the role of encouraging the establishment of *new* industrial enterprises based on technical innovation—whether this might be new production processes or new product development. This is distinct from the traditional interstate competition to lure industries away from each other. New industries founded on new technologies, an area of relative strength for New Jersey, offer an important opportunity to counteract the structural decline of the New Jersey economy revealed in this study.

## V

# THE POTENTIAL FOR EMPLOYMENT IN NEW JERSEY'S SERVICE SECTOR\*

Each year since 1969, New Jersey has experienced a decline in the total number of wage and salary workers employed in manufacturing. During this period employment in service industries\*\* has increased, taking up much of the slack. This relationship between service and manufacturing employment and the fact that service employment now represents over half of the total employment in the State, and the U.S. as a whole, has fostered an often-expressed belief that New Jersey policy need not be concerned with its declining manufacturing sector. Instead, it is alleged, the State should concentrate on developing its service sector.†

It is appropriate to ask whether the implication that growth of service employment is not dependent on growth in the rest of the economy makes any economic sense. The existing literature does not address itself directly to this question. Instead, it is primarily concerned with the belief that productivity increases, through technological advances, in the service sector na-

turally lag behind those in manufacturing. This productivity lag, it is said, causes employment growth in services to outpace that in manufacturing provided demand for services grows as fast as demand for output from the manufacturing sector.‡

Emphasis given to the dramatic shift to services nationwide varies. Russell Lewis suggests economic development may traverse four phases: (1) an agricultural phase; (2) industrial revolution; (3) mass consumption; and (4) the service society.¶ Gersuny and Rosengren suggest that the future output of tangibles will be curbed because of resource depletion and environmental degradation.§ Then, they say, "only services have a potential for unlimited growth in this environment of scarcity."

On the other hand, Fuchs seems to warn that the growth of services is not unbounded: ". . . the dramatic shift to services has occurred in employment—not in output. A question arises,

\* Prepared by Dr. Laurence H. Falk, Economist, Office of Economic Policy in consultation with Dr. Adam Broner, Director, and assisted by Alan Malz.

\*\* For this study we consider as service industries: wholesale and retail trade; finance, insurance, and real estate; lodging places and other personal services including entertainment, recreation and household services; professional services; and transportation, communications and public utilities. We exclude governmental services.

† The very poor performance of the service sector in New Jersey during and since the last recession (as illustrated by Figure 4.15, Chapter IV) should raise serious questions about this proposition.

‡ William Baumol, "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis", *American Economic Review*, June 1967, pp. 415-26; or Edward F. Dennison, "The Shift to Services and the Rate of Productivity Change," *Survey of Current Business*, October 1973, pp. 20-35.

¶ Russell Lewis, *The New Service Society*, London, 1973, p. 8.

§ Carl Gersuny and William R. Rosengren, *The Service Society*, Cambridge, Massachusetts, 1973, p. 145.

therefore, about the validity of the emphasis given here to the growth of a service economy.”\*

The stress that is given to the growth of the service economy seems to lend at least some credence to the notion that services can grow independently from the rest of the economy, particularly manufacturing; however, the literature neither tests the proposition nor, indeed, even makes it explicit.

In contrast to the notion of unlimited growth, it is our hypothesis that expansion of employment in the service sector depends, to a large extent, on development of the goods producing sector. It is the objective of this chapter to examine the evidence which will support or reject this hypothesis. Our approach is to investigate the relationship between service employment increases, across states, and other variables representing economic development and demographic change.

#### Employment Changes in the Service Sector

This study examines employment changes in the service sector from 1950 to 1970. Figure 5.1 shows how the service sector has grown, as a

percent of total employment in New Jersey and the U.S., during the 20-year period.

In the U.S. as a whole, service employment grew from 47.77% of total employment in 1950 to 56.66% in 1970. Growth in New Jersey was slightly less—from 47.63% in 1950 to 55.50% in 1970. Virtually all of the total increase for the U.S. and New Jersey can be accounted for by the increase in professional services employment: medical, legal, educational, engineering, etc. However, other adjustments are apparent with declines in personal services and transportation, communications and public utilities being largely offset by modest increases in wholesale and retail trade; finance insurance and real estate; and business and repair services.

The approach of this study has been to relate 1950-1970 percentage changes in total and per capita employment in the service industries to changes in other economic variables *across states*. Figures 5.2 and 5.3 give some notion of how these changes were distributed among the 48 coterminous states.\*\*

Examination of Figure 5.2 reveals that percentage increases in service employment in the

FIGURE 5.1  
SERVICE INDUSTRY EMPLOYMENT AS A PERCENT  
OF TOTAL EMPLOYMENT: U.S. AND NEW JERSEY

	U.S.		N.J.	
	1950	1970	1950	1970
Transportation, Communications, and Public Utilities (TCU) .....	7.83	6.55	8.35	7.32
Wholesale and Retail Trade (TR) .....	18.69	19.68	17.79	18.95
Finance, Insurance and Real Estate (FIRE) .....	3.38	4.85	4.99	5.93
Business and Repair Services (BR) .....	2.32	3.04	2.34	3.81
Professional Services (PRO) .....	8.46	17.12	7.83	15.42
Personal Services (PER) .....	7.09	5.42	6.33	4.07
<b>TOTAL</b> .....	<b>47.77</b>	<b>56.66</b>	<b>47.63</b>	<b>55.50</b>

SOURCE: Computed from *Regional Employment by Industry, 1940-1970*, U.S. Department of Commerce, Bureau of Economic Analysis, 1975.

\* Victor R. Fuchs, *The Service Economy*, New York, 1968, p. 183.

\*\* Our statistical analysis, discussed in the next section, excludes Alaska, Hawaii, and the District of Columbia since their unique features would tend to distort the results.

**FIGURE 5.2**  
**COMPARISON OF SERVICE AND MANUFACTURING EMPLOYMENT CHANGES**  
**BY REGION (1950-1970)**

Employment Category	Percentage Change			Number of States Above or Below Average <sup>c</sup>							
	U.S. <sup>a</sup>	Average of States <sup>b</sup>	New Jersey	Northern Industrial <sup>d</sup>		Sunbelt-South <sup>e</sup>		West <sup>f</sup>		Others	
				Above	Below	Above	Below	Above	Below	Above	Below
Transportation, Communication, and Public Utilities (TCU) . . . . .	15.3	17.4	28.7	2	9	10	4	6	5	2	10
Wholesale and Retail Trade (TR) . . . . .	45.5	53.4	56.3	2	9	6	8	6	5	3	9
Finance, Insurance and Real Estate (FIRE) . . . . .	98.7	120.9	74.4	0	11	9	5	5	6	3	9
Business and Repair Services (BR) . . . . .	80.6	76.7	138.6	3	8	6	8	5	6	2	10
Professional Services (PRO) . . . . .	179.8	188.4	189.1	3	8	4	10	6	5	2	10
Personal Services (PER) . . . . .	5.6	17.8	-5.8	0	11	1	13	10	1	2	10
Manufacturing (MAN) . . . . .	35.5	59.8	23.2	0	11	9	5	7	4	3	9

SOURCE: Same as Figure 5.1

<sup>a</sup> Coterminous 48 states.

<sup>b</sup> Arithmetic mean of individual percentage changes of 48 coterminous states.

<sup>c</sup> Above denotes greater growth or less decline than arithmetic mean of percentage changes in 48 coterminous states; below denotes less growth or greater decline than average state.

<sup>d</sup> Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Michigan, Indiana, Illinois and Wisconsin.

<sup>e</sup> West Virginia, Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas.

<sup>f</sup> Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon and California.

<sup>g</sup> Maine, New Hampshire, Delaware, Maryland, Vermont, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.

industrial North generally fell below the average\* percentage increase for the 48 states. Both the Sunbelt-South and the West fared better, but their experiences were mixed. The miscellaneous remaining states did poorly.\*\*

The bottom row of Figure 5.2 compares percentage changes in manufacturing employment by regions. All of the Northern industrial states fared worse than the average state. The mixed performance of the Sunbelt-South and Western states in the manufacturing category corresponds to their experiences in service employment, and the poor manufacturing performance of the remaining states corresponds to their service employment changes.†

Given the below average performance of the Northern Industrial Tier, in general, New Jer-

sey seems to have done fairly well; better than average in transportation, communications and public utilities (TCU); and business and repair services (BR); about average in trade (TR) and professional services (PRO); but worse than average in personal services (PER).

But the percentage changes in employment in Figure 5.2 fail to tell the whole story. New Jersey's population increased by 48.3% during the period 1950-1970, while the population of the 48 states increased only 35.5%. Thus, part of New Jersey's apparently adequate performance, relative to the U.S., must be attributable to its higher population gain.

Figure 5.3 removes the effect of population increases by comparing changes in employment per capita and thus provides better measures

\* We compare individual state percentage changes for each service category to the simple mean of state changes for that category (individual state percentage changes summed and divided by 48). This is consistent with the regression procedure of the next section which utilizes percentage changes across states, unweighted for population differences, as values of the dependent and independent variables.

\*\* See Figure 5.2 table notes for description of regional divisions.

† Comparing individual state experiences to average U.S. would alter the number of states above and below the average; however, the changes would be minor. For example, only one state in the Northern Industrial Tier would move to above average. At the same time two Southern states would move to "above" as would one Western and three miscellaneous states. Conclusions drawn from the Figure would remain unchanged.

**FIGURE 5.3**  
**COMPARISON OF PER CAPITA SERVICES AND MANUFACTURING**  
**EMPLOYMENT CHANGES BY REGION (1950-1970)**

Employment Category	Percentage Change			Number of States Above or Below Average							
	U.S.	Average of States	New Jersey	Northern Industrial		Sunbelt-South		West		Other	
				Above	Below	Above	Below	Above	Below	Above	Below
Transportation, Communication, and Public Utilities (TCU) . . .	-14.1	-12.2	-13.2	3	8	9	5	0	11	1	11
Wholesale and Retail Trade (TR) . . . . .	8.3	13.8	5.4	0	11	11	3	4	7	8	4
Finance, Insurance and Real Estate (FIRE) . . . . .	47.7	65.2	17.7	0	11	11	3	4	7	4	8
Business and Repair Service (BR) . . . . .	35.2	25.5	63.9	7	4	11	3	5	6	2	10
Professional Services (PRO) . . . . .	108.4	113.9	95.0	3	8	12	2	3	8	7	5
Personal Services (PER) . . . . .	-21.4	-16.9	-37.5	1	10	6	8	7	4	8	4
Manufacturing (MAN) . . . . .	0.9	21.1	-16.9	0	11	12	2	4	7	6	6

SOURCE: Same as Figure 5.1  
 See Figure 5.2 for explanations of column headings.

of development, or intensity of development, of the service industries. In this formulation the industrial North's experience is again very poor, except in business and repair services where seven of the 11 states did better than the 48 state average. On the other hand the Sunbelt-South's experience is no longer mixed; in every category, except personal services, a large majority of the states surpassed the average. The West's experience is again mixed as is now the experience of the miscellaneous remaining states.

The last row of Figure 5.3 compares regional changes in per capita manufacturing employment. It may be observed that *all* of the Northern Industrial Tier states performed worse than the 48 state average but 12 out of 14 Sunbelt states did better than the average in manufacturing development. The Western and miscellaneous states show mixed results. A clear pattern now emerges: The Northern-Industrial

region which did poorly in manufacturing employment per capita also did poorly in service employment per capita; the Sunbelt-South did well in manufacturing employment and in service employment per capita. The uneven results in manufacturing development in the Western and miscellaneous states categories are reflected by mixed results in the development of service employment. Even at this point the message seems clear: Development of the service sector does not appear to happen in isolation; rather, it accompanies development in the manufacturing sector.\*

New Jersey's experience is fairly typical of states in the Industrial North. Its per capita employment exceeded the 48 state average only in the BR category, which represented less than 4% of the State's total service employment in 1970; its performance in TCU was about aver-

\* The conclusion does not change when the comparison is made between total U.S. and individual states as in the table below. Although the North looks somewhat better in this comparison, it still exhibits a majority of states below the standard except in TR. And it continues to look poor indeed relative to the South which did better than the U.S. in all categories. The apparently improved performance of the West and other categories results only because many of the state values are near the U.S. value (between the all-state average and U.S. change) and thus switch headings. But the fact that the values are near the two figures only confirms their mixed performances both in manufacturing and services.

	North		South		West		Other	
	A	B	A	B	A	B	A	B
TCU . . . . .	5	6	13	1	1	10	1	11
TR . . . . .	6	5	11	3	7	4	9	3
FIRE . . . . .	2	9	14	0	8	3	8	4
BR . . . . .	4	7	8	6	4	7	2	10
PRO . . . . .	5	6	13	1	5	6	10	2
PER . . . . .	2	9	9	5	9	2	10	2
MAN . . . . .	1	10	14	0	10	1	8	4

age, but changes in the other four service categories were below par.

New Jersey's substandard performance in service industry development might prompt one of two reactions: (1) We can do better, because there is much room for improvement; or (2) Since the rest of the Northern Industrial Tier states did no better, we cannot look to the service sector to solve unemployment problems. In the former instance we need to ask *how* we can do better. In the latter, we must ask *why* it can't be done. In either case it is appropriate to find the factors upon which service employment depends.

### The Empirical Evidence

To test our hypothesis that growth of employment in the service sector in a state depends on other economic development,\* we have employed the econometric technique of ordinary least-squares regression. Using cross-sectional data for the 48 coterminous states, we have examined the statistical relationship between changes in employment in the six service categories and six other variables which measure economic development and demographic change from 1950 to 1970. Percentage changes in service employment, both total and per capita, were regressed against percentage changes in the following independent variables: (1) per capita income (CINC); (2) the ratio of manufacturing employment to agricultural employment (CRMA); (3) a demographic variable, the ratio of the number of persons under age 21 and over 64 to total state population (CDEM); (4) productivity, as measured by value-added in manufacturing per employee in manufacturing (CPROD); (5) manufacturing employment per capita (CMAN); and (6) population (CPOP).\*\*

\* There has been much discussion recently about the movement of services from New York City (and perhaps Philadelphia) to the nearby New Jersey suburbs. This study does not examine this phenomenon. Instead, it addresses itself to the question: Can increasing service employment be expected in a declining economy?

\*\* The population variable was not used in regressions where the dependent variable was formulated as percentage change in per capita service employment.

† *The Conditions of Economic Progress*, London, 1940, pp. 6-7. Clark's "tertiary" industry definition (pp. 319-20) corresponds roughly to our service categories.

‡ State indexes are not available for deflating per capita income. Using a U.S. index, such as the C.P.I., would merely divide all observations of the dependent variables by a constant and thus leave the estimated regression coefficients unchanged.

¶ George Stigler, *Trends in Employment in the Service Industries*, Princeton, 1956.

*A priori*, CINC can be expected to show a positive relationship with service employment. Colin Clark has observed for nations "a very firmly established generalization that a high average level of real income per head is always associated with a high proportion of the working population engaged in tertiary industries."† Both our total percentage and per capita formulation of service employment changes (the dependent variables) should be positively related to CINC. The per capita relationship that we test corresponds closely, but not precisely, with "real income per head"‡ and "high proportion of the working population" in tertiary industries.

CRMA, the ratio of manufacturing to agricultural employment, is intended as a measure of the intensity of a state's industrial development. We have hypothesized a positive relationship between this variable and development of the service sector.

The CDEM variable presents a paradox: Stigler essentially hypothesizes a positive relationship when he states, "as between two countries with equal real incomes, the service industries will be larger . . . the larger the relative numbers of children and aged in the population. . ."¶ However, our findings, discussed in the next section, indicate that the actual relationship between percentage changes in service employment and in CDEM across states is *inverse*: the smaller the percentage increase in the number of children and aged in state populations, the *larger* the percentage increase in service employment. We share Stigler's expectation that children and aged add to the *need* for various services (e.g., educational and medical), but we note a countervailing force that occurred during the period 1960-70. CDEM changes over that

FIGURE 5.4  
TRANSPORTATION, COMMUNICATIONS AND PUBLIC UTILITIES (TCU)\*

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
I	— .982 (.130)	.425 (.059)	....	....	.111 (.057)	.719 (.052)	....	.848
II	— .472 (.110)	....	.056 (.010)	....	.140 (.063)	.696 (.057)	....	.814
III	— .186 (.127)	....	....	—1.430 (0.321)	.159 (.069)	.742 (.064)	....	.773
IV	— .386 (.135)	....	....	....	.167 (.078)	.708 (.071)	.195 (.079)	.711

time were apparently associated with migration of working age population from the older industrial states to the more rapidly developing states. As CDEM fell in developing states, the percentage of breadwinners—those having the ability to pay for services—rose. Here, we would expect a decline in CDEM would result in an increase in demand for services, leading in turn to an increase in service employment; hence, from this force the relationship between CDEM and percentage changes in service employment should be negative.

Changes in productivity (CPROD) in the manufacturing sector can be expected to be positively associated with development of new manufacturing plants across states. In agreement with our hypothesis that service industry development depends on development of other industry, we expect CPROD to be positively associated with changes in service industry employment.

Population changes (CPOP) should be positively associated with service employment percentage changes (in total). Moreover, we would expect this variable to account for most of the variation in service employment changes across states.

Finally, we expect a positive relationship between service employment change and change in manufacturing employment per capita

(CMAN). Hypothesizing a positive relationship for these two variables is tantamount to restating our initial hypothesis.

In the following subsections we present results of our statistical investigations. The best results for every category were produced by regressions which express the dependent variable as percentage changes in total employment for each service classification and include percentage change in population as an independent variable. Verification was provided by regressions using percentage change-per capita formulations of the dependent variables, but such regressions are discussed only where they provide additional information.

#### 1. *Transportation, Communications, and Public Utilities (TCU)*—The most significant results for this category are given in Figure 5.4.

Changes in employment in TCU have proven\*\* to be directly related to population changes (CPOP) and changes in productivity (CPROD). Moreover, a third dependent variable, which in some way represents a state's economic development, is seen to be significant in each of the four regression results shown above.

The first estimated regression (I) adds per capita income, CINC, as the third independent variable, and its positive coefficient implies its

\* Numbers directly under headings are the estimated regression coefficients; figures in parentheses are standard deviations. R<sup>2</sup> measures the portion of the variance in service employment changes that is accounted for by the variance of the explanatory variables taken in combination.

\*\* All coefficients reported in this chapter are significant at the .05 level (95% probability).

effect on TCU: a one per cent increase in per capita income leads to an increase in TCU employment of approximately .4%.\* Since the first regression has the highest R<sup>2</sup>, it is apparently the best of the four explanations of the variation in TCU employment.

The three remaining estimated regressions also have high, but descending in order, R<sup>2</sup>'s. Each of these regressions have a different variable replacing the CINC variable of the first regression. Unfortunately, multicollinearity,\*\* a problem frequently seen in economic data, prevents any two (or more) of the four variables CINC, CRMA, CDEM and CMAN from appearing together—with statistical significance in the same regression. While these four variables are all “measures” of economic development, they do not describe the same phenomenon and thus warrant separate attention.

In regression II, TCU is seen as varying directly with the change in the ratio of manufacturing to agricultural employment (CRMA). The ratio is frequently used as a proxy for industrial development, and, in our regressions, the percentage change in the ratio for a state would represent the rate at which industrialization took place over the 20-year period. The CRMA coefficient indicates a one percent increase in the ratio would be associated with a small (.06 percent) increase in TCU employment.

Regression III includes the variable CDEM representing the change in the dependency ratio (percentage of old and young people) of the population. As previously noted, we have found

significant *inverse* relationships between this variable and employment in the service industries. In this instance, a one percent *decrease* in CDEM is associated with a 1.4 percent *increase* in TCU employment.

The explanation for this relationship can be seen in the data. In the states of the North, where the increase in the percent of the population under 21 and over 64 was above the national increase, TCU employment generally increased less than the two-decade average state increase of 17.4%. In the South where CDEM increased considerably less than the average increase, per capita TCU employment usually increased by a larger percent than the average of the states. In the West where the demographic variable increased by the same percentage as the U.S., six states fared better and five worse than the average.†

Again the demographic variable/service variable relationship tells us that increases in employment in wholesale and retail trade are directly related to economic development. The North has been experiencing a loss of young working population, especially the better-educated and better trained, to the South where faster economic growth has created more positions for individuals in the productive age bracket. This migration pattern has tended to increase the percent of population in non-productive ages in the North and to decrease it in the South. It is not surprising that the South's employment in services rose faster than the North's, given the more rapid increase in working-age population—people who have the ability to pay for additional

\* All four results indicate that a one per cent increase (decline) in population would lead to an increase (decline) in TCU of approximately .7%, and a one per cent increase in value-added per manufacturing employee (CPROD) would lead to a .11 to .17% increase in TCU.

\*\* Multicollinearity occurs when supposedly independent variables are highly correlated with one another.

† The following tabulation shows how population in the under 21 and over 64 age groups increased by regions of the U.S.

Region	Percent 1950	Percent 1970	Increase (Percentage Points)
North East	40.3	48.3	8.0
North Central	43.1	50.5	7.4
South	46.9	50.0	3.1
West	42.6	48.7	6.1
Total U.S.	43.5	49.6	6.1

SOURCE: Computed from U.S. Department of Commerce, Bureau of the Census, *Census of Population, 1950 and 1970*.

FIGURE 5.5  
WHOLESALE AND RETAIL TRADE (TR)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
V	.322 (.021)	....	....	-1.089 (.156)	....	.900 (.028)	....	.959
VI	.122 (.026)	....	.029 (.006)	....	....	.867 (.032)	....	.943
VII	-.092 (.076)	.177 (.043)	....	....	....	.880 (.034)	....	.938
VIII	.181 (.022)	....	....	....	....	.871 (.036)	.145 (.044)	.930

services. When a state adds persons in the productive age, with much higher incomes than dependent persons, the addition has a positive impact on demand for services (in this instance, transportation, communications and utilities).

Regression IV shows that a one percent increase in employment per capita in manufacturing should lead to approximately a .2% increase in TCU jobs. Evidence is again found that service jobs are complementary to manufacturing jobs.

2. *Wholesale and Retail Trade (TR)*—The best regressions for wholesale and retail trade are shown in Figure 5.5.

Regressions V, VI, VII and VIII again give evidence of the positive effect of economic development on service employment—in this instance employment in wholesale and retail trade. The CPOP coefficient in all four regressions indicates that a one percent change in population leads to a .9% increase in employment in the trade industries. As before multicollinearity prevents CINC, CRMA, CDEM and CMAN from appearing together, either all at once or any two at a time. But separately the coefficients are again statistically significant and carry the same signs as for TCU, though somewhat smaller changes in employment in this category are associated with one percent changes in any of the variables. (For example, a one percent decrease in CDEM leads to a gain of approximately 1.1 percent in trade employment vs. 1.4 percent for TCU.)

The high R<sup>2</sup> for each of the regressions show that most of the variation in CTR can be explained by any of the four regressions, but CDEM now appears in the “best” regression, in place of per capita income.

CPROD was not statistically significant in any of the regressions utilizing total percentage change in TR as the dependent variable and including CPOP as an independent variable. However, a regression of the TR percentage change *per capita* against the independent variables, excluding CPOP, repeats the positive relationship between productivity and service employment. The best results for this formulation are:

Regression Number	Constant	CDEM	CPROD	R <sup>2</sup>
IX	.157 (.043)	-1.015 (.126)	.062 (.025)	.644

From the above regression we would expect a one percent improvement in manufacturing productivity to lead to a .06% increase in TR employment *per capita*.

3. *Finance, Insurance and Real Estate (FIRE)*—Results for FIRE, shown in Figure 5.6, are similar to the results described in the previous two subsections.

The usual relationships between development variables and service employment are repeated; however, CDEM is stronger than CPOP, and CMAN is statistically significant paired with

FIGURE 5.6  
FIRE, INSURANCE AND REAL ESTATE (FIRE)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
X	-.896 (.089)	....	....	-3.486 (.547)	....	1.754 (.072)	.250 (.119)	.936
XI	.258 (.007)	....	.084 (.023)	....	....	1.656 (.086)	.368 (.153)	.905
XII	-.321 (.214)	.467 (.129)	....	....	....	1.702 (.086)	.520 (.126)	.904

CDEM, CRMA or CINC.\* CPROD did not assume statistical significance in any regression attempt.

Results of the FIRE regressions again support the hypothesis that service employment is dependent on economic development in general.

4. *Business and Repair Services (BR)*—Figure 5.7, which gives regressions for this category, includes some atypical results.

Coefficients of CINC, CRMA and CDEM seem to support the findings presented in preceding subsections: more economic development, better service employment experience.\*\* However, estimates for CPROD and CMAN seem to point to the opposite conclusion.† Part of the explanation for the apparent discrepancy

can be seen in the data. In contrast with other categories, some states which experienced below average growth in manufacturing employment per capita did quite well in growth of business and repair services. Examples are: New Jersey, Connecticut, New York, Maryland and Delaware.

Additional understanding can be gained by examining a listing of the industries included in this category.‡ A number of the industries are traditionally based in the New York City area and can be expected to experience much of their growth in this region. Examples are advertising; research and development laboratories; news syndicates; and management, consulting and public relations services. On the other hand, other industries in the general category can be

FIGURE 5.7  
BUSINESS AND REPAIR SERVICES (BR)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
XIII	.319 (.217)	....	.135 (.027)	....	-.382 (.123)	1.835 (.112)	-.632 (.178)	.912
XIV	-.265 (.330)	.609 (.167)	....	....	-.411 (.136)	1.887 (.123)	-.312 (.161)	.894
XV	.946 (.275)	....	....	-2.554 (.893)	-.345 (.141)	1.932 (.130)	-.375 (.194)	.884

\* The effect of multicollinearity may now be observed in the instability of the CMAN coefficient which ranges from .25 to .52, depending on which collinear variable it is paired with.

\*\* Population changes again prove to have a strong positive effect on service employment.

† That its coefficient can now take a negative sign provides verification that CMAN measures economic changes which differ from those measured by collinear variables CINC, CRMA, and CDEM. This affords some justification for the separate attention we have been giving variables when collinearity has been a problem.

‡ See SIC codes 73, 75 and 76 in Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual*, 1972, pp. 301-14.

FIGURE 5.8  
PROFESSIONAL SERVICES (PRO)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
XVI	1.408 (.036)	....	....	-1.330 (.268)	....	1.685 (.048)	....	.965
XVII	.817 (.112)	.266 (.063)	....	....	....	1.667 (.050)	....	.961
XVIII	1.155 (.040)	....	.039 (.009)	....	....	1.646 (.050)	....	.961
XIX	1.231 (.033)	....	....	....	....	1.652 (.054)	.197 (.066)	.955

expected to experience the highest growth rates in the most rapidly developing regions. Some examples might be: employment agencies, personnel supply services, and equipment rental and leasing services.

Finally, a negative relationship between productivity in manufacturing (or per capita employment in manufacturing) and many business services can be explained by state specialization trends. Many services that were once performed by manufacturing firms have been spun off to service firms as new manufacturing plants have been erected in developing states. Thus, smaller rises in productivity would be associated with greater rises in business service employment.

5. *Professional services (PRO)*—Results for this category are typical of those outlined for TCU, TR and FIRE. Best regressions are shown in Figure 5.8.

Once more there is confirmation of previous findings of positive economic development/service employment relationships. And the regression on the *per capita* form of the service variable change provides a significant coefficient for

the productivity variable and the expected positive sign:

Regression Number	Constant	CDEM	CPROD	R <sup>2</sup>
XX	1.097 (.073)	-1.356 (.212)	.126 (.041)	.569

6. *Personal Services (PER)*—The best regression for personal services in total is given in Figure 5.9.

The explanatory capability of regression XXI is considerably less than that found in other regressions incorporating total percentage change in service employment (and CPOP); its R<sup>2</sup> is only .676 compared to the .8 and .9 and higher values found in previous subsections.

Since the personal services category includes services in private households along with hotels and many other commercially provided services, we have investigated these categories separately and displayed them in Figure 5.10, but the results show little improvement. Regression XXII covers hotels and other personal services; regression XXIII is for household services.

FIGURE 5.9  
PERSONAL SERVICES (PER)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
XXI	.966 (.482)	-.532 (.229)	....	-2.860	....	1.166	....	.676

FIGURE 5.10  
PERSONAL SERVICES—HOTELS AND OTHER (XXII)  
AND HOUSEHOLDS (XXIII)

Regression Number	Constant	CINC	CRMA	CDEM	CPROD	CPOP	CMAN	R <sup>2</sup>
XXII	.016 (.093)	....	....	—1.639 (.684)	....	1.381 (.122)	....	.739
XXIII	— .820 (.215)	— .372 (.118)	— .083 (.025)	— 2.232 (.634)	....	.281 (.058)	.560 (.099)	.654

Regressions XXI and XXIII show negative coefficients for the CINC variable, and regression XXIII indicates an inverse relationship between percentage changes in private household employment and CRMA. These results apparently reflect the 20.1 percent decline that occurred in household employment, including employment of farm domestics, between 1950 and 1970.

On the other hand, the CDEM, CPOP and CMAN coefficients carried their usual signs.\* *Ceteris paribus*, the greater the percentage gain in population and manufacturing employment per capita and the smaller the gain in the dependency ratio, the greater is the percentage increase (or the lower the loss) in personal services employment.

#### Summary and Conclusions

This study has examined, through ordinary least-squares regression analysis, the relationship between employment increases in the service industries and development of the goods producing sector. The high R<sup>2</sup>'s indicate that the regressions will be useful in making future simu-

lations of the State economy. Estimates can be made of the service employment increases (or decreases) that can be expected, given various changes in population, per capita income, manufacturing employment, etc. The computed results will provide valuable inputs to the State's economic planning process.

Figure 5.11 summarizes some of the relationships that are particularly revealing.

All manufacturing coefficients are positive except for the BR (business and repair services) category which represented only 3.81% of total service employment in 1970. The magnitude of the coefficients indicate that a one percent increase in CMAN (manufacturing employment per capita) leads to an increase of approximately .3% in service employment. CPOP (population change) coefficients are *all* positive and their levels indicate that a one percent increase in population (which has also been positively related to economic development) leads to increases in service employment ranging from about .6% to about 1.9% for the various service categories.

FIGURE 5.11

Service	Regression	Coefficients		Percent of Total Employment in New Jersey (1970)
		CMAN	CPOP	
TCU	IV	.195	.708	7.32
TR	VIII	.145	.871	18.95
FIRE	XII	.520	1.702	5.93
BR	XV	— .375	1.932	3.81
PRO	XIV	.197	1.652	15.42
PER (Household)	XXIII	.281	.560	4.07

\* That the development variable coefficients do not always assume the same sign is again an indication that, despite their collinearity, they are not measuring the same economic phenomenon.

Our hypothesis was that increases in employment in the service industries are to a large degree dependent on the development of the goods producing sector. Our full results (only briefly summarized in Figure 5.4) strongly support the hypothesis for four service categories—TCU, TR, FIRE and PRO. And the remaining two categories—BR and PER—give evidence that their growth can be retarded (or their decline accelerated) if the economy does not expand generally.

These results indicate that any policy which stresses development of the services sector, to the neglect of the manufacturing sector, would probably fail. Employment gains must be achieved by developing both sectors simultaneously. For New Jersey, the implication is that it is unrealistic to expect the recent severe declines in manufacturing employment to be somehow offset by a corresponding growth in the service sector. Rather, the health of one sector is closely and directly related to that of the other sector.

# VI

## THE DISTRIBUTION OF AIR QUALITY IN NEW JERSEY\*

In 1970 Congress passed a series of amendments to the Clean Air Act which required the U.S. Environmental Protection Agency to identify all significant air pollutants and establish *national, uniform, ambient* air quality standards.\*\* Subsequently, the EPA determined primary and secondary standards for particulate matter, sulfur oxides, carbon monoxide, nitrogen dioxide, photochemical oxidants and hydrocarbons. Primary standards are designed to protect human health while more stringent secondary standards are intended to protect vegetation, materials and amenities.†

Although the standards apply nationally, the individual states are charged with the responsibility of attaining them. States are required to develop implementation plans (subject to federal approval) that insure the standards will be met. To this purpose, EPA regulations allocate broad authority to the states to impose emission requirements on specific pollution sources. Any subsequent failure of a state to comply

with the national standards will result in federal intervention.

Since the many factors which influence air quality vary considerably throughout the country, the existence of uniform federal air quality standards will impose differential burdens among the individual states‡ For a heavily industrialized, densely populated, geographically small state like New Jersey, on-going compliance with the federal standards will obviously imply considerably more effort (and expense) than that required, for example, by a rural state in the Southwest or Midwest.

Following the enactment of the Clean Air Amendments, a significant discussion has developed in New Jersey concerning the impact of New Jersey's air quality regulations on the State's economy. Attention has focused on the effect that the costs of the State's air quality control program may have on the competitive position of New Jersey industry vis-à-vis other areas of the country.¶ Moreover, these concerns

\* Prepared by Dr. Joseph J. Seneca, Chairman, Economic Policy Council.

\*\* Clean Air Amendments of 1970, Public Law 91-604.

† Standards are defined as physical concentrations of the individual pollutants in the atmosphere and are measured in terms of annual averages and/or hourly periods depending on the pollutant.

‡ For example, a partial list of such factors would include the degree and mix of industrial activity, the extent of urbanization, population density, transportation facilities, energy sources, weather, topography and regional economic patterns.

¶ See, e.g., "Rate of Spending on Pollution Abatement Equipment in 1973 by Industry in New Jersey in Comparison with Other Areas," Arnold Landy, Project Specialist, Office of State Economic Planning, Governor's Office, Trenton, New Jersey, June 1976 and "Glassmaking Costs in New Jersey and the Surrounding States," Donald M. Scarry, Economic Development Research Unit, Division of Planning and Research, Department of Labor and Industry, January 5, 1976. The general problem is whether, in order to achieve the national standards, the historically poor air quality conditions in industrial states will require higher costs on industry in those states compared to other less polluted areas of the country. This genuine concern may become less critical since recent Federal EPA regulations rule that even if air quality is *better* than the standards, it cannot be allowed to deteriorate *to* the standards. This will reduce any cost disadvantage the older industrial states may have in terms of air quality control costs.

about employment and economic growth have been exacerbated by the long-term movement of industry away from the Northeast in general, and the severe impact of the two recent recessions on New Jersey in particular. As a result, New Jersey has devoted considerable efforts to investigate the economic impact of its air quality controls and has sought modifications in requirements where legally possible and economically warranted.\*

However, the primary purpose of this study is to draw attention to the other and somewhat neglected portion of the air quality issue; namely, the extent and distribution of *air pollution damages* in New Jersey. Thus, complementary to the important questions just cited concerning the economic impact of the costs of air quality regulations, there is the sometimes overlooked dual issue of the physical and economic consequences of not ameliorating air pollution.

This question has several dimensions. One concerns the overall magnitude of the damage costs resulting from air pollution in New Jersey. Unfortunately, no definitive answer yet exists to this difficult problem.\*\* However, some recent, although admittedly rough estimates of air pollution damage costs suggest that they are substantial.

A second aspect of this issue, and the major concern of this study is the *distribution of air quality* in the State; i.e., who bears the burden of air quality deterioration? Does this burden fall primarily on the rich, on the poor, or is it randomly and equally distributed over the population? This is the question of equity or inci-

dence and it can be examined in two possible ways. First, the distribution of air quality can be measured in physical terms; e.g., exposure to atmospheric concentrations of pollutants by income class. Alternatively, the physical amounts of air pollutants can be translated into economic (i.e., dollar) damages and these damages distributed according to income class. Paradoxically, measuring incidence by each of these two methods may yield considerably different results. Thus, the poor may be exposed to higher concentrations of pollutants because of generally lower social mobility and constrained housing and work choices while relatively higher income groups may incur more economic damages due to air pollution (e.g., they pay higher commuting and housing costs to avoid pollution).

In the following section an attempt is made to estimate the distribution of air quality in New Jersey according to the physical concentrations of pollutants. Measuring incidence using this concept appears to be consistent with the basic Congressional intent of the Clean Air legislation; namely, "to protect the health of persons regardless of where such persons reside."† However, some measures of incidence based on estimates of economic damages from a recent national study are also reported.

### Air Quality and Income Distribution

The New Jersey Department of Environmental Protection regularly samples air quality conditions throughout the State. Pollution concentrations for a variety of pollutants are reported by the Department of Environmental Protection from air quality monitoring sites located in various cities and townships.‡ The most recent

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\* The Department of Environmental Protection has attempted to change existing federal regulations and obtain the cooperation of neighboring states whose air pollution activities directly affect air quality in New Jersey. This latter problem highlights the difficult position of any state in the federated structure. In this situation, New Jersey faces mandatory federal standards, but lacks direct authority to control pollution in other states although this pollution partly determines New Jersey air quality. Unfortunately, pollution does not observe political boundaries.

\*\* *Pollution control costs* are relatively easily measured (e.g., the additional investment and operating costs of pollution abatement equipment, the increase in auto prices due to emission control devices, etc.). The obviousness of these costs explains much of the concern about their impact on local economic conditions. The damage costs due to *uncontrolled pollution* are more elusive (e.g., health effects, crop damages, property losses, etc.). However, simply because these costs are more diffuse and do not usually appear on balance sheets does not imply that they are unimportant. Indeed, the existence of substantial pollution damage costs compared to the abatement costs necessary to avoid them is the economic basis for pollution control programs.

† 42 U.S.C. §§ 1857c-4, 1857c-5 (1970).

‡ *Air Quality in New Jersey, 1975*. Department of Environmental Protection.

FIGURE 6.1  
NORTHERN METROPOLITAN AREA COUNTIES

Variable	POLLUTANTS				
	Particulates <sup>a</sup>	Sulfur Dioxide <sup>b</sup>	Carbon Monoxide (1 hr.) <sup>c</sup>	Carbon Monoxide (8 hrs.) <sup>d</sup>	Smoke Shade <sup>e</sup>
1. % of Families <\$5,000 .....	.089	.100	.553	.043	.279
2. % \$5,000 to \$7,000 .....	.249	.214	.720	.293	.464
3. % \$7,000 to \$10,000 .....	.715	.103	.553	.413	.435
4. % \$10,000 to \$15,000 .....	.399	.156	-.531	-.016	-.224
5. % >\$15,000 .....	-.528	-.332	-.673	-.260	-.451
6. % >\$25,000 .....	-.591	-.504	-.641	-.319	-.438
7. Median Family Income .....	-.448	-.184	-.651	-.183	-.395
8. % White Population .....	.020	-.196	-.497	-.122	-.542
9. Number of Families .....	.256	.742	.476	.614	.850
10. Sample Mean .....	53.92	.0137	25.12	14.05	2.82
11. Standard Deviation .....	12.08	.0039	8.98	4.65	0.72
12. Number of Observations .....	25	8	8	8	8

a = Annual geometric mean; measured in micro-grams per cubic meter.

b = Annual average; measured in parts per million.

c = Maximum one hour average; measured in parts per million.

d = Maximum eight hour average; measured in parts per million.

e = Maximum twenty-four hour average; coefficient of haze per 1,000 lineal feet.

air quality readings (for calendar year 1975) can be matched with income distribution and population composition data.

The geographic area within the State of prime interest consists of the rim New Jersey counties which surround New York City (Bergen, Essex, Hudson, Middlesex, Monmouth and Union). These counties represent the relatively urbanized, heavily populated, industrial area of New Jersey. Air pollution levels generally tend to be higher in this region than elsewhere and the potential for violations of the federal ambient standards is therefore larger.\* The data base for the analysis consists of all those cities and towns in this six county area for which both air pollution and income distribution data could be obtained.\*\* Pollution readings for several

pollutants are correlated with the income variables and the zero-order correlation coefficients are reported in Figure 6.1. Thus, the correlations of Figure 6.1 are derived from *inter-city* variations between pollution levels and income characteristics.† The income distribution variables consist of the percentage of families by income class in each city (rows 1 through 6 in Figure 6.1). Median family income (row 7), the percentage of the population which is white (row 8) and a measure of city size (the total number of families, row 9) complete the demographic variables. Four air pollutants appear in the columns of Figure 6.1 (particulates, sulfur dioxide, two measures of carbon monoxide and smoke shade). The first three of these pollutants are subject to federal standards and the last, smoke shade, is the alert criterion for air stag-

\* This is a general statement for this relatively large region. Certainly, there are several other specific locations in the State, outside of this area, with particular air quality problems. See *Air Quality in New Jersey, 1975, op. cit.*

\*\* A list of these cities appears in the Appendix. The air quality in this general area has previously received considerable attention; see Y. Horie and A.C. Stern, *Analysis of Population Exposure in New York-New Jersey-Connecticut Tri-State Region*, Environmental Protection Agency, Office of Air Quality and Standards, March, 1976, and J.M. Zupan, *The Distribution of Air Quality in the New York Region*, Johns Hopkins Press, 1973. However, the EPA study does not examine the relation of air quality with income and there is only a very broad classification of income-exposure in the Zupan analysis and it is not confined to New Jersey.

† An important point is that no attempt is made here to establish a causal relation for differences in pollution levels. Rather, the objective is to determine whether variations in pollution across cities are associated with differences in income and income distribution (i.e., does pollution exposure vary with income?).

nation conditions. The average sample value, its standard deviation and the number of observations (i.e., cities) for each pollutant are listed in the final three rows (10 to 12) of Figure 6.1.

Before discussing the results for individual pollutants, the general conclusion for this group of counties is that air pollution is directly associated with low income characteristics. Although the statistical significance of this relation varies, its direction is consistent over the entire range of pollutants examined.

The first two pollutants in Figure 6.1, particulates and sulfur dioxide, are primarily generated by stationary combustion activities using fossil fuels (e.g., electric power generation and industrial processes). Particulates are any solid or liquid particles suspended in the atmosphere (ash, soot, dust, metals, *etc.*). Sulfur dioxide is a pungent gas released during the combustion of fossil fuels (e.g., coal, oil). Both pollutants are associated with aggravation of respiratory symptoms and diseases (asthma, bronchitis, emphysema, reduced lung function, *etc.*) and can lead to increased mortality. Particulates also cause soiling and deterioration of buildings and both pollutants interfere with plant growth. Sulfur dioxide when oxidized forms sulfur trioxide, which with rain forms sulfuric acid and leads to corrosion of materials, surfaces and vegetation damage.

The results in Figure 6.1 indicate that inter-city variations in both of these pollutants are closely associated with income. The correlation coefficients are positive up to the \$15,000 income class and then become negative. The pattern revealed is one of low income—high pollution exposure to high income—low pollution exposure. Thus, cities with low income characteristics (i.e., larger percentages of families in the lower income categories) have relatively higher levels of particulates and sulfur dioxide. Median family income is also inversely related to both

pollutants. However, the percentage of city population which is white (row 8) shows no relation to particulates (.020) but does have a weak, negative association with sulfur dioxide (−.196). Both pollutants are directly associated with city size (.256 and .742, respectively).

It should be noted that of the 25 cities in the particulate sample for 1975, only two exceeded the annual primary standard (Carteret and one of the two reporting monitoring sites in Jersey City).<sup>\*</sup> None of the eight cities in the sulfur dioxide sample exceeded either the annual primary or secondary standards (.03 parts per million and .02 parts per million, respectively). Nevertheless, though pollution levels (for both pollutants) were generally below the primary (health) standard, Figure 6.1 indicates that they were *relatively* higher in lower income cities.

The next two columns in Figure 6.1 report on two measures of carbon monoxide (maximum 1 and 8 hour levels). Carbon monoxide is an odorless gas generated by the incomplete combustion of carbon in fuels and other substances. In large quantities it is toxic while chronic exposure is associated with impairments to mental functions, fetal development and the aggravation of cardiovascular diseases. Nationally, almost all carbon monoxide emissions are due to mobile transportation sources, and particularly, the motor vehicle. Carbon monoxide, therefore, has a potentially different spatial distribution vis-à-vis income compared to the preceding stationary source oriented pollutants (particulates and sulfur dioxide). Nevertheless, the same low income-high exposure pattern emerges and in fact, in the case of the 1 hour carbon monoxide measure, the relation is the strongest observed for any of the pollutants. It is also noteworthy that the correlation coefficients change from positive to negative at the lower level of income of \$10,000 compared to the particulate and sulfur dioxide results. For the 1 hour carbon monoxide measure this change is rather marked, with all income categories be-

<sup>\*</sup> The primary standard is 75 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Carteret had a reading of 86.1 and Jersey City reported 81.4. Five cities exceeded the secondary standard of 60  $\mu\text{g}/\text{m}^3$  (in addition to Carteret and Jersey City; Bayonne, Hoboken and Perth Amboy). See, *Air Quality in New Jersey, op. cit.*

low \$10,000 having positive coefficients greater than .5, and then for all income groups above \$10,000, the coefficients are sharply negative. The results for the 8 hour measure follow the same pattern but at a considerably lower level of correlation. Median family income is negatively related to both carbon monoxide readings as is the percentage of white population. City population size continues to be directly associated with pollutant levels.

None of the eight cities in the carbon monoxide sample exceeded the 1 hour primary standard,\* but *all* of the eight exceeded the 8 hour primary standard.\*\*

The final pollutant examined, smoke shade, does not have a federal ambient standard. However, it is used as an indicator for air stagnation alerts and measures overall haze conditions in the atmosphere. The same direct relation with low income and inverse association with high income that was observed for the other pollutants also emerges for smoke shade. The percentage of white population is again negatively related to pollutant level while city size is positively correlated. Of the eight sample cities, four had maximum 24 hour averages in excess of the alert criterion (Elizabeth, Jersey City, Newark and Perth Amboy).

The conclusion from Figure 6.1 is that for this area of New Jersey and for all the pollutants examined here, air quality is regressively distributed. Cities with relatively high pollutant levels tend to have a greater percentage of population in the lower and lower-middle income groups. Although the sample sizes are relatively small and hence the degree of statistical significance of the individual coefficients varies considerably, the overall consistency of the direction of the relation is indisputable. No negative correlation coefficients are observed in any of the 15 cells of Figure 6.1 representing income

classes below \$10,000 (i.e., rows 1 to 3 for each of the five pollutants). On the other hand, all 10 cells for incomes above \$15,000 (i.e., rows 5 and 6) are negative. For the middle range of income (\$10,000 to \$15,000, row 4) the two stationary source pollutants (particulates and sulfur dioxide) have positive coefficients while carbon monoxide (both measures) and smoke shade have a negative relation.

The traditional link between race and income implies that the higher the white percentage in the city's population, the lower is the pollution level (four of the five coefficients in row 8 are negative). Finally, city size is directly associated with pollution levels for all pollutants (five positive coefficients in row 9).

Figure 6.2 reports correlation coefficients based on a sample of cities from all other New Jersey counties *outside* of the six county area covered by Figure 6.1. Matching air pollution and income data were obtained for 12 cities for particulates and for 11 cities for the remaining pollutants.† This sample generally represents the less industrialized and urban areas of the state.‡

There are several noteworthy differences and similarities between the two sets of results. First, average pollution levels tend to be somewhat lower in these counties. A comparison (of row 10) indicates that of the five pollution measures only the 8 hour carbon monoxide reading is higher in the Figure 6.2 sample relative to Figure 6.1.

Second, the same general income-pollution exposure pattern is observed for particulates and sulfur dioxide in both samples. In Figure 6.2, low income characteristics are again associated with relatively high levels of both of these pollutants. It should be noted, however, that none of the 12 cities exceeded either the primary or

\* Both the primary and secondary standards are set at 35 parts per million.

\*\* Bayonne measured exactly at 9 parts per million, the primary and secondary 8 hour standard. See, *Air Quality in New Jersey, op. cit.*

† See the Appendix for a list of Figure 6.2 cities.

‡ Once again such a generalization is somewhat imprecise since this sample includes several distinctly urban centers (e.g., Camden and Paterson). However, adding these to the Figure 6.1 sample and removing them from Figure 6.2 would not appreciably alter the general conclusions.

FIGURE 6.2  
ALL OTHER COUNTIES

Variable	POLLUTANTS				
	Particulates <sup>a</sup>	Sulfur Dioxide <sup>b</sup>	Carbon Monoxide (1 hr.) <sup>c</sup>	Carbon Monoxide (8 hrs.) <sup>d</sup>	Smoke Shade <sup>e</sup>
1. % of Families <\$5,000 .....	.149	.182	-.350	-.435	-.066
2. % \$5,000 to \$7,000 .....	.189	.202	-.438	-.433	-.086
3. % \$7,000 to \$10,000 .....	.278	.556	-.463	-.405	.049
4. % \$10,000 to \$15,000 .....	-.039	-.144	.221	.302	-.095
5. % >\$15,000 .....	-.243	-.445	.607	.612	.130
6. % >\$25,000 .....	-.210	-.484	.648	.591	.166
7. Median Family Income .....	-.229	-.264	.491	.550	.050
8. % White Population .....	-.308	-.230	.006	.084	.165
9. Number of Families .....	.261	.027	-.183	-.211	.489
10. Sample Mean .....	38.117	.0109	23.991	15.936	2.316
11. Standard Deviation .....	7.390	.0044	9.897	5.208	.665
12. Number of Observations .....	12	11	11	11	11

<sup>a</sup> = Annual geometric mean; measured in micro-grams per cubic meter.

<sup>b</sup> = Annual average; measured in parts per million.

<sup>c</sup> = Maximum one hour average; measured in parts per million.

<sup>d</sup> = Maximum eight hour average; measured in parts per million.

<sup>e</sup> = Maximum twenty-four hour average; coefficient of haze per 1,000 lineal feet.

secondary standard for particulates and none of the 11 cities violated the primary standard for sulfur dioxide (one city, Camden, did exceed the secondary standard). This suggests that the low income-high pollution exposure relation is a relative one; i.e., even the "high" pollution levels in this sample are all, at least, below the federal primary standard.

The carbon monoxide results reveal the most notable contrast between the two samples. In Figure 6.2, high income areas are *directly* associated with high carbon monoxide levels (all the signs of the correlation coefficients are reversed relative to the pattern in Figure 6.1). This is true for both of the carbon monoxide measures. It also indicates that for this sample of 11 cities, sulfur dioxide, and by inference particulates,\* are inversely related to carbon

monoxide levels.\*\* This implies that a different spatial distribution exists for stationary source pollutants vis-à-vis mobile source pollutants. Only one city (Morristown) violated the primary standard for 1 hour carbon monoxide levels. However, it should be noted that only one city (Phillipsburg) was *below* the 8 hour carbon monoxide primary standard. Moreover, it is also noteworthy that with this one exception, *all* of the cities (i.e., for both samples combined) exceeded the 8 hour carbon monoxide standard. This indicates that carbon monoxide is a significant pollution problem in New Jersey and justifies the innovative State inspection system for motor vehicle emission performance.†

The opposing results for carbon monoxide in Figures 6.1 and 6.2 suggest that a general improvement in carbon monoxide levels

\* Since both particulates and sulfur dioxide share the same general relationship with income distribution characteristics.

\*\* In this sample, the correlation coefficients between sulfur dioxide and carbon monoxide are *negative* (-.247 and -.130 for the 1 hour and 8 hour measures of carbon monoxide). This contrasts with *positive* correlations between these two pollutants for the northern metropolitan counties of Figure 6.1 (in that case, the same two coefficients were +.347 and +.135 and indicated a similar spatial distribution of both pollutants).

† There is evidence to suggest that the periodic emission inspection procedure is a more effective means to control auto pollutants than the imposition of higher (initial) emission performance standards on new model cars (a technique used in California where no inspection procedure exists). The New Jersey testing system is unique in the nation and is now a model for efforts by other states in this area.

throughout the State is likely to benefit a broad range of income groups. Thus, Figure 6.1 indicates that carbon monoxide reductions in the northern metropolitan counties may primarily benefit lower income groups (as will improvements in the other pollutants). Figure 6.2 shows, however, that for the remaining area of the State, upper income groups may benefit proportionately more from a decline in carbon monoxide levels. Moreover, since carbon monoxide is the one pollutant in New Jersey where consistent violations of the primary standard (8 hour) occur throughout the state, the overall benefits of carbon monoxide control would appear to be relatively substantial.

There are several final points of interest that emerge from Figure 6.2. In direct contrast to the results of Figure 6.1, no systematic relation appears to exist between smoke shade and income. The correlation coefficients are generally low throughout and change signs on two occasions. The racial composition variable (row 8) is negative for particulates\* and sulfur dioxide, but shows essentially no relation for carbon monoxide and is only weakly positive for smoke shade. City size (row 9) has a positive association with particulates, sulfur dioxide and smoke shade but the correlation coefficients for carbon monoxide are negative (again reflecting the exact opposite relation compared to Figure 6.1).

### Some Problems

Several difficulties, both statistical and conceptual, are present in the preceding analysis. First, the sample sizes, especially for sulfur dioxide, carbon monoxide and smoke shade are relatively small, and hence the results are sensitive to any given observation. For example, in the Figure 6.2 sample, Morristown simultaneously has the

highest median income and the lowest level of carbon monoxide and thus makes a major contribution to the inverse relation between carbon monoxide and income.\*\* Accordingly, the statistical significance of any single correlation coefficient is not to be regarded as especially convincing or important. Rather, the objective is to observe trends in the entire set of coefficients and what is somewhat remarkable is that these trends are quite discernible *in spite of* the small sample sizes.†

The second statistical problem concerns the matching of income data from 1970 (unfortunately, more recent income distribution data does not exist) with 1975 pollution levels. This will not, however, cause statistical problems unless there have been marked shifts in *relative* income distribution characteristics among cities since 1970.‡

On a conceptual level, it should also be recalled that the basis of the results in Figures 6.1 and 6.2 is *inter-city* variation in pollution readings. This carries with it an implicit assumption that a "glass dome" exists over each city and all the residents within the city are exposed to the same observed levels of air quality. Two points should be noted here. First, no account is taken of any *intra-city* variation in air quality which may exist.¶ A second problem is that the presence of substantial commuting activity (either into or out from) any city may imply an incidence pattern which is quite different from that immediately suggested by the results reported here. For example, a city with high pollution levels and a low income profile might be said to have a regressive distribution of air quality. However, this judgment would have to be modified if this city receives (each work day) a large and relatively high income com-

\* This negative relation for particulates ( $- .308$ ) contrasts with the result in Figure 6.1 ( $+ .020$ ).

\*\* However, even if Morristown is omitted from the sample, the same pattern remains, though with less statistical significance.

† Certainly larger samples and an analysis of air quality changes over time are needed before any definite conclusion can be reached.

‡ The emphasis here is on *relative* changes in income distribution. Across the board changes in income will not affect the correlation coefficients.

¶ This could be done if a sufficient number of pollution monitoring sites reported air quality readings within any given city. Such data does not exist for New Jersey cities. Sophisticated computer mapping techniques and air quality simulation models permit pollutant levels to be estimated for broad, but contiguous geographic areas. However, these methods (see, *Analysis of Population Exposure, op. cit.*) have not been combined with income data for New Jersey.

FIGURE 6.3  
TEN HIGHEST BENEFIT AREAS

Per Family Benefits			Per Family Net Benefits		
Rank	Area	Dollars Per Family	Rank	Area	Dollars Per Family
1	Jersey City SMSA . . . . .	2,547.29	1	Jersey City SMSA . . . . .	2,284.11
2	New York, NY SMSA . . . . .	1,169.94	2	New York, NY SMSA . . . . .	885.83
3	Erie SMSA . . . . .	1,040.37	3	Erie SMSA . . . . .	700.85
4	Newark SMSA . . . . .	864.41	4	Newark SMSA . . . . .	509.59
5	Paterson SMSA . . . . .	782.99	5	Detroit SMSA . . . . .	385.15
6	Detroit SMSA . . . . .	762.77	6	Paterson SMSA . . . . .	377.95
7	Chicago SMSA . . . . .	660.71	7	Chicago SMSA . . . . .	317.87
8	Cleveland SMSA . . . . .	652.12	8	Providence SMSA . . . . .	283.91
9	Providence SMSA . . . . .	631.39	9	Cleveland SMSA . . . . .	278.80
10	Gary SMSA . . . . .	622.94	10	Gary SMSA . . . . .	264.09

SOURCE: L.P. Gianessi, H.M. Peskin, and E. Wolff, "The Distributional Effects of the Uniform Air Pollution Policy in the United States," Discussion Paper D-5, Resources for the Future, March, 1977.

muting population (e.g., from suburban areas). These commuters would then be exposed to relatively poor air quality conditions during a substantial part of any given week. Such a situation would tend to make the distribution of air pollution exposure *less regressive* since the relatively higher income commuters will also experience benefits from air pollution reductions as well as the lower income city residents. Such complications are extremely difficult to deal with statistically without detailed information on the precise residences, destinations and income characteristics of the commuters vis-à-vis the city residents (some of whom in turn will be commuters). In the absence of such information, a hazardous guess is that the example just mentioned is likely to characterize a substantial portion of the New Jersey commuting population.\*

#### Economic Damages and Incidence

The problem of translating air pollution exposure into economic (i.e., dollar) damages is

a difficult one. There is a larger literature which attempts to quantify the effect of air quality on human health and property and then estimate the dollar damage cost of these effects.\*\* Unfortunately, there is no available estimate of the total damage costs of air pollution in New Jersey. However, a recent study of national air quality benefits and costs does suggest that (parts of) New Jersey will experience considerable gains if the federal air quality standards are uniformly achieved throughout the nation.† This study estimated air pollution damage costs (in dollars) by geographic area according to each area's industrial composition, pollutant emissions, geographic size and population.‡ The authors assume a fully implemented federal air quality policy which would alleviate all air pollution damages. Accordingly, their estimates of air pollution damages are simultaneously estimates of the benefits of air quality control. Figure 6.3 lists their estimates of the 10 highest (per family) benefit areas in the U.S. Of considerable interest is the fact that 3 of the top 5 areas are in New Jersey (in column 1, Jersey

\* Extreme caution is in order. For example, Figure 6.2 indicates for its sample that carbon monoxide is progressively distributed in terms of city residents. The presence of any substantial commuting may lessen or even reverse this result and is therefore an immediate counter example to that developed in the text. Interstate commuting patterns with New York City and Philadelphia are a further complication.

\*\* For a comprehensive review of this literature, see, V. K. Smith, *The Economic Consequences of Air Pollution* (Cambridge: Ballinger Publishing, 1976).

† L.P. Gianessi, H.M. Peskin, and E. Wolf, "The Distributional Effects of the Uniform Air Pollution Policy in the United States," Discussion Paper D-5, Resources for the Future, March, 1977.

‡ The geographic areas were standard statistical metropolitan areas (SMSAs) and county groups outside of SMSAs.

FIGURE 6.4  
BENEFITS, CONTROL COSTS, AND NET BENEFITS BY INCOME CLASS

		TOTAL (\$)									
		INCOME CLASS									
		3,000	3-3,999	4-5,999	6-7,999	8-9,999	10-11,999	12-14,999	15-19,999	20-24,999	25,000+
1.	Benefits .....	142.82	176.32	203.61	245.27	304.33	335.85	386.40	434.35	486.49	508.99
2.	Control Costs .....	145.04	204.91	248.66	305.51	355.81	399.38	453.32	520.00	597.68	760.64
3.	Net Benefits .....	- 2.22	- 28.59	- 45.05	- 60.24	- 51.48	- 63.53	- 66.92	- 85.65	-111.19	-127.51

		AS A PERCENT OF INCOME									
4.	Benefits .....	8.0	5.1	4.1	3.5	3.4	3.0	2.9	2.5	2.2	1.3
5.	Control Costs .....	8.2	6.0	5.1	4.4	3.9	3.6	3.4	3.0	2.7	1.8
6.	Net Benefits .....	- .2	- .9	-1.0	- .9	- .5	- .6	- .5	- .5	- .5	- .5

SOURCE: L.P. Gianessi, H.M. Peskin, and E. Wolff, "The Distributional Effects of the Uniform Air Pollution Policy in the United States," Discussion Paper D-5, Resources for the Future, March, 1977.

City, Newark and Paterson). After adjusting for pollution control costs (column 2) in order to compute *net* benefits, the New Jersey areas still rank in the highest 10 in the country. This estimate suggests that New Jersey stands to experience significant net benefits from air pollution control relative to other areas of the nation.\*

The authors also estimate the distribution of air quality benefits, control costs and net benefits by income class (i.e., they measure incidence in dollar rather than physical exposure terms). No estimate is available for New Jersey alone, but the national figures are given in Figure 6.4. Total benefits increase consistently by income class (row 1)\*\* as do total control costs (row 2). Net benefits (i.e., the difference, in row 3) however, are negative for all income categories.

When expressed in percentage terms (i.e., as a percent of the mid-point income by income class), benefits are progressively distributed (row 4),† control costs are regressively distributed (row 5) and the difference, net benefits (row 6) is proportional from approximately the \$8,000 income class.

All of these estimates are subject to substantial qualifications and assumptions and are not intended to be definitive.‡ They are presented here for two purposes; first, to provide one estimate of the dollar magnitudes of the national air quality control program and its relative geographic impact and second, to indicate an alternative measure of incidence compared to that developed in Figures 6.1 and 6.2 (i.e., one which is in dollar terms rather than exposure levels).

### Conclusion

The purpose of this paper has been to focus attention on the relatively neglected issue of the *distribution* of air pollution. This aspect of the air pollution problem contrasts with the considerable and legitimate concerns that have been expressed about air quality control costs and their impact on State economic conditions.

It is important to understand that New Jersey faces the mandatory federal requirements of the Clean Air Act which are applicable to all states. Moreover, air quality problems in New Jersey

\* Of course, the entire state is not represented by these SMSAs. Also, although significant *net* benefits are present, it is important to remember that pollution control costs fall directly on industry and individuals in the form of very visible cost and price increases while air quality improvement benefits (i.e., damages avoided) are less immediately apparent, but no less real.

\*\* As suggested previously, the middle and upper income groups have greater air pollution damages. They have more to lose in money terms and there are more individuals in these income classes than there are in the lowest groups.

† Alternatively, if air quality is not improved, these figures represent *damages* and they are regressively distributed.

‡ The ambitious nature of the study (i.e., a national estimate of benefits and costs by geographic area) makes these necessary. They are clearly spelled out by the authors, see, "The Distributional Effects of the Uniform Air Pollution Policy in the United States," *op. cit.*

stem from basic and historical conditions; namely, a large population, heavy industrialization and urbanization, small geographic size and a location in a general urban region. Nevertheless, New Jersey's air quality record in terms of the pollutants examined here is a good one. Only carbon monoxide levels (and specifically, the 8 hour maximum) consistently violate the federal primary standard although isolated problems exist for certain other pollutants as well.

Within this overall commendable performance, the existing air pollution in the State appears to be regressively distributed. Lower income groups are exposed to higher levels of air pollution. This seems particularly true for the urbanized northern counties of the State but this result also extends to the area outside of this region for particulates and sulfur dioxide (but not for carbon monoxide and smoke shade). Although there are several important complications, the results presented here indicate that improvements in air quality would tend to be distributed progressively.

A recent national study estimates that areas in New Jersey would experience significant net benefits in money terms (relative to other areas

in the country) from the achievement of the federal air quality standards. An economic measure of air quality incidence indicates that this would also result in a progressive distribution of benefits.

The New Jersey results presented in Figures 6.1 and 6.2 are intended only as a preliminary and tentative indication of the distribution of air quality in the State. More work is certainly necessary before any definitive conclusion can be reached. An examination of the distribution of changes in air quality over time and a larger sample of pollution reading sites are two areas which promise to contribute valuable additional information.

The basic point to be stressed is that the issues of air pollution damage and the distribution of air pollution are integral and equal parts of the air quality problem. The concept of incidence, as measured by pollutant exposure levels, is a major and motivating force behind the federal legislation. The intent of Congress "to protect the health of persons regardless of where such persons reside" clearly makes the distribution of air quality an important concern for public policy at all levels of government.

APPENDIX TO CHAPTER VI

Figure 6.1 Cities

<b>Particulates</b>	<b>Sulfur Dioxide, Carbon Monoxide and Smoke Shade</b>
Asbury Park	Asbury Park
Bayonne	Bayonne
Brielle	Elizabeth
Carteret	Freehold
East Orange	Hackensack
Fair Lawn	Jersey City
Fort Lee	Newark
Hackensack	Perth Amboy
Hoboken	
Irvington	
Jersey City	
Linden	
Metuchen	
Middlesex	
Newark	
Orange	
Perth Amboy	
Rahway	
Redbank	
Roselle	
Sayreville	
Secaucus	
South Amboy	
Upper Saddle River	
West Orange	

Figure 6.2 Cities

<b>Particulates</b>	<b>Sulfur Dioxide, Carbon Monoxide and Smoke Shade</b>
Atlantic City	Atlantic City
Burlington	Burlington
Collingswood	Camden
Dover	Morristown
Florham Park	Paterson
Hammonton	Paulsboro
Paterson	Penns Grove
Phillipsburg	Phillipsburg
Toms River	Somerville
Trenton	Toms River
Vineland	Trenton
Woodbury	

## VII

# REGIONAL ECONOMIC DEVELOPMENT: THE SUNBELT - SNOWBELT CONTROVERSY\*

Regional implications of national policies and priorities have been ignored for too long. Increased attention to the regional dimensions of federal policies is therefore a welcome change. It is natural that in the debate over comparative levels of development of the so-called Sunbelt and Snowbelt states some officials might overstate their case. A recent and widely publicized study by Jusenius and Ledebur\*\* (hereafter, JL) embarks in an exercise of debunking potential myths in this important area of national policy. Unfortunately, it is not clear exactly what the myths consist of. Surely, the relative decline of the Snowbelt states and the fast growth of the Sunbelt is not a myth. The purpose of this paper is to provide an evaluation of the JL study and an alternative interpretation of the evidence.†

The main conclusion of the JL report is that, "it may well be that the relative improvement of the Southern States is, in part, a cyclical phenomenon which may not be sustained through

the full recovery of the economy. *Policy decisions based on the assumption that the experience of 1970 through 1975 represents a new trend may be ill-considered and counter-productive in the longer run*"‡ (original italics).

There has been recent concern (at all levels of government) with developing more equitable social policies aimed at alleviating the severe dislocations between major regions of the United States. An evaluation of the facts is indispensable in the process of new policy formulation. The publication of the JL study in the *Congressional Record*,¶ without an independent analysis of its conclusions, contributes to the confusion in this important area of national policy. These comments in the *Annual Report* attempt to clarify the evidence on recent regional economic growth. We invite the attention of the New Jersey Congressional delegation to this important subject which is so inextricably linked to the healthy development of the State's economy.

\* Prepared by Dr. Adam Broner, Director, Office of Economic Policy.

\*\* C.L. Jusenius and L.C. Ledebur, "A Myth in the Making: The Southern Economic Challenge and Northern Economic Decline", Office of Economic Research, Economic Development Administration, U.S. Department of Commerce, November 1976.

† In the reviewed study the two "superregions" are called: "The Northern Industrial Tier" and the Sunbelt-South". Our analysis comprises the same states that are included in the cited study. They are: Illinois, Indiana, Michigan, Ohio, Wisconsin, Connecticut, Massachusetts, Rhode Island, New Jersey, New York, Pennsylvania, (Snowbelt) . Arkansas, Louisiana, Oklahoma, Texas, Alabama, Kentucky, Mississippi, Tennessee, Georgia, Florida, North Carolina, South Carolina, Virginia, West Virginia, (Sunbelt).

‡ Jusenius and Ledebur, *op. cit.*, p. 34.

¶ *Congressional Record*, Senate, January 25, 1977, pp. 1421-1431.

**FIGURE 7.1**  
**NET MIGRATION BY REGIONS (1955-1975)**  
**(PERCENTAGE CHANGE OF BASE YEAR POPULATION)**

	1955-60*	1965-70**	1970-75†
New England .....	-0.6	0.0	-0.5
Middle Atlantic .....	-1.6	-2.0	-2.0
East North Central .....	-1.2	-0.8	-1.9
South Atlantic .....	+2.0	+2.6	+7.3
East South Central .....	-2.8	-1.3	+1.6
West South Central .....	-1.1	+0.5	+2.9
Mountain .....	+4.1	+1.1	+9.8
Pacific .....	+5.7	+2.5	+2.5

**SOURCES:**

\* United States Census of Population 1960, *Lifetime and Recent Migration* (U.S. Department of Commerce, Bureau of the Census) p. 16.

\*\* 1970 Census of Population, *Lifetime and Recent Migration* (U.S. Department of Commerce, Bureau of the Census) p. 54.

† "A Myth in the Making . . .", *op. cit.* p. 3, except migration rates for the Mountain and Pacific regions which are from *Estimates of the Population of States with Components of Change: 1970 to 1975* (U.S. Department of Commerce, Bureau of Census) Series P-25, #640, p. 20.

**Population**

During the years 1970-1975, population increased in the Sunbelt states by 8.9% (7% excluding Florida), and by 1.0% in the Snowbelt region. At the same time the North experienced a net out-migration of 1.8% of its 1970 population while the South gained 4.6% of population through net in-migration. The JL study doubts whether this disparity is the beginning of a new long-term trend of population increase.\* However, an examination of regional migration patterns over a longer period of time is appropriate (See Figure 7.1).

The data for two decades leave little doubt that the North experienced net out-migration for a long period of time. Clearly, the 1970-75 population movements are not isolated, temporary phenomenon.

Even in the South we can detect changes in patterns of migration prior to 1970-75. First, the South Atlantic region experienced net in-migration during the entire 20-year period (although this is mainly attributable to Florida). Secondly, we see a diminishing rate of net out-migration in the other Southern states, and this

turns into a positive migration balance in the West South Central region by the late 1960's. By the mid 1970's a positive migration balance occurs for all Southern regions. The main beneficiaries of the net out-migration from the North in the 1950's and 1960's were the Western States (Mountain and Pacific regions). More recently, however, the South has shared in this gain.

The long-term Northern out-migration trend accelerated during the 1970's and it is the cumulative effects of this 20-year process which have now become so alarming. These effects are associated with pure economic losses—abandonment of houses, industrial and commercial facilities, railroads, *etc.* This is a real issue, not a myth.

However, aggregate migration data do not tell the entire story. They hide important information on the characteristics of the migrants. Therefore, it is necessary to look at the age, educational attainment, and income distribution of the population movements. It is well documented that the North received a significant share of the rural-poor, black out-migrants of the South.\*\* During the 1950-70 period, the

\* "At this point the evidence is inconclusive regarding the degree to which the in-migration into the Southern States is a new, long-term trend or is a short-term response to the recent cyclical downturn in the industrialized North." "A Myth in the Making . . .", *op. cit.*, p. 3.

\*\* 1970 Census of Population, *Lifetime and Recent Migration*, Table 9, p. 54.

Following the objective of measuring comparative regional well-being, we applied JL's cost of living coefficients to state incomes in both regions. The result of these calculations are shown in Column 5 of Figure 7.2. By this measure the difference between per capita income in the North and the South is reduced to 5% ( $100 - \frac{4393}{4590} \times 100 = 5\%$ ). In other words, on the average, real disposable per capita income in the North is only 5% higher than in the South. Considering possible errors of measurement, the percentage difference in adjusted disposable income is small indeed.

We should also mention that out of the 5% difference, approximately 1.7% is due to lower labor force participation rates in the South. In other words, in 1975 out of every 100 persons residing in the South, 42.37 persons (42.69 without Florida) were working or looking for a job. In the North, 44.11 of every 100 were in the labor force. Moreover, the percentage of unemployed was higher in the North than in the South. It was 4.6% in 1970-74 in the South, compared to 5.6% in the North. This difference became even larger in 1975. Also relevant is the fact that the South is importing labor from other regions. Thus, lower rates of participation in the labor force in the South are caused by demographic and other factors rather than lack of available jobs.

In light of these results derived from data provided in the JL study, it is difficult to agree with the conclusion that: "Adjusting per capita disposable income figures for cost-of-living does not change the picture significantly."\*

As we have seen, cost-of-living reduces the per capita disposable income gap by 11% ( $100 - \frac{105}{118} \times 100 = 11.01\%$ ). This is a signifi-

\* *op. cit.*, p. 6.

\*\* It should be noted that this comparison does not account for differentials in per capita State and local taxes which are higher in the North. In fiscal year 1975, they ranged from \$1,025 in New York to \$405 in Arkansas. See: *Monthly Tax Features*, Tax Foundation, Volume 21, #1, January 1977.

† The average earning per person can vary due to differences in the industry mix. We have checked for this possibility and found no impact of this factor. Somewhat lower shares of manufacturing employment in the South are compensated by higher shares of mining and construction employment—the two sectors with highest earnings. Services and other sectors are roughly the same.

cant reduction. Moreover, for the purpose of measuring comparative regional well-being, real disposable per capita income should be compared, and in this case, the North's average advantage is 5%.\*\*

What is the economic meaning of this analysis? Abstracting from the contribution of the federal sector, the average income recipient in the South is paid over 16% less than in the North† ( $100 - \frac{100}{(121-1.7)} \times 100 = 16.2\%$ ). The main part of this difference (11.0%) is due to cost of living differentials. The remaining 5% can be attributed to other factors, among them the presence of right-to-work laws, lower rates of unionization, and lower levels of education.

The question then arises whether the federal government should redistribute income between regions so that per capita disposable income will equalize.

It is clear that from a standpoint of comparative well-being the federal government should not redistribute income in relation to nominal per capita income differentials. Thus, the only income gap which might be considered in a policy of income redistribution is the five percentage differential due to such factors as right-to-work laws and lower unionization rates which are assumed here to cause that differential. It can be argued that such income redistribution should not be made if it aggravates the North's economic decline.

The private sector takes advantage of cost of living differentials and offers lower wages in the South. In addition, other cost elements are also cheaper in the South thus creating a strong incentive to locate industries in that region. Population movements are to a large extent responsive to these more favorable economic conditions.

On the other side of the coin are the inflated expenses in the North due to these unfavorable market conditions. Out-migration of population harms business and erodes the tax base. Other disadvantages related to the climate, congestion and high level of urbanization add to environmental expenditures, land costs and state and local taxes. The North is burdened with higher spending on welfare programs which result from joint cost arrangements in federal policies.

Relatively higher per capita spending by federal agencies in the South increases the advan-

tages of that region over the North (for example, by expanding the tax base) and ultimately contributes to the decline of the North.

### Income Distribution and Poverty

The JL study correctly states that "a region whose population has a higher per capita income but a more unequal income distribution might be suffering greater economic distress than a region with a lower per capita income but a more equal income distribution."\* A commonly used measure of inequality in the income dis-

FIGURE 7.3  
CHANGE OF GINI COEFFICIENTS FOR SELECTED STATES  
(1949 - 1969)

	Gini Coefficient		1969
	1949	1969	1949
Illinois .....	.375	.342	.912
Indiana .....	.365	.322	.882
Michigan .....	.351	.329	.937
Ohio .....	.360	.331	.920
Wisconsin .....	.362	.326	.901
Connecticut .....	.365	.336	.921
Massachusetts .....	.356	.334	.938
Rhode Island .....	.367	.341	.929
New Jersey .....	.360	.341	.947
New York .....	.389	.369	.949
Pennsylvania .....	.363	.334	.920
Total North .....			.927
Arkansas .....	.491	.404	.823
Louisiana .....	.460	.403	.876
Oklahoma .....	.443	.387	.874
Texas .....	.445	.380	.854
Alabama .....	.475	.393	.827
Kentucky .....	.454	.392	.864
Mississippi .....	.526	.427	.812
Tennessee .....	.459	.390	.850
Georgia .....	.474	.381	.804
Florida .....	.453	.398	.879
North Carolina .....	.445	.372	.836
South Carolina .....	.467	.375	.803
Virginia .....	.427	.379	.888
West Virginia .....	.395	.371	.939
Total South .....			.852

SOURCES: For 1949: A. Al-Samarrie and H.P. Miller, "State Differentials in Income Concentration", *American Economic Review*, Volume 57.  
For 1969: *Census of Population*

NOTE: Totals for the North and the South are weighted averages, where the weights are population in 1970.

\* *op. cit.*, p. 11.

tribution is the Gini Coefficient. The Gini Coefficient varies between zero (complete equality of income distribution) and 1.0 (complete inequality).<sup>\*</sup> According to the JL study in 1969, the coefficients were .386 in the North and .404 in the South, indicating a somewhat more unequal income distribution in the South (See Figure 7.3). However, this is not a significant difference. More importantly, over the 20-year period (1949-1969) the weighted average Gini Coefficient declined in the North by 7.3% and in the South by 14.8%; i.e., double the rate of decline in the North.

We also disagree with the unqualified conclusion about relative economic distress based on comparisons of percentages of population in

the low income brackets. The authors say that 20.1% of all families in the North received less than \$6,000 in 1969, while in the South there were 36.2% such families. As previously noted, without adjusting for cost of living differentials, such statements are misleading as measures of comparative well-being of these families.

The JL study also disputes "the view that the post-World War II migration of the Southern poor to the North resulted in a concentration of poverty in the North."<sup>\*\*\*</sup> In support, it cites statistics that in 1970, 31.1% of the poverty population resided in the Northern Industrial Tier, but 43.7% was located in the Sunbelt-South.<sup>†</sup> Again, it should be recognized that these numbers are not adjusted for cost of living

FIGURE 7.4  
ANNUAL COSTS OF A LOWER BUDGET FOR A FOUR-PERSON  
FAMILY—AUTUMN 1975 (SELECTED URBAN AREAS)

	Total Budget
Urban United States . . . . .	\$9,588
Metropolitan Areas . . . . .	9,720
Nonmetropolitan Areas . . . . .	9,002
Northeast:	
Boston, Mass. . . . .	10,500
Buffalo, N.Y. . . . .	9,733
Hartford, Conn. . . . .	10,117
New York - Northeastern N.J. . . . .	10,266
Pittsburgh, Pa. . . . .	9,205
Cleveland, Ohio . . . . .	9,489
Dayton, Ohio . . . . .	8,971
Nonmetropolitan Areas . . . . .	9,187
South:	
Atlanta, Ga. . . . .	8,924
Austin, Texas . . . . .	8,412
Baton Rouge, La. . . . .	8,588
Durham, N.C. . . . .	9,267
Nashville, Tenn. . . . .	8,697
Nonmetropolitan Areas . . . . .	8,551

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, *News*, May 5, 1976.

<sup>\*</sup> See George Nagle, "Is the Distribution of Family Income Becoming More Equitable?", *Economic Indicators*, Department of Labor & Industry, #120, August 1973, pp. 11-14.

<sup>\*\*</sup> A Myth in the Making . . ., *op. cit.*, p. 11.

<sup>†</sup> *ibid.*

FIGURE 7.5  
POVERTY POPULATION IN SELECTED STATES, 1959 AND 1969

	Poverty Population		Poverty Population As A Percent Of Total Population		Ratio of 1969 to 1959 Poverty Levels	
	1959	1969	1959	1969	Population (Col. 2 ÷ 1)	Percentage (Col. 4 ÷ 3)
	(1)	(2)	(3)	(4)	(5)	(6)
Illinois .....	1,445,974	1,112,145	14.7	10.2	0.769	0.694
Indiana .....	797,059	493,379	17.5	9.7	0.619	0.554
Michigan .....	1,215,762	819,438	15.9	9.4	0.674	0.591
Ohio .....	1,508,475	1,041,348	15.9	10.0	0.691	0.629
Wisconsin .....	607,003	420,581	15.7	9.8	0.693	0.624
Connecticut .....	236,220	212,185	9.6	7.2	0.899	0.750
Massachusetts .....	608,386	473,200	12.2	8.6	0.788	0.705
Rhode Island .....	135,098	99,997	16.5	11.0	0.741	0.667
New Jersey .....	672,706	573,674	11.3	8.1	0.853	0.717
New York .....	2,319,301	1,985,954	14.2	11.1	0.857	0.782
Pennsylvania .....	1,880,529	1,227,794	17.0	10.6	0.653	0.624
Total North .....	11,426,513	8,459,695	14.5	9.71	0.741	0.670
Arkansas .....	843,175	522,969	47.5	27.8	0.621	0.585
Louisiana .....	1,273,813	932,671	39.5	26.3	0.733	0.666
Oklahoma .....	679,517	464,931	29.9	18.8	0.685	0.629
Texas .....	2,970,280	2,046,593	31.7	18.8	0.689	0.593
Alabama .....	1,373,985	857,248	42.5	25.4	0.624	0.598
Kentucky .....	1,137,202	718,313	38.3	22.9	0.632	0.598
Mississippi .....	1,172,919	766,605	54.5	35.4	0.654	0.650
Tennessee .....	1,373,982	836,405	39.3	21.8	0.609	0.555
Georgia .....	1,505,478	924,262	39.0	20.7	0.614	0.531
Florida .....	1,370,737	1,088,225	28.4	16.4	0.794	0.578
North Carolina .....	1,796,019	996,309	40.6	20.3	0.555	0.500
South Carolina .....	1,049,253	594,938	45.4	23.9	0.567	0.527
Virginia .....	1,163,954	690,615	30.6	15.5	0.594	0.507
West Virginia .....	636,794	380,113	34.6	22.2	0.597	0.642
Total South .....	18,347,108	11,820,197	36.1	20.6	0.645	0.571
Total U.S. ....	38,684,545	27,124,985	21.5	13.4	0.702	0.621

SOURCE: Poverty Status in 1959 and 1969 of Persons and Families for States, SMSA's, Central Cities, and Counties, 1960-70. Supplemental Report, 1970 Census of Population, PC(S1)-105, December 1975.

differentials.\* If such adjustments were made, the difference would narrow considerably by reducing the income threshold in the South or increasing it in the North. Some examples of cost of living differentials are provided in Figure 7.4. Both metropolitan and nonmetropolitan areas in the North have higher family budgets than in the South; i.e., higher costs of living. Secondly, it is not correct to make inferences from data based on one year about changes that took place over a quarter of a century.

In order to gain some insight into these past developments, we compare progress made in reducing poverty in both regions during the decade 1960-1970. Figure 7.5 presents statistics of poverty population in 1959 and 1969 and the improvements achieved during that period.\*\* Two measures of improvement are used: (1) the reduction of poverty population; (2) the decline of the percentages of poverty population between 1959 and 1969. In either case, it is clear that the improvement was far greater in the South than in the North. Poverty population declined in the North by 26% (1.00 - 0.741), and in the South by over 35% (1.00 - 0.645). Similarly, the decline of percentages of poverty population in the South is considerably greater (1.00 - 0.571 = .429) than in the North (1.00 - 0.67 = 0.33). Taking total poverty population in the U.S., its 1959 regional location was 47.43% (18,347,108/38,684,545) in the South and 29.54% (11,426,513/38,684,545) in the North. However, in 1969 the North increased its share of total poverty population to 31.19% while the South reduced its share from 47.43% in 1959 to 43.58% in 1969. Hence, the direction of movement is quite clear. In terms of absolute magnitudes, the North had in 1969 roughly 8.5 million people classified at the poverty level, while the South had 11.8 million. Allowing for noncomparability of these magnitudes due to cost of living differentials one cannot say that

poverty is concentrated only in the South. A more objective statement would be that poverty is almost equally divided between the South and the North and more importantly, the share of the North is rising.

### Personal Wealth

The distribution of wealth holders is not a critical variable in the analysis of relative well-being of the population in the South and North. However, the JL study states that 48.5% of total wealth holders with assets valued in excess of \$60,000 resided in the North and controlled 45.0% of personal wealth in this asset category in the nation. The comparative figures for the South are 22.6% and 25.1%, respectively. The impression one gets is that the North is twice as wealthy as the South.

Most importantly, however, is the location of the real assets themselves rather than the residence of the wealth holders. But even if one disagrees with this distinction, the above comparisons are still misleading. It is only meaningful to examine the distribution of wealth vis-à-vis the distribution of population. The share of total U.S. population residing in 1970 in the Northern Industrial Tier was 42.9% and they controlled 45% of personal wealth. The South's share in total U.S. population in 1970 was 28.4% and the share of wealth—25.1%. Although there is some inequality, it is considerably less than that implied by the simple distribution of wealth data alone.

### Unemployment and Employment

The JL study states that "even though the South has had relatively low unemployment rates and the Northeast, relatively high rates, this differential does not imply necessarily that the Sunbelt-South has been shifting its unemployment burden to the Northern Industrial

\* "Poverty thresholds are computed on a national basis only. No attempt has been made to adjust these thresholds for regional, State, or other local variations in the cost of living (except for the farm/non-farm differential described above)." See *Low Income Population*, 1970 Census of Population, U.S. Department of Commerce, PC(2)-9A, p. IX.

\*\* The statistics are not adjusted for regional cost of living differentials and thus overstate the true difference. Poverty population in 1959 and 1969 is compared with 1960 and 1970 total population, respectively. This allows a comparison with census data and is preferable to annual population estimates because of smaller errors.

FIGURE 7.6  
TOTAL NONAGRICULTURAL AND MANUFACTURING  
EMPLOYMENT 1967-1975 (Thousands)

	Total Nonagricultural		Manufacturing	
	1967	1975	1967	1975
Illinois .....	4,191.9	4,424.9	1,392.5	1,220.1
Indiana .....	1,777.0	1,930.4	716.0	644.1
Michigan .....	2,903.8	3,127.0	1,138.5	979.7
Ohio .....	3,619.8	4,009.5	1,398.8	1,258.0
Wisconsin .....	1,430.5	1,669.9	508.7	503.1
Connecticut .....	1,130.1	1,220.4	479.5	389.4
Massachusetts .....	2,162.2	2,324.7	699.7	593.8
Rhode Island .....	338.3	343.0	127.4	109.1
New Jersey .....	2,420.9	2,667.9	881.9	735.9
New York .....	6,858.3	6,791.1	1,885.7	1,407.1
Pennsylvania .....	4,167.2	4,415.9	1,556.9	1,335.8
Total Region .....	31,000	32,925	10,786	9,176
$\frac{1975}{1967}$ (Index)		106.2		85.1
Arkansas .....	497.9	620.0	152.2	175.6
Louisiana .....	1,005.0	1,199.4	173.1	182.4
Oklahoma .....	706.3	887.4	116.4	149.5
Texas .....	3,251.7	4,413.1	664.3	800.2
Alabama .....	951.8	1,149.8	298.2	319.8
Kentucky .....	835.1	1,041.7	230.6	254.2
Mississippi .....	531.9	667.3	167.0	198.0
Tennessee .....	1,218.8	1,497.3	435.7	454.1
Georgia .....	1,394.7	1,724.8	437.8	433.2
Florida .....	1,816.4	2,729.5	292.8	327.7
North Carolina .....	1,600.9	1,996.3	663.5	736.5
South Carolina .....	754.4	977.8	319.6	336.4
Virginia .....	1,330.2	1,755.0	346.0	366.3
West Virginia .....	503.6	561.1	133.2	119.5
Total Region .....	16,399	21,220	4,430	4,853
$\frac{1975}{1967}$ (Index)		129.4		109.5

SOURCE: *Employment and Earnings, States and Areas, 1939-1975*, U.S. Department of Labor, 1977.

Tier.”\* This is really not the issue. The problem resides in the economic implications of a prolonged process of losses of job opportunities in the North, especially in the manufacturing sector. The essential problem is not that the South is developing faster than the North; rather, the economic distress of the North stems from the fact that not only is this region growing

at a slower pace, but in many instances employment is declining *absolutely*—particularly manufacturing employment (see Figure 7.6). Factories are being closed; workers laid off; house stocks devalued, deteriorated, and abandoned; and the tax burden on the remaining industries and population is increasing even more than expenditures for social programs. At the same

\* *Op. cit.*, p. 18.

time, the South is using its comparative cost advantages *and* is being assisted in this by the federal government.

An interesting insight regarding federal government employment in the two superregions is provided in the JL report. In 1975, the North's share of total federal employment was 29% and declining, while the South's share was also 29% and growing. This is despite the fact that in the same year the share of population residing in the North was 41.3% and in the South, 29.4%. If the federal government would have followed a scheme of roughly equal distribution of federal employment, the North would have had approximately 340,000 more federal jobs.\* True, this would have come mainly from a redistribution from states other than those included in the Southern group.

The JL study incorrectly confines the problem of contrasting employment experiences to recent migration of firms from the North to the South. It makes the following statement: "Throughout much of the U.S. history, economic investment, jobs, and population have been shifting from the Northeast to the West and the South."\*\* It then states that "the problem with this point of view is that it does not coincide with the evidence."† To prove this point, the report cites evidence which shows that the migration of firms over the past few years did not cause the employment changes between 1970 and 1974. But it is questionable whether a long historical tendency can be disproved with data relevant *only* to three or four recent years. Moreover, data on actual migration of firms would not be convincing even if a longer period was covered since the shift in economic investment and jobs could have occurred even if no firm *moved* from the North to the South. All that is needed is that a larger number of new firms were established in the South, or even that existing firms expanded in the South more than in the North.

\* Calculations based on Table 7, Table A-3 and Table A-4 of the cited report: "A Myth . . .", and U.S. population in 1975.

\*\* *Ibid.*, p. 24.

† *Loc. Cit.*

‡ See Chapter V of this report.

Finally, the report turns to identifying those industries in which the North has a better chance of expanding its employment. It points to the traditional specialization of Northern states in services, finance, insurance, and real estate. However, it is quite possible that these services will develop in those states where population and business is moving. Secondly, the industries in which the North has traditionally specialized are those which are now being more evenly located throughout the nation.‡

Most importantly, the North is losing manufacturing and related jobs. This is a direct result of industrial development in the South. A secondary effect is the out-migration of population, especially the more employable young and well educated. This in turn reduces demand for some of the services (which are supposed to be the area of comparative advantage in the North). A process of decline cannot be stopped at a particular sector. The same is true of the process of development in the South, which cannot be confined to manufacturing. Either the North in cooperation with the South and national policy will be able to stem the overall decline and revitalize its economy, or the process of decline will continue up to a point where the advantages of the South will be reversed.

## Summary and Conclusions

Despite the limitations imposed on regional studies due to a dearth of State data, the original JL study and the expansion provided in these comments allowed us to arrive at the following findings:

1. For a long period of time the industrial states of the North experienced a net out-migration of population. The beneficiaries of this population outflow were initially Western states and, more recently, the South. More importantly, the poor and black who out-migrated from the South often settled in the North, while

outmigrants from the North were, to a large extent, the skilled and more educated.

2. Comparisons of nominal per capita incomes by states are misleading in the light of significant cost of living differentials. Although data do not exist for various states, approximations of such differentials were provided in the JL study. After adjusting nominal per capita income for cost of living differences and federal taxes, the inference can be drawn that, despite some intra-regional variations, real per capita incomes in the South are not significantly lower than in the North. On the average, 1975 disposable per capita income adjusted for cost of living differences was about 3-5% lower in the South than in the North. A further reduction of per capita personal income differentials between the South and the North would follow if State and local taxes are also excluded from nominal income. Even without the latter reduction, this difference can be expected to disappear within a matter of several years in the light of continued higher rates of growth in the South.

3. As a result of migration and consistent higher unemployment in the North, the size of population considered below the poverty level residing in the South and North is rapidly approaching parity.

4. Incomes derived from various federal grants and location of military and civilian facilities and procurements significantly aided the economies of Southern states.

5. Considering the effects of market forces and federal policies on the economies of the old industrial states, it seems economically prudent to adjust federal assistance, expenditure and procurement policies with the objective to alleviate the hardships of those states which are in severe economic distress. Such a turn in federal economic policy should benefit the entire nation.

6. Studies of comparative economic conditions in various states and regions should be continued in order to arrive at objective and full measures. There is need for federal assistance both in terms of providing more timely State data and in encouraging a well-documented and professional discussion of regional economic policies.

# VIII

## A PROCESS OF ECONOMIC PLANNING FOR NEW JERSEY\*

The Office of State Economic Planning has recently completed its first year of operation and this opportunity to briefly review our progress and plans is welcome. In last year's *9th Annual Report* of the Economic Policy Council, a chapter entitled "Economic Planning in New Jersey" provided some background information concerning the history of planning in New Jersey and a description of the current effort to develop a comprehensive process of planning in the State.

This process is to have as its "bottom line," the ability to recommend to decision makers, policy alternatives to provide better management of the State's critical resources and a positive effect on the serious economic problems confronting New Jersey. The need for a system of long-range economic planning which had been identified a year ago has become even more apparent as we have progressed with the implementation of our program.

Initially, staff members of the Office of State Economic Planning spent considerable time and effort in the design of a management system which would most effectively deal with the extremely broad and challenging work objectives that had been established for inclusion in the proposed planning process. The agreed-upon approach involves the following general princi-

ples: establishing goals, knowing present performance, determining reasons for unsatisfactory results, developing improvement strategies and implementing and evaluating corrective programs. During the developmental phase, particular emphasis also was placed on the need for the system to be comprehensive in scope, integrated with other planning activities and ongoing as opposed to a series of ad hoc studies. In addition, the programming of staff member work assignments was included in the methodology to insure complete compatibility with the overall process direction and intelligent utilization of office personnel resources.

Specifically, the process outline calls first for the establishment of a set of performance criteria that will form the basis for establishing specific economic goals for the State. The criteria serve also as a means of assessing how well the components of our State's economy are contributing to the achievement of those goals and the effectiveness of various policy recommendations. It was agreed that employment and income including their levels and distribution were appropriate as initial selections of performance criteria.

Of course, the task of planning for the future requires an understanding of the past and necessitates the establishment and maintenance of a

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\* Prepared by Raymond S. Petterson, Director, Office of State Economic Planning.

suitable base of data to permit detailed examination of the manner in which each sector and its subdivisions contribute to State goals. This phase of the selected management approach is being implemented through in-depth economic research and analytical activities. This technical work requires that a thorough understanding be developed concerning where our economy has been, where it is at present and where it is likely to go. The technical examinations are conducted on an industry-by-industry basis and frequently at low levels of aggregation in order to discern those factors that drive New Jersey's economy and the vital linkages that exist between sectors. An example of this type of analysis is represented by "New Jersey's Rubber and Miscellaneous Plastics Products Industries: An Examination," a study conducted by Mr. William Carmichael of this office that is included as a separate chapter in this *10th Annual Report*.

Limited resources in terms of money and manpower dictate that efforts to identify key factors must be energetic and innovative. In this connection, as we study the industrial sectors, we are also analyzing critical resource factors that affect our total economy to determine where they might have the greatest impact in New Jersey. "An Examination of Labor Costs in New Jersey's Manufacturing Industries" prepared by Dr. Ira Kay and "Relative Pollution Abatement Expenditures by Manufacturing Industries" completed by Mr. Arnold Landy, both of which are included in this report, represent efforts by personnel of this office of this type of technical work.

Once the key factors that are affecting the State's economic performance have been identified, the work to develop and test corrective policies and programs begins. It is here that the policy analyst must utilize his expertise and judgment in the most effective manner possible to insure that sensible recommendations will be

forthcoming. In this connection, a Statewide econometric model has been acquired to assist at this point in our planning operation. While the model will provide considerable useful economic information and a forecasting capability, its main service will be as another tool to assist the economist in his work to prepare economic policy alternatives for the decision maker.

Another major avenue of involvement by this office in bringing about a comprehensive process of economic planning is that of attempting to bring coordination to the many planning activities currently being performed in various State agencies. Efforts to achieve an integrated planning effort are being directed to such areas as off-shore drilling, land use planning and one-stop permit handling and a coordinated approach to the various planning efforts required in the Atlantic City area. In addition, means to provide direct economic input to the capital budgeting process are currently being discussed. In all of these coordinative efforts, the planning office intends its role to be an active one whereby quantitative economic output is provided as well as serving in a central clearing house role. Finally, improved communications with planning units at the local level and in the private sector have been established as priority areas for attention this year.

Critical growth issues such as economic development, land use, environmental protection and energy, continue to confront our decision makers today. The need to forecast the likely consequences of alternative policy decisions and their long-term effect on the State's economy probably have never been as pressing as today. Long-range economic planning of the type being initiated in New Jersey can provide today's decision makers with the type of economic recommendations that will best insure a thoughtful and efficient utilization of governmental services.

# IX

## AN EXAMINATION OF LABOR COSTS IN NEW JERSEY'S MANUFACTURING INDUSTRIES\*

### Introduction

By the end of 1976, the manufacturing sector in New Jersey had lost approximately one hundred and fifty thousand jobs since 1969, a decrease of almost 16%. While there are many reasons for this decline, a predominant one appears to be that the cost of operating a manufacturing business is higher in New Jersey than the national average. It is the purpose of this study to examine one component of these costs, namely labor costs. These comprise approximately 50% of total costs disbursed by manufacturing industries.

This study examines data on labor costs in specific manufacturing industries in New Jersey relative to the nation and relative to selected Southern states. The analysis focuses on a detailed level of manufacturing industries using data for 96 of the "three-digit" Standard Industrial Classification (SIC) industries in New Jersey.

### Definitions

Three concepts are useful in examining labor costs in manufacturing: payroll per employee, productivity (output per employee), and unit

labor costs. Payroll per employee is a measure of the wage paid by the employer. Productivity is the amount of output obtained by the employer from each employee. Unit labor costs are the payroll costs in each unit of output, and therefore are payroll costs adjusted for productivity.

The data\*\* analysis relies upon *relative* indices of unit labor costs, payroll costs, and productivity. The derivation of these indices is a two-step process. First, the absolute level for New Jersey or any other state must be calculated. This is done as follows:

$$(a) \text{ Unit labor costs}_{ijt} = \frac{\text{Total Payroll}_{ijt}}{\text{Value Added}_{ijt}}$$

where *i* is the particular three-digit industry, *j* is the state, and *t* is the year.

"Value added" is used here as the measure of output of the industry. Value added is essentially equal to the dollar value of total shipments minus the cost of materials. Payroll is gross earnings paid to all employees.

$$(b) \text{ Payroll costs}_{ijt} = \frac{\text{Total Payroll}_{ijt}}{\text{All Employees}_{ijt}}$$

$$(c) \dagger \text{ Productivity}_{ijt} = \frac{\text{Value Added}_{ijt}}{\text{All Employees}_{ijt}}$$

\* Prepared by Dr. Ira T. Kay, Economist, Office of State Economic Planning

\*\* The source of data is the *Census of Manufactures* for 1947, 1954, 1958, 1963, 1967, and 1972.

† There are many other definitions of productivity, the most well-known of which is value added/manhour. The definition used above, however, appears suitable.

The next step is to derive the *relative* index. This is done by dividing the calculated value for New Jersey by the *national average* for the industry. For example, the index of unit labor costs (ULC) for an industry in New Jersey would be the level of ULC for an industry in New Jersey divided by the *national* level of ULC for that industry. If this index were greater than "1," then New Jersey would have "high" ULC in this industry; if this index were less than "1," then New Jersey would have "low" ULC for this industry.

In the above definition, ULC is the same whether *total* payroll and value added are used or whether these factors *per employee* are used. Therefore, the index of ULC can be interpreted as *payroll per employee adjusted for productivity*.

These definitions also emphasize that we are not interested in labor cost differences between industries within a region, but wage differentials for the same industry between regions. An example of this might be helpful. In 1972, the Miscellaneous Plastics Products industry had payroll per employee in New Jersey of \$8,022, while Miscellaneous Chemicals Products had payroll per employee of \$9,824, with the latter having higher absolute payroll costs. However, when compared to their respective industries at the national level, Miscellaneous Plastics Products had a payroll index of 1,054 and Miscellaneous Chemicals Products had an index of 1,003. That is, relative to their national industries, Miscellaneous Plastics Products had higher payroll costs, while Miscellaneous Chemicals Products had lower payroll costs.

## Analysis of Results

### **Relative Unit Labor Costs in New Jersey\***

The indices of productivity, unit labor costs, and payroll per employee, can be used to cate-

gorize the three-digit SIC manufacturing industries in New Jersey. All categorizations in this study are based on six or fewer observations over a 25 year period. The classification begins with a determination of whether the industry experienced "high" (above-average) unit labor costs or "low" (below average) ULC in most of the six (or fewer) *Census* years. For example, if in four of the six years ULC were above the average, the industry was labeled "high" or, for example, if the industry had high ULC for three years and low for three years, the overall ULC value (high or low) was considered indeterminate. This technique was deemed superior to a mean over the years since the specific values for any one year might not be comparable to another year, and therefore not additive.

The summary results of this categorization of unit labor costs are presented in Figure 9.1. A complete listing of the characteristics of all the industries are given in Figure A9.1. Fifty-nine (61.5%) of the ninety-six industries have ULC which are above the national average. These industries had 65.8% of total manufacturing employment in 1972 and 61.2% of total value added in 1972.\*\* Sixty-nine (71.9%) of all the industries have payroll per employee that is above the national average. Forty-seven (49.0%) of all the industries have productivity which is above the national average.

The next question concerns the other characteristics of the industries with high ULC. Of the fifty-nine industries that have above-average ULC, thirty-nine (66.1%) also have above-average payroll per employee (see Figure 9.1). An additional finding is that even the low ULC industries also have high average payroll costs, compared with the national average. However, while 49.0% of all industries have high productivity, only 27.1% (sixteen) of the high ULC industries have high productivity. Industries with high ULC tend to have both high payroll

\* The statistics utilized in this study come from calculations based on data from the *Census of Manufactures* from 1947, 1954, 1958, 1963, 1967, and 1972. The tables which were derived from these calculations are available upon request from the Office of State Economic Planning.

\*\* The percent of industries, the percent of employment, and the percent of value added were very similar. Accordingly, in the remainder of the study, it is assumed that the percent of industries approximately represents their importance in terms of value added and employment.

FIGURE 9.1  
NUMBER AND PERCENT OF NEW JERSEY INDUSTRIES WITH  
HIGH UNIT LABOR COSTS, PAYROLL, AND PRODUCTIVITY

	Number	Percent
All Industries .....	96	100*
High ULC .....	59	61.5
High Payroll .....	69	71.9
High Productivity ...	47	49.0
High ULC Industries ....	59	100*
High Payroll .....	39	66.1
High Productivity ...	16	27.1

\* Note that the total of high ULC (shown) and low ULC (not shown) is not 100%. The characteristics for certain industries were indeterminate. This holds true for payroll and productivity as well. The "indeterminate" category was approximately 10% of the total in most cases.

SOURCE: Figure A9.1 and unpublished tables.

and low productivity, while the low ULC industries have both high payroll costs and high productivity.

It is also of interest to determine if the proportion of industries with high ULC is changing over time. The total number of industries with high ULC each year are listed in Figure 9.2. The proportion of all industries with high ULC has slightly increased recently. A continuing trend such as this could indicate a worsening competitive position for manufacturing industries in New Jersey.

***The Impact of Labor Costs on Growth of Employment in New Jersey***

Labor costs are examined in order to explain the impact of cost differentials on regional economic activity. If the cost of operation in one region yields a lower rate of profit than in another region, capital should tend to migrate toward that lower cost area. Such a movement of capital should be reflected as changes in employment of one region relative to another. Growth in employment could depend upon many factors in addition to labor costs (possibly including taxes, pollution standards, energy

FIGURE 9.2  
THE NUMBER AND PERCENT OF MANUFACTURING  
INDUSTRIES IN NEW JERSEY WITH  
HIGH UNIT LABOR COSTS (ULC)

Year	Total Number of Industries	Number of Industries With High ULC <sup>a</sup>	%
1947	78	46	59.0
1954	80	45	56.3
1958	88	50	56.8
1963	93	54	58.1
1967	87	54	62.1
1972	96	59	61.5

<sup>a</sup> For the definition of "high ULC" see Page 77.

SOURCE: *Census of Manufactures*, 1947, 1954, 1958, 1963, 1967 and 1972.

costs, *et cetera*). An analysis which includes all of these variables is beyond the scope of this paper. The hypothesis examined here is much simpler: industries with high ULC should experience declining employment while industries with low ULC should experience growing employment. Employment trends were analyzed using end-points only, i.e., 1947 to 1972.

Employment growth as shown in Figure A9.1 is a relative measure of New Jersey's growth rate compared to the national growth rate for the same industry. Accordingly, the industry can be growing in New Jersey and yet have a negative relative growth rate, if the national growth rate is larger. This relative growth rate, of course, is the appropriate measure since it is relative labor costs which are examined. A declining or low index of ULC for an industry in New Jersey should yield, one would predict, a positive growth rate of employment, even if absolute ULC rose.

Seventy-one industries have values for both variables (i.e., a high or low ULC and a growth rate). Thirty-nine (54.9%) of these industries have the predicted relationship. That is, if ULC is high, then relative growth of employment is negative; if ULC is low, then relative growth of employment is positive. It should be noted that since New Jersey has more industries with high ULC than with low ULC, it is possible that a substantial part of New Jersey's employment loss can be attributed to high ULC.

Additional insight into the problem of explaining employment trends can be obtained by examining the trends in ULC.\* Twelve industries—(202, 208, 225, 238, 252, 254, 273, 283, 284, 332, 343, and 369) which have high relative ULC and growing employment, also have a declining trend in ULC over the examination period. Five industries (239, 289, 335, 342, and 372) which have low relative ULC and declining employment, also have rising ULC. The combination of the trend analysis and the level of ULC means that an economic justification for growing or

declining employment can be determined for fifty-six (39 plus 12 plus 5) of the seventy-one industries. Of course, there are other industries which have the predicted relationship between ULC and growth of employment, and yet have the "incorrect" relationship with the *direction* of the growth. Nevertheless, employers may be sensitive not only to the relative level of labor costs, but also whether the cost structure is improving.

While the results are not totally conclusive, it does appear that industries with high and/or rising relative labor costs declined in New Jersey and those with low and/or falling labor costs grew, indicating some sensitivity to regional differences in costs of operating a business.

#### ***Unit Labor Costs and Growth in Employment in Selected Southern States***

While an examination of all industries in all states is beyond the scope of this study, labor costs and employment growth in certain key states have been examined. North Carolina, South Carolina, Louisiana, Texas, and the aggregate of these four states were examined and compared to New Jersey. These states were chosen for a number of reasons. They all have a reasonably complete mix of manufacturing industries. They are considered in the "Sun-belt" and have been experiencing industrialization recently.

These states tend to have cheaper sources of energy than New Jersey. They also have been aggressively recruiting manufacturing industries.

The industries in these states that were examined had to satisfy two criteria: 1) New Jersey had to have employment in that industry in 1972, and 2) the state chosen had to have some employment in that industry in either 1963 or 1972, or both. The period of analysis has been limited to 1963 and 1972 since this is the time period during which the dramatic changes have occurred in the manufacturing sectors of the Northeast and the South.

\* A regression equation was used to determine this trend. The equation is  $ULC_t = a + bt$ , where  $t$  is time. If  $b$  was positive, ULC was rising; if  $b$  was negative, ULC was declining. There were six or fewer observations.

FIGURE 9.3  
 THE NUMBER AND PERCENT OF MANUFACTURING  
 INDUSTRIES WITH HIGH ULC AND THE PREDICTED  
 RELATIONSHIP TO GROWTH IN EMPLOYMENT,  
 NEW JERSEY AND SELECTED SOUTHERN STATES (1963, 1972)

State	Number of Industries <sup>a</sup>	Number of Industries With High ULC <sup>b</sup> (%)	Number of Industries With Predicted Relationship <sup>c</sup> (%)
New Jersey	45	33 (73.3)	31 (68.9)
North Carolina	49	17 (34.7)	32 (65.3)
South Carolina	33	18 (54.6)	18 (54.6)
Louisiana	33	15 (45.5)	19 (57.6)
Texas	50	15 (30.0)	34 (68.0)
South <sup>d</sup>	50	12 (24.0)	32 (64.0)

<sup>a</sup> The number of industries with a high or low entry for ULC and present in New Jersey.

<sup>b</sup> Based on median value; see Page 77.

<sup>c</sup> If ULC is high, employment should decline; if ULC is low, employment should rise.

<sup>d</sup> The aggregate of the four states (North Carolina, South Carolina, Louisiana, Texas).

SOURCE: *Census of Manufactures*, 1963, 1972.

The data were used to test the following two statements. First, do the Southern states have lower ULC than New Jersey? Second, have these lower ULC resulted in employment growth?

The analysis in this section is similar to the analysis used for New Jersey alone. An index of ULC was calculated for each industry in each state for 1963 and 1972. The industry was either classified as a "high" or "low" ULC industry based on the median level. Employment growth rates (positive or negative) were also calculated between 1963 and 1972. For comparison, data for New Jersey in 1963 and 1972 are included as well.\*

The results for the Southern states are presented in Figure 9.3. Several important issues are raised by this information.

First, these Southern states have a much lower proportion of industries with high ULC (see Figure A9.2 for a complete listing of industries by states and regions).

Second, most industries in these states experienced growing employment if ULC were low, and declining employment if ULC were high.

Since many industries had low ULC, employment did tend to increase.

Third, in comparing New Jersey with the Southern aggregate, New Jersey had higher ULC in forty-eight of sixty-nine (69.6%) industries.

The question arises as to the other characteristics of the industries with lower ULC in the South; i.e., do they have low payroll costs or high productivity. Again, using the Southern aggregate, the answer is obviously low payroll costs. Sixty-one (88.4%) of the industries have payroll costs that are below the national average. Only twenty-one (30.4%) have productivity above the national average. This means that while productivity tends to be low in the South, payroll costs are even lower, yielding ULC that are less than the national averages.

It is important to note that during the period 1963-1972, 34% of the New Jersey industries had low ULC and declining employment or high ULC and growing employment, the "incorrect" relationships as compared to 45.1% for 1947-1972. This could mean that employment growth has become more sensitive to labor costs in the recent period. However, since ULC have been

\* It is important to note that in switching the period of classification from 1947-1972 (as in Figure A9.1) to 1963-1972, no industry in New Jersey changed from high ULC to low ULC, or vice versa (although there were several changes in the intermediate category).

high at least since 1947 (see Figure 9.4), this indicates that factors in addition to labor costs influence growth in employment.

### Why Labor Costs Are High in New Jersey

Labor costs for most manufacturing industries are higher in New Jersey than in the nation. In examining the average payroll per employee, these costs have been approximately 5% higher in New Jersey than in the nation (see Figure 9.4). While these higher payroll costs may be partly attributed to inefficiency on the part of manufacturers or their employees, *at least part of those higher payroll costs stem from higher living costs in New Jersey.* Urban budgets from the Bureau of Labor Statistics for low income families of four in New York City and Philadelphia (an approximation for all of New Jersey) are 5% higher than the national average for 1975. The average budget for five cities in North Carolina, Texas, and Louisiana was 8% *below* the national average. This means that to maintain their labor force, employers in New Jersey must pay higher wages while those in the South can pay lower wages. Regardless of the cause of the difference in cost of living (e.g., higher wages or any other factors), on the average all employers in New Jersey must have payroll per employee that is 5% higher than the national average. Therefore, one might expect *all* indus-

tries to have above-average payroll per employee in New Jersey.

It was shown above, however, that not only do most (71.9%) industries in New Jersey have high payroll costs, but many (49.0%) have above-average productivity. It was also shown that the dominant characteristic of low ULC industries in the South was *low* payroll. This indicates that the dominant problem in labor costs in New Jersey lies with high payroll (in part caused by the higher cost of living) and not with the overall efficiency of the labor force. While there are particular industries which do not follow this pattern (i.e., there are many industries with low productivity), the results are important.

### Labor Costs and Growth in Employment: Some Problems

It has been shown that those industries with high ULC tended to experience declining employment and those with low ULC tended to grow, especially between 1963 and 1972.

These are predictable relationships because many, if not most, manufacturers sell their output in national markets. It is reasonable to assume, therefore, that New Jersey's manufacturers have little control over final prices. Accordingly, the profitability of the local firm is primarily determined by the price of inputs (e.g.,

FIGURE 9.4  
MEAN<sup>a</sup> AND STANDARD DEVIATION OF THE RATIO OF  
PAYROLL PER EMPLOYEE IN NEW JERSEY  
TO PAYROLL PER EMPLOYEE IN THE UNITED STATES  
FOR THREE-DIGIT SIC INDUSTRIES IN SELECTED YEARS

Year	Mean	Standard Deviation	Number of Industries <sup>b</sup>
1947	1.072	.115	79
1954	1.047	.091	81
1958	1.048	.102	89
1963	1.052	.104	93
1967	1.042	.083	88
1972	1.050	.120	96

<sup>a</sup> Unweighted arithmetic mean.

<sup>b</sup> The number and composition of the industries varies from *Census* to *Census*.

SOURCE: *Census Manufactures*, 1947, 1954, 1958, 1963, 1967, and 1972.

labor and capital). Assuming that the quantity and quality of inputs (including labor) used in the production process are identical for all states, then if New Jersey's manufacturers face a higher price for the input than elsewhere, it follows that profit in a given industry will be lower in New Jersey. Since profits attract investment, a low profit rate on owner's equity in New Jersey could mean a lower incentive for investment and hence lower employment growth in the State. Conversely, lower labor costs should mean higher employment.

There were, however, many industries whose employment growth responded in an unpredictable manner. From 1947 to 1972, 45.1% and from 1963 to 1972, 34% of the industries had either high ULC and growing employment or low ULC and declining employment. Since these findings are counter-intuitive, some additional explanations are needed.

The most important explanation would be for those industries which had low ULC, but which nevertheless had declining employment from 1947 to 1972. Fourteen of twenty-five industries with low ULC had declining employment. A satisfactory explanation for this phenomenon is required if useful and appropriate policy solutions for these and other declining industries are to be devised. Some hypotheses follow.

### ***The Productivity Problem***

It has been maintained that above-average productivity in New Jersey's industries has somewhat mitigated the impact of high payroll costs. What, however, is the cause of that high productivity? In certain industries, high productivity might only be obtained by substituting capital equipment for labor. This, however, represents an increased cost of production to the employer. There might be some limit to the new capital expenditures undertaken by an employer. At some point, high productivity through high capital spending for certain industries be-

comes too expensive to obtain and the low *payroll* per employee of other regions becomes attractive, as the employer chooses to combine lower capital expenditures with lower-cost labor.

One might argue that *all* of the high productivity gains in New Jersey stem from increased capital spending. However, there are reasons to doubt the veracity of this. First, a study of productivity in the U.S. from 1919 to 1957 found that Gross National Product grew at 3.2% per year, while labor and capital inputs grew at only 1.1%. Part of this gap has been attributed to the improvement in the *quality* of labor.\*

Second, there is reason to believe that the quality of labor varies by regions in the United States. New Jersey's population, for example, does have more schooling than most Southern states.\*\*

For the purposes of this study, it is only necessary that *part* of the increased productivity stem from differences in labor quality.

### ***Trends in Labor Costs***

As mentioned, five industries which had low ULC and declining employment, also had *rising* ULC. This could mean that when employers make decisions to move or expand, they consider the *trends* in costs as well as the levels of costs. Labor costs which rise into the future could mean declining future profits.

### ***Payroll and Labor Costs: Employer Perceptions***

Another possible explanation for declining employment is that employers pay more attention to payroll per employee than to unit labor costs. This could be because employers believe, rightly or wrongly (as explained above), that productivity gains will only occur through increased capital expenditures. In addition, data on payroll are readily available to the firm. Productivity measures may be more difficult to obtain. It is also possible that given the state of current disequilibrium in the labor market,

\* Lloyd G. Reynolds, *Labor Economics and Labor Relations*, Prentice-Hall, 1974, 49.

\*\* Adam Broner, *et al.*, "The Quality of the New Jersey Labor Force," *8th Annual Report*, Economic Policy Council, 107.

arbitrage profits are available in certain low wage areas which have only recently experienced massive industrialization (where wages have not yet risen commensurate with productivity). Such profits would not exist in an older industrialized area, such as New Jersey.

### Summary

Nearly three-quarters of the manufacturing industries in New Jersey have labor costs per unit of output which are *above* the national average. Most industries in New Jersey have above-average payroll per employee, but many industries have higher labor productivity which offsets higher wages.

Most manufacturing industries in the specified Southern region had unit labor costs which were *below* the national average. Low payroll per employee accounted for these lower unit labor costs.

In both New Jersey and the Southern region, those industries with high unit labor costs tended to experience declining relative employment, while those with low unit labor costs tended to experience growing relative employment. The net effect was that from 1963 to 1972, New Jersey's manufacturing sector had a relative decline in employment of 8.9%, while the Southern region had relative growth of 24.9%.

An important cause of the high payroll per employee, and accordingly the high unit labor costs, is the higher cost of living in New Jersey. Many employers compensate their employees for these higher living costs.

Since regional differences in the cost of living are beyond the control of State policymakers, public policy to rectify the labor cost situation should focus on productivity-related issues. This would include low interest loans to improve stocks of physical capital and training programs to increase the skills of the employees.

TECHNICAL APPENDIX TO CHAPTER IX  
 FIGURE A9.1  
 RELATIVE MANUFACTURING EMPLOYMENT GROWTH AND  
 UNIT LABOR COSTS, NEW JERSEY AND UNITED STATES

Industry Code	Industry Name	Relative Growth <sup>a</sup> (1947-1972)	Index of ULC <sup>b</sup>
201	Meat Products	-12.3	Low
202	Dairy Products	53.8	High
203	Canned Foods	-27.2	Indeterminate
204	Grain Mill Products	-19.6	High
205	Bakery	48.0	Indeterminate
206*	Sugar	n.a.	High
207 (1972)	Fats, Oil	n.a.	High
208	Beverages	- 7.9	High
209	Miscellaneous Foods	16.9	Low
222	Silk Mills	85.9	High
223	Wool Weaving	n.a.	High
224	Narrow Fabric	-61.4	Indeterminate
225	Knitting Mills	42.1	High
226	Textile Finishing, Except Wool	50.5	High
228	Yarn, Thread	n.a.	Low
229	Miscellaneous Textile Goods	-34.2	High
231	Men's Suits	-22.0	High
232	Men's Furnishings	-60.6	Low
233	Women's Outerwear	- 4.8	High
234	Women's Undergarments	-50.3	Indeterminate
236	Children's Outerwear	-25.2	High
238	Miscellaneous Apparel	3.3	High
239	Miscellaneous Fabrics	- 5.9	Low
242	Sawmills	80.9	Low
243	Millwork	- 5.4	Indeterminate
244	Wood Containers	-34.1	Low
249	Miscellaneous Wood Products	43.0	Low
251	Household Furniture	-27.2	Low
252	Office Furniture	47.0	High
254	Partitions	120.9	High
264	Converted Paper	-30.6	High
265	Paperboard Containers	n.a.	Indeterminate
271	Newspapers	23.6	Low
273	Books	843.4	High
274	Miscellaneous Publishing	530.4	Low
275	Commercial Printing	- 4.9	High
278	Bookbinding	124.0	Low
279	Printing Services	101.8	Low
281 <sup>b</sup>	Inorganic Chemicals	49.2	High
282	Plastics	n.a.	High
283	Drugs	34.3	High
284	Soap	14.1	High
285	Paints	-30.0	Low
287	Agricultural Chemicals	10.9	High
289	Miscellaneous Chemicals	-33.8	Low
299	Miscellaneous Petroleum	n.a.	Low
306	Fabricated Rubber	n.a.	High
307	Miscellaneous Plastics	n.a.	High

\* (207 in 1963)

Industry Code	Industry Name	Relative Growth <sup>a</sup> (1947-1972)	Index of ULC <sup>b</sup>
311	Tanning	24.8	Low
314	Footwear	— 2.8	High
316	Luggage	—24.9	High
317	Handbags	38.6	Indeterminate
319	Miscellaneous Leather	71.8	High
322	Glassware	37.0	High
323	Purchased Glass	—10.9	High
326	Pottery	—25.0	Low
327	Concrete	—18.8	High
329	Nonmetallic Mineral Products	— .1	High
331	Steel	n.a.	High
332	Foundries	—38.3	Low
333	Primary Nonferrous Metals	n.a.	High
334	Secondary Nonferrous Metals	7.2	High
335	Nonferrous Rolling and Drawing	—31.6	Low
336	Nonferrous Foundries	—35.5	High
339	Miscellaneous Primary Metal Products	13.7	Low
341	Metal Cans	34.3	Indeterminate
342	Tools	—16.9	Low
343	Plumbing Equipment	11.0	High
344	Structural Metals	13.4	Low
345	Screw Machine Products	n.a.	Low
346	Metal Stamping	7.7	Low
347	Metal Services	—20.7	High
349	Miscellaneous Metals	— 5.6	High
353 <sup>a</sup>	Construction Machinery	—24.1	Low
354	Metalworking Machinery	—28.5	High
355	Special Industry Machinery	16.4	Indeterminate
356	Industrial Machinery	—33.2	High
357	Office and Computing Machines	— 6.8	Low
358	Refrig. and Serv. Machines	—21.8	High
359	Miscellaneous Machinery	—30.4	High
361	Electrical Apparatus	—22.8	High
362 <sup>c</sup>	Electrical Appliances	n.a.	High
363	Household Appliances	n.a.	High
364	Lighting	n.a.	High
365	TV Receiving Equipment	n.a.	High
366	Commercial Equipment	—51.7	High
367	Electronic Components	n.a.	High
369	Miscellaneous Elec. Equipment	144.6	High
372 <sup>c</sup>	Aircraft	—62.8	Low
381	Scientific Instruments	—82.3	High
382	Measuring Devices	— .6	High
384	Medical Instruments	—32.1	High
387	Clocks	n.a.	High
394	Toys	—19.3	High
395	Pens, Office, and Art Goods	—45.3	High
396	Notions	—32.3	High

$$^a \left\{ \frac{\text{N.J. Employment 1972 in Industry } i / \text{N.J. Employment 1947 in Industry } i}{\text{U.S. Employment 1972 in Industry } i / \text{U.S. Employment 1947 in Industry } i} - 1 \right\} \times 100$$

<sup>b</sup> Based on median level, "high" meaning above national average, "low" meaning below.

<sup>c</sup> 1954 to 1972.

n.a.=Not Available.

SOURCE: *Census of Manufactures, 1947, 1954, 1958, 1963, 1967, and 1972.*

FIGURE A9.2

RELATIVE MANUFACTURING EMPLOYMENT GROWTH AND UNIT LABOR COSTS,  
NEW JERSEY AND SELECTED SOUTHERN STATES (1963, 1972)

Industry Code	New Jersey		North Carolina		South Carolina		Louisiana		Texas		South Carolina	
	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>
201	-5.0	L	-66.2	I	66.9	I	241.3	L	-77.9	L	-69.8	L
202	-37.3	H	-11.1	L	-	L	758.0	I	0.7	L	6.2	L
203	2.8	I	-30.0	L	116.5	I	-42.9	H	3.5	I	-9.0	I
204	-16.2	H	-	L	-	H	-	H	4.3	H	4.3	H
205	4.6	L	44.5	I	-	L	1.0	H	3.5	L	8.8	I
206 (207)	-30.1	H	-	H	n.a.	-	609.2	H	104.8	H	156.3	H
208	-13.4	H	18.9	I	0.6	H	-1.4	H	21.9	I	13.0	I
209	-25.3	L	-	H	-	H	-0.1	L	-14.3	L	-27.0	L
222	-18.0	I	-17.4	H	43.7	I	n.a.	-	n.a.	-	8.2	I
224	-34.8	I	19.2	L	92.6	I	n.a.	-	n.a.	-	41.3	L
225	37.5	H	9.2	I	288.4	H	n.a.	-	n.a.	-	21.8	I
226	-23.0	H	30.2	L	-6.9	L	n.a.	-	n.a.	-	105.9	L
228	5.8	L	6.2	I	61.6	I	n.a.	-	n.a.	-	12.8	L
229	-4.9	H	271.4	L	32.1	I	n.a.	-	-	H	69.8	I
232	-26.5	L	17.0	H	4.7	I	41.9	I	56.9	L	31.2	H
233	-10.1	H	114.5	I	-1.1	I	n.a.	-	68.0	H	48.6	H
234	-36.2	I	39.1	H	+	L	n.a.	-	-	H	43.1	I
236	-9.7	H	-44.0	H	24.7	H	n.a.	-	-15.2	H	-6.0	H
238	-3.4	H	49.0	H	-	H	-	H	-	H	-17.6	H
239	-31.2	L	83.3	L	161.0	L	-	L	34.5	I	72.5	L
242	-9.9	I	-5.2	I	1.2	I	-17.8	H	14.1	I	-3.3	H
243	27.9	H	-3.8	I	-2.9	L	109.5	I	43.5	I	22.7	L
249	-10.4	I	101.6	L	-	H	-	H	-	L	-42.2	L
251	-32.5	L	21.6	I	37.4	I	-	L	28.4	L	21.1	I
252	31.4	I	114.2	L	n.a.	-	n.a.	-	-	H	77.5	L
254	95.9	H	-	H	n.a.	-	-	H	22.1	I	-15.4	I
264	4.1	H	69.0	L	-	L	-5.8	H	24.3	H	6.8	H
265	-12.4	H	48.1	L	36.1	I	-	H	65.1	L	24.7	H
271	4.1	L	13.3	I	+	L	18.1	L	9.7	L	22.3	L
273	-60.6	H	-	H	-	H	n.a.	-	48.8	I	1.8	I
275	4.9	H	25.2	L	-	L	47.4	H	20.7	L	16.3	L
279	99.7	L	-	H	n.a.	-	-	L	32.3	L	-12.1	L
281 (286)	-4.4	H	-	L	n.a.	-	-59.4	I	16.5	L	-9.1	L
282	-22.0	I	68.5	L	179.3	L	42.2	L	60.5	L	92.2	L
283	29.0	L	-	L	n.a.	-	n.a.	-	-11.1	H	-46.7	I
284	0.0	H	192.9	H	-	H	-	L	26.0	I	35.0	I
285	-13.9	L	-	H	-	H	-	L	28.8	L	-4.3	L
287	-8.6	I	-	L	-	H	495.7	L	20.4	L	-12.1	L
289	5.7	I	-	H	-	L	-	L	4.2	L	-33.7	L
306	-45.7	H	-	L	n.a.	-	n.a.	-	+	L	93.2	L
307	-23.2	H	+	L	-	L	-	L	63.9	L	73.9	L
314	-29.8	H	201.9	I	n.a.	-	n.a.	-	81.2	L	129.5	L
322	11.6	H	14.7	L	n.a.	-	n.a.	-	-13.2	L	1.2	L
327	1.5	H	10.7	I	46.5	H	16.5	I	-1.9	L	7.1	L
329	-19.8	H	-	H	-	H	-	L	54.6	L	-30.7	L
332	-18.2	L	-	L	n.a.	-	-	H	20.1	L	-11.0	L
335	-24.3	I	138.8	L	n.a.	-	n.a.	-	65.8	L	99.5	L
341	3.5	I	n.a.	-	n.a.	-	n.a.	-	35.4	L	35.4	L
342	-10.6	I	34.8	L	n.a.	-	n.a.	-	-	H	4.9	L
344	-13.5	I	42.4	I	73.1	I	34.0	I	24.1	H	31.4	H

Industry Code	New Jersey		North Carolina		South Carolina		Louisiana		Texas		Southc	
	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>	Growth <sup>a</sup>	ULC <sup>b</sup>
345	-13.0	I	n.a.		n.a.		n.a.		56.6	I	56.6	I
347	-24.4	I	-	L	-	H	-	L	33.2	L	- 4.9	L
349	-26.6	I	204.2	H	-	H	-	L	51.7	I	39.9	I
353	-35.6	L	n.a.		n.a.		-	H	13.8	I	10.2	I
354	-14.4	H	462.1	L	+	L	n.a.		-	L	166.8	L
355	- 6.1	H	37.9	L	23.4	I	-	L	- 9.8	L	17.8	L
356	-20.0	I	438.5	L	205.0	I	-	H	42.4	I	90.9	L
358	- 3.8	H	34.2	I	n.a.		-	L	9.7	L	9.5	L
359	-17.7	I	61.5	I	-	H	40.6	I	54.0	L	33.7	I
361	-37.9	H	80.1	L	n.a.		n.a.		-	L	1.9	L
362	-36.1	H	90.0	L	+	L	n.a.		-	H	92.4	L
363	-38.1	H	100.1	I	+	H	n.a.		n.a.		213.2	I
364	- 9.4	H	+	L	n.a.		n.a.		351.0	L	1035.1	L
367	-36.6	H	-59.9	L	38.5	H	n.a.		-	L	-19.4	I
369	-37.6	H	- 4.65	L	n.a.		n.a.		121.1	I	39.6	L
381	-14.7	I	n.a.		n.a.		n.a.		-27.6	H	-27.6	H
382	-10.1	H	+	L	n.a.		n.a.		255.1	L	611.0	L
384	-25.2	I	219.9	H	n.a.		-	H	-	L	38.9	I
394	-34.0	I	-	H	-	L	n.a.		32.1	H	-24.5	H

<sup>a</sup> Relative Growth of Employment:

$$\left[ \frac{\text{Area Employment 1972 in Industry } i / \text{Area Employment 1963 in Industry } i}{\text{U.S. Employment 1972 in Industry } i / \text{U.S. Employment 1963 in Industry } i} - 1 \right] \times 100$$

<sup>b</sup> Median value of ULC index.

H=High; L=Low; I=Indeterminate.

<sup>c</sup> South—sum of North Carolina, South Carolina, Louisiana, Texas.

- : Industry present in 1963 and not in 1972; employment assumed to have declined.

+ : Industry present in 1972 and not in 1963; employment assumed to have risen.

n.a.=Not Available.

# X

## RELATIVE POLLUTION ABATEMENT EXPENDITURES BY MANUFACTURING INDUSTRIES\*

In recent years, governmental regulations for the abatement of air pollution have received criticism regarding their adverse impacts upon the economy. The environmental movement and government agencies have responded to such criticism by pointing to the economic and social benefits of pollution control, such as improved health, reduced deterioration of buildings and job creation in pollution control industries.\*\*

The adoption of relatively higher environmental standards by one state can reduce growth or cause unemployment in manufacturing industries to the extent that manufacturing costs are increased above those costs in other states. If competitive factors prevent the producer from raising prices to cover those added costs, profitability will decline and the state will be less attractive to investment by that industry. Even if an industry competes in a purely local or regional market (such as certain elements of the food processing industry), and it is able to raise prices to cover fully the cost increase, those consumers who now pay higher prices for this industry's product will have fewer dollars to

spend on other goods and services. This would cause unemployment in the state to the extent that those dollars would have been spent on goods or services produced within the state. However, the unemployment problem would be mitigated by job creation in the pollution abatement industries, including equipment manufacturing and government. Overall, it is difficult to assess the net short-term effect of environmental standards on employment, but from the point of view of consumption, society is consuming a better environment at the cost of some reduction in other goods and services.

States differ from one another in their standards for various air pollutants.† Thus, a state's pollution abatement standards will impose costs on manufacturers which may vary from state to state. If environmental costs are large then both the standards and the stringency of enforcement may have some impact upon the location decisions of firms among states. If the costs of environmental compliance in New Jersey are higher and cause the products of New Jersey's industries to be less competitive or more costly to produce than those of other states, the result

\* Prepared by Arnold L. Landy, Urban Planner, Office of State Economic Planning.

\*\* See the *Sixth Annual Report of the Council on Environmental Quality*, Washington, D.C., 1975.

† Although *new* pollution sources in various industries must meet uniform *federal* requirements.

may be an adverse impact upon manufacturing employment within the State.

This chapter attempts to provide information regarding operating and capital expenditures for pollution abatement by industries in New Jersey relative to other states. The direct impact of such spending upon employment is beyond the scope of this paper. However, the presentation of the pollution abatement costs to industries in New Jersey and other states provides perspective regarding the magnitude of these costs, the relative costs to industries and the relative expenditures among competing states.

### Air Pollution Abatement Operating Expenditures

Air pollution abatement operating expenditures\* vary widely among manufacturing industries in the United States, ranging from \$4.67 per employee in 1975 in the leather and leather products industry to \$1,722.84 per employee in the petroleum industry (see Figure 10.1). Almost three-quarters of total air pollution abatement operating costs were accounted for by four major industries: primary metals, petroleum, chemicals and the paper industry. Those same industries represent only 17% of total U.S. manufacturing employment. The following industries had lower pollution control expenditures (i.e., less than \$50 per employee in 1975) in the United States and in the seven states studied: textiles, furniture, printing, leather, fabricated metals, non-electrical machinery, electrical machinery, transportation equipment, instruments and miscellaneous manufacturing. These industries accounted for 12% of total U.S. air pollution operating costs, but 57% of total manufacturing employment.

### State Comparisons

An analysis of the air pollution abatement spending pattern from 1973 through 1975 was

made for the U.S., New Jersey and six additional states, for purposes of comparison. The states studied were North Carolina and South Carolina—Sunbelt states which have a growing manufacturing sector; Texas and Louisiana—growing states which, like New Jersey, have relatively large petroleum and chemical industries; and New York and Pennsylvania—which share New Jersey's position as Middle Atlantic industrial states whose manufacturing sector is performing poorly relative to the rest of the nation.

In 1975, U.S. manufacturing industries incurred \$1.5 billion in operating expenses for air pollution abatement. This represented \$87.47 per employee, on average. To compute the comparable figure for New Jersey and six other states, the total air pollution abatement operating expenditures (APAOE) in each state were summed and divided by the total state employment.\*\* New Jersey expenditures per employee in 1975 were \$107.81. Thus, industry expenditures per employee in the State were 23% higher than the national average. However, this can be misleading because New Jersey has a relatively high proportion of its employment in industries which tend to spend large amounts per employee on pollution abatement. In fact, the three industries which have the highest rate of spending (primary metals, chemicals and petroleum) account for 13% of U.S. manufacturing employment, but account for 22% of such employment in New Jersey. Therefore, the State should be *expected* to spend more than the national average per employee in manufacturing, even if the rate of pollution control spending in each industry were equal to the nation's. To adjust for this, the following formula was used:

Expected rate of APAOE in State S

$$= \frac{\sum_i \left[ \frac{\text{APAOE}_i^{\text{US}}}{\text{Emp}_i^{\text{US}}} \times \text{Emp}_i^{\text{S}} \right]}{\sum_i \text{Emp}_i^{\text{S}}}$$

\* Operating expenditures consist of depreciation, labor, equipment leasing, materials, supplies and services. Included are the incremental costs for fuel incurred when low sulphur fuel is required to be substituted for high sulphur fuels.

\*\* Data limitations forced some industries to be excluded from some of the sample states.

Where APAOE = air pollution abatement operating expenditures

Emp = employment

i = a particular manufacturing industry

US = United States

S = a particular state

That is, the number of employees in each industry (the "two-digit industries" as defined by the Standard Industrial Classification code) in the State was multiplied by the national rate of spending per employee in that particular industry. This yielded a figure for each industry which represented the amount which would have been spent if the national rate of spending had applied in each industry. These figures were then summed to yield the total amount of spending which would be expected if each industry in the State spent at the national rate.\* This total was then divided by the sum of State employment in those industries and yielded \$115.61 per employee for New Jersey. This means that

in 1975, New Jersey industries' actual spending of \$107.81 per employee was somewhat less than what would have been expected if each New Jersey industry had spent at the national rate per employee (see Figure 10.1). In 1974 and 1973, however, New Jersey's industries spent somewhat more than what would have been expected if the U.S. rate of spending were exhibited by New Jersey's industries. The conclusion can be drawn that industries in New Jersey spend more per employee than the nation, but this is attributable to the particular industry mix of the State. Once this industry mix is accounted for, the State spends approximately what would be expected according to the national rate of operating expenditures.\*\*

Industry data for the other states show that over the three years 1973-75, Texas and Louisiana have an aggregate APAOE per employee which is higher than what would be expected if each SIC two-digit industry in these states had the U.S. rate of spending per employee in each

FIGURE 10.1  
ACTUAL AND EXPECTED\* AIR POLLUTION ABATEMENT  
OPERATING EXPENDITURES PER EMPLOYEE

	1975		1974		1973	
	Actual	Expected*	Actual	Expected*	Actual	Expected*
United States	\$87.47		\$64.76		\$51.50	
New Jersey	107.81	\$115.58	94.46	\$88.43	86.46	\$72.66
Pennsylvania	132.43	128.31	97.69	93.48	69.01	73.98
New York	38.05	69.06	26.84	52.36	19.07	42.00
Texas	192.52	163.55	142.21	120.00	127.32	99.44
Louisiana	431.69	204.03	314.49	147.15	218.30	118.77
North Carolina	33.01	41.95	28.89	33.50	23.04	25.29
South Carolina	34.89	51.61	18.28	40.75	13.32	32.40

\* Spending per employee that would have been expected if each two-digit SIC industry in each state had spent at the national rate for each industry.

SOURCES:

U.S. Bureau of the Census, *Pollution Abatement Costs and Expenditures, 1973, 1974, 1975*, (MA-200).

U.S. Bureau of Labor Statistics, *Employment and Earnings, States and Areas, 1939-1975*, Bulletin 1370-12, 1977.

U.S. Bureau of Economic Analysis, *Survey of Current Business*, February 1977 (Vol. 57, No. 2), March 1976 (Vol. 56, No. 3), July 1975 (Vol. 55, No. 7).

\* This methodology is analogous to shift-and-share analysis, a method used to account for regional differences in employment growth.

\*\* In the comparison between New Jersey and the U.S., the methodology consisted of adjusting New Jersey's spending by each industry in accordance with the U.S. rate of spending per employee. In such a procedure, the possibility exists that the comparison might be very different if the opposite procedure had been used, i.e., to adjust U.S. pollution abatement spending for each industry to reflect New Jersey's actual rate of spending in each industry. To test for this, the latter procedure was also employed. The relative results for New Jersey versus the nation were virtually unchanged. The data for the other states were also tested in the same manner and the difference between the U.S. and individual states' spending, while changed to some degree for some states, remained in the same direction.

industry. New York, North Carolina and South Carolina were lower than the national average while Pennsylvania (and New Jersey) had a pattern that was mixed from year to year but close to the national average (see Figure 10.1).

On the individual industry level (Figure 10.2), New Jersey's 1975 expenditures per employee were the highest among the seven states in four industries: food processing, textiles, leather and fabricated metal products (accounting for 19% of State manufacturing employment) while they were lowest in three industries: lumber, instruments and miscellaneous manufacturing industries (7% of employment).

While Louisiana's industry in the aggregate shows the highest APAOE per employee, the data for that state are dominated by the high spending figures in both the petroleum and chemical industries. Indeed, while Louisiana had the highest APAOE per employee in three industries in 1975 (chemicals, petroleum, and stone, clay and glass), the state also exhibited the lowest APAOE per employee in three other industries (fabricated metal products, nonelectrical machinery and transportation equipment).

Differences among states in APAOE per employee within individual industries require interpretation. In some cases, the rate of spending in an industry in one state may be several times the spending in another state for that same industry. At least part of this difference may be due to an aggregation problem, that is, the

two-digit SIC industry groups are so broad that they include sub-industries which have widely varying anti-pollution spending burdens.\* For example, in the stone, clay and glass industry (SIC 32) most of the pollution control operating costs are incurred by the hydraulic cement industry, so that differences among states in APAOE in the stone, clay and glass industry reflect, to a great extent, the location and concentration of the hydraulic cement industry. States can differ considerably in the extent to which their two-digit SIC industries consist of various sub-industries with widely divergent pollution abatement spending patterns. Therefore, one should not draw conclusions from Figure 10.2 regarding the comparative costs among states for a particular SIC two-digit industry without also taking into account the mix of industries within the broad two-digit industries in those states.

The two-digit SIC level was considered to be a sufficient level of disaggregation for purposes of making the industry mix adjustment. This assumption was verified by conducting a three-digit mix adjustment of the New Jersey data for 1973. The results differed only slightly from those derived from the two-digit adjustment.\*\*

### Capital Expenditures

In addition to operating expenditures, capital costs for pollution control should also be analyzed because such costs are associated with new investments in plant and equipment. Pollu-

\* The two-digit SIC industries are divided into further sub-categories: three- and four-digit. Pollution abatement data is available in the Census publication for many three- and four-digit industries, nationally. However, data for the states is only published at the two-digit level.

\*\* Consideration was given to the possibility that the two-digit SIC adjustment for industry mix was too broad a classification to allow for valid conclusions regarding the composite expenditures by states. While New Jersey clearly has a disproportionately high share of those two-digit industries which have high APAOE, it is possible that we might have a preponderance of low spending industries within those two-digit categories. For example, while New Jersey has a large chemical industry (SIC 28), within that high spending industry a relatively large proportion is comprised of the drug industry (SIC 283), which is a low spender among the chemicals group. To adjust for New Jersey's three-digit industry mix a method was used which yielded New Jersey's *expected* APAOE per employee at the three-digit SIC industry level, assuming the U.S. rate of APAOE per employee for those industries in 1973 (comparable data for 1974-75 were not available). The procedure was the same as that described by the formula shown previously, except that the industry data here is predominantly at the three-digit SIC level. To facilitate comparison with prior results, the three-digit analysis also included the petroleum and coal products industry (a two-digit industry for which three-digit employment data for New Jersey are unavailable). In total the analysis included industries which accounted for 577,000 of the 713,000 employees covered in the prior two-digit analysis. The analysis showed that the expected rate of APAOE per employee was \$79.01. This was very close to the expected figure of \$72.66 at the two-digit level of disaggregation (see Figure 10.1).

To summarize, it can be said that in 1973 the U.S. rate of spending was \$51.50 per employee, compared with \$86.46 for New Jersey, but that New Jersey's expected rate after adjustment at the two-digit level was \$72.66, and was \$79.01 after adjustment at the three-digit level. The similarity of the two latter figures validates the use of the two-digit industry mix adjustment in comparing New Jersey and the nation.

FIGURE 10.2  
AIR POLLUTION ABATEMENT OPERATING EXPENDITURES PER EMPLOYEE  
FOR MANUFACTURING INDUSTRIES, 1975

SIC Industry Code*	Industry Name	U.S.	N.J.	PA.	N.Y.	TEX.	LA.	N.C.	S.C.
20	Food and Kindred Products . . . . .	\$31.74	\$60.31	\$49.49	\$13.46	\$11.16	\$25.36	\$15.35	\$15.38
21	Tobacco Products . . . . .	60.26	....	....	....	....	....	84.69	....
22	Textile Mill Products . . . . .	10.42	40.98	11.98	.58	....	....	9.27	6.71
24	Lumber and Wood Products . . . . .	40.75	—0—	23.62	2.14	33.76	6.06	55.97	7.75
25	Furniture . . . . .	15.30	10.20	9.05	1.05	5.81	....	35.18	25.64
26	Paper and Allied Products . . . . .	156.92	25.48	118.69	23.31	191.86	211.92	252.69	414.06
27	Printing and Publishing . . . . .	6.49	8.95	4.43	.68	2.24	....	25.48	....
28	Chemicals and Allied Products . . . . .	235.83	229.75	198.92	122.28	542.30	735.18	91.40	60.61
29	Petroleum and Coal Products . . . . .	1722.84	1850.00	1782.35	294.12	1609.04	3250.00	....	....
30	Rubber and Miscellaneous Plastics . . . . .	35.20	17.99	53.10	59.83	....	....	6.10	....
31	Leather and Leather Products . . . . .	4.67	12.99	....	.90	3.03	....	....	....
32	Stone, Clay and Glass . . . . .	178.66	145.66	152.71	96.00	230.09	375.00	20.00	27.52
33	Primary Metals . . . . .	364.32	246.27	378.89	185.31	466.67	....	....	....
34	Fabricated Metal Products . . . . .	21.63	45.94	31.40	29.21	5.88	2.27	5.08	....
35	Machinery, Except Electrical . . . . .	13.73	4.47	31.89	14.11	3.99	3.16	22.16	8.73
36	Electrical and Electronic Equip. . . . .	15.67	12.10	24.12	23.45	8.79	....	30.85	1.60
37	Transportation Equipment . . . . .	31.66	55.84	15.54	59.78	9.87	9.26	....	....
38	Instruments . . . . .	12.07	10.75	12.01	22.07	....	....	....	....
39	Miscellaneous Manufacturing Ind. . . . .	14.11	4.63	48.87	28.66	....	....	....	....

(.) Represents lack of data.

\* Direct costs to the apparel industry (SIC 23) are minimal and were excluded from the Census survey.

SOURCES:

- U.S. Bureau of the Census, *Pollution Abatement Costs and Expenditures, 1975*, (MA-200), 1977.
- U.S. Bureau of Labor Statistics, *Employment and Earnings, States and Areas, 1939-1975*, Bulletin 1370-12, 1977.
- U.S. Bureau of Economic Analysis, *Survey of Current Business*, February 1977 (Vol. 57, No. 2).

tion abatement capital costs become, in effect, part of the total capital costs involved in a given industrial expansion. As such, those costs may influence the location decisions of firms among various states.

The analysis of capital costs involved computing a ratio of air, water and solid waste pollution abatement equipment expenditures to total capital expenditures for each industry in 1973.\* These ratios were then weighted for New Jersey's industry mix to adjust for the difference in the nature of the industrial structure between New Jersey and the comparison states and regions. New Jersey was found to have a higher ratio of pollution abatement capital spending to total capital expenditures (PA/CE Ratio) than all the comparison states and regions (see Figure 10.3, Column II). However, New Jersey has a lower rate of total capital spending than each of the comparison areas and this may

partially account for the higher PA/CE ratio, since total capital spending is the denominator of the PA/CE ratio.\*\* It was, therefore, necessary to adjust the data to reflect a common rate of capital spending.

The rate of capital spending per dollar of value added in manufacture was computed for each two-digit industry in New Jersey, based on the 1972 *Census of Manufactures*. The capital expenditure figures for industries in the comparison states were then adjusted to reflect the same rate of capital spending as obtained in New Jersey. Since New Jersey's rate of capital spending was lower than every comparison area, this adjustment resulted in lowering their capital expenditures, thereby raising their PA/CE ratio. In spite of this adjustment, the ratio for New Jersey was still higher than for Connecticut, Pennsylvania, New England and the Northeast region (see Figure 10.3, Column III). However,

FIGURE 10.3  
INDUSTRY SPENDING ON POLLUTION ABATEMENT  
EQUIPMENT\* AS A PERCENT OF  
TOTAL CAPITAL EXPENDITURES, 1973

	I. Unadjusted PA/CE Ratio**	II. N.J. PA/CE Ratio** as Percent of Comparison Area's Ratio After Adjustment for Industry Mix	III. Column II. Adjusted for Rate of Capital-Spending
New Jersey . . . . .	10.1%	...	...
United States . . . . .	9.8	112%	84%
Northeast . . . . .	7.9	120	112
New England . . . . .	5.7	157	128
New York . . . . .	5.7	116	89
Pennsylvania . . . . .	10.7	135	115
Connecticut . . . . .	5.7	135	109

\* Equipment for air, water and solid waste pollution abatement.

\*\* Ratio of pollution abatement capital spending to total capital expenditures.

SOURCES:

U.S. Bureau of the Census, *Pollution Abatement Costs and Expenditures*, 1973, MA-200, 1976.

U.S. Bureau of the Census, *Census of Manufactures*, 1972, Subject Series: General Summary, MC72(1)-1.

\* For a more detailed discussion of this section of the study, see *Rate of Spending on Pollution Abatement Equipment in 1973 by Industries in New Jersey in Comparison with Other Areas*, Arnold L. Landy, New Jersey Office of State Economic Planning, Governor's Office, 1976. For a comparison of relative pollution abatement capital spending by regions, using unadjusted data, see William D. Toal, "Capital Spending for Pollution Abatement," *Monthly Review*, Federal Reserve Bank of Atlanta, August 1976.

\*\* For all states, some pollution abatement capital expenditures are associated with construction of new or expanded plants, while the remainder consists of add-ons to existing plants. In the former case, the PA figure is part of a larger total CE figure for that plant, while in the latter case, the PA figure equals the CE figure, since no productive capacity is being added. A low rate of capital spending in New Jersey implies that New Jersey has relatively less of the former and more of the latter PA spending patterns than the comparison states and this could partly account for the State's higher PA/CE ratio.

FIGURE 10.4

**POLLUTION ABATEMENT CAPITAL EXPENDITURES AS A PERCENT OF  
TOTAL CAPITAL EXPENDITURES FOR INDUSTRIES IN NEW JERSEY  
AND COMPARISON AREAS, 1973**

		Pollution Abatement Capital Expenditures* as a Percent of Total Capital Expenditures						
SIC Code	Industries Listed in Order of Value-Added in Manufacture in New Jersey Economy	New Jersey	Pa.	Conn.	New York	New England Region	Northeast Region	U.S.
28	Chemicals and Allied Products .....	14.4%	14.8%	11.5%	13.5%	10.5%	13.5%	13.5%
36	Electrical and Electronics Equipment .....	5.8	3.0	3.8	3.1	2.3	3.2	3.0
20	Food and Kindred Products .....	6.7	6.2	1.6	11.4	9.7	8.0	9.2
35	Machinery, Except Electrical .....	0.7	2.8	0.8	2.1	1.2	1.9	2.7
34	Fabricated Metal Products .....	8.0	3.9	2.3	2.3	3.8	4.0	4.4
37	Transportation Equipment .....	20.2	3.1	w	w	1.5	6.3	4.3
27	Printing and Publishing .....	2.4	w	0.0	0.3	0.7	0.5	0.7
32	Stone, Clay and Glass Products .....	32.4	11.5	4.8	10.0	1.2	13.6	12.9
30	Rubber, Miscellaneous Plastic Products .....	0.7	1.6	3.0	6.5	1.9	2.1	2.0
33	Primary Metals .....	19.4	18.8	14.8	10.4	11.5	16.3	22.9
26	Paper and Allied Products .....	0.6	9.0	33.9	17.9	25.2	16.5	23.7
38	Instruments, Related Products .....	0.3	2.5	w	w	1.9	1.7	2.0
22	Textile Mill Products .....	1.7	6.7	5.9	2.4	3.1	3.0	3.3
39	Miscellaneous Manufacturing Industry .....	3.6	w	2.8	1.2	4.8	2.9	4.6
29	Petroleum and Coal Products .....	28.8	40.2	w	18.2	9.2	35.2	28.9
25	Furniture and Fixtures .....	2.7	2.0	1.4	4.4	1.4	2.8	6.7
31	Leather and Leather Products .....	2.1	w	w	1.4	0.3	0.8	6.5
24	Lumber and Wood Products .....	0.0	4.3	w	6.9	1.3	3.2	6.7

w=withheld to avoid disclosing operations of individual companies

\* Air, water and solid waste pollution abatement capital expenditures

SOURCE: U.S. Bureau of the Census, *Pollution Abatement Costs and Expenditures, 1973*. (MA-200) 1976.

the PA/CE ratios for New York and the United States were now higher than New Jersey's. No conclusions can be drawn from the latter findings because the adjustment for rate of capital spending actually over-inflates the comparison areas' PA/CE ratios. This is because the procedure reduces the denominator in the ratio, but it does not decrease pollution abatement spending (the numerator) by the amount that would have been spent in conjunction with the eliminated capital expenditures. It is especially noteworthy, therefore, that most of the comparison areas still showed lower ratios than New Jersey, even after their ratios were increased by this procedure.

It can be concluded that the rate of pollution abatement spending in 1973 as indicated by the PA/CE ratio was higher in New Jersey than in Pennsylvania, Connecticut, New England and the Northeast by an amount that is somewhere within the range specified by Columns II and III of Figure 10.3. For example, New Jersey's PA/CE ratio is from 115% to 135% of Pennsylvania's. The comparisons of New Jersey with

New York and the nation fail to show clear differences. For example, New Jersey's PA/CE ratio was from 84% to 112% of the national rate.

The finding that New Jersey's PA/CE ratio was greater than that of the Northeast but not necessarily greater than the U.S. implied that the Northeast's PA/CE was lower than the nation's. This was a surprising finding, since one would expect the old industrial states of the Northeast to incur higher pollution abatement costs than the U.S. average, due to the higher levels of pollution associated with the high degree of industrialization in the region. To test directly for the difference between the PA/CE ratios of the Northeast and the U.S., the data for the U.S. were adjusted to reflect the Northeast's industry mix. The Northeast's PA/CE ratio was found to be 74% of the national rate. After an adjustment for the Northeast's lower rate of capital spending, the region was found to spend at 87% of the national ratio. Thus, the Northeast did have a lower pollution abatement capital spending rate than

the U.S. in 1973, ranging from 74% to 87% of the national average.

Pollution abatement expenditures as a percent of total capital expenditures for industries in New Jersey and the comparison areas are shown in Figure 10.4. Care should be exercised in interpreting this data for at least two reasons:

1. The wide variations in the data among the comparison areas reflects, to a certain extent, the variation in industry mix within each two-digit industrial category among the states.
2. The data are for a single year only. This causes two problems:
  - a) New capital investment may vary substantially from year to year for individual industries. A single year does not furnish a reliable indicator of average yearly capital investment.
  - b) During any one year, various states may be emphasizing the promulgation or enforcement of pollution abatement standards which affect particular individual industries, while the principal impact on other industries may occur during other years. Since the states differ in this respect, the interpretation of pollution abatement expenditures for a specific industry should take into account data covering a period of several years, rather than for a single year.

Due to the problems stated above, no extensive analysis of individual industries was undertaken based on the 1973 data. Instead, only the composite PA/CE ratio for each comparison area was used for purposes of comparison.

### Summary of Results

During 1973, 1974 and 1975, industry in New Jersey, Pennsylvania, Texas and Louisiana had, on an unadjusted basis, higher air pollution

abatement operating expenditures per employee than the national average while North Carolina, South Carolina and New York had expenditures which were below the national average. However, in making comparisons among states, the unadjusted spending data can be misleading. After adjustment for industry mix in each state, Pennsylvania and New Jersey were found to exhibit a rate of spending approximately the same as the national rate, with Texas and Louisiana higher and North Carolina, South Carolina and New York remaining below the national average. The differences among the states may be due, in large part, to differences in pollution abatement operating expenditures in a small number of relatively large or high spending industries in the state.

Total pollution abatement capital expenditures as a percentage of total capital spending in New Jersey were higher than the average for the Northeast region in 1973, but were not found to be higher than the U.S. average, after adjustment for industry mix and rate of capital spending. The Northeast's rate of pollution abatement capital spending was found to be lower than the national average.

### Policy Implications

State government's attempts to reduce pollution standards in order to make the State more attractive to industry should not be undertaken without a careful analysis of the pollution abatement spending patterns in those industries which will be affected by a proposed change in pollution standards. If an industry is spending relatively small amounts annually to abate air pollution, the employment impact of the lowering of standards may be relatively small. If a given industry's spending is above average, however, more potential exists for noticeably impacting the operating costs and, thus, the profit potentials and investment plans of firms in that industry.\*

\* For an analysis of environmental and other costs for the glass industry in competitive states, see Donald M. Scarry, *Glass-making Costs in New Jersey and the Surrounding States*, Division of Planning and Research, New Jersey Department of Labor and Industry, January 5, 1976.

In those cases where a lowering of standards is being considered, an analysis of the impact upon costs to the industry should include answers to the following questions:

- a) To what extent are the high pollution abatement costs in the State related to the required use of low-sulphur fuel, rather than the operation and maintenance of anti-pollution equipment?
- b) To what extent are the expenses due to the costly retrofitting of old plants with pollution abatement equipment?
- c) Do new plants in the industry involve much lower pollution abatement costs, due

to advances in technology? Or are costs higher due to federal emission standards for *new* pollution sources?

Answers to such questions will enable the State to choose among various policies of adjusting standards, or possibly, arranging for financing of pollution abatement capital equipment, as appropriate. The central point, however, is that adjustments of environmental standards to aid the economy should not be implemented in a wholesale manner. Rather, they should be undertaken only if environmentally acceptable and where meaningful benefits to particular industries can be shown to outweigh the social costs of increased pollution damage.

## XI

# NEW JERSEY'S RUBBER AND MISCELLANEOUS PLASTICS PRODUCTS INDUSTRIES: AN EXAMINATION\*

### Introduction

This paper reports on a study of two industries that are part of New Jersey's Rubber and Miscellaneous Plastics Products industries (SIC 30). The specific industries examined are Fabricated Rubber Products (SIC 3069) and Miscellaneous Plastics Products (SIC 3079).

The Fabricated Rubber Products industry consists of firms manufacturing a wide variety of goods, including foam rubber, floor coverings, component parts for machinery and equipment and heels and soles for shoes. The Miscellaneous Plastics Products industry, also a residual classification, produces a broad range of goods for direct sale to consumers and for use in the production of automobiles, appliances and other products. This industry is to be distinguished from the Plastics Materials and Resins industry (SIC 2821), which is a supplier to the producers of miscellaneous plastics products.

Rubber and Miscellaneous Plastics Products was selected for study for two reasons. First, this group of industries is relatively small in New Jersey (1.2% of the State's 1976 nonfarm employment) and, therefore, has not attracted

extensive analytical attention. Second, this major group (SIC 30) contains both an industry growing slowly at the national level (Fabricated Rubber Products) and an industry growing rapidly at the national level (Miscellaneous Plastics Products). Comparison and contrast of these two industries in New Jersey should provide insights that are both interesting and useful in a policy-making context.

### Industry Employment in New Jersey

In 1964, the Fabricated Rubber Products industry employed approximately 12,800 persons in New Jersey. Two years later, an additional 800 were on the industry's payrolls in the State, bringing Fabricated Rubber Products employment in New Jersey to 13,600. After a decline in 1967 at both the national and State level, perhaps reflecting the tightening of monetary policy in the latter half of 1966, employment in the industry regained a level of 13,500 in 1968. While Fabricated Rubber Products employment at the national level continued to grow through 1969, in New Jersey the industry began to lose jobs after 1968. In fact, in every year since 1968, employment in the industry in New Jersey has

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\* Prepared by William W. Carmichael, Economist, Office of State Economic Planning.

FIGURE 11.1  
EMPLOYMENT IN FABRICATED RUBBER PRODUCTS AND MISCELLANEOUS  
PLASTICS PRODUCTS, NEW JERSEY AND UNITED STATES  
IN THOUSANDS AND PERCENTAGES

	Fabricated Rubber Products SIC 303 + 306			Miscellaneous Plastics Products SIC 307		
	U.S.(1)	N.J.(2)	N.J./U.S.	U.S.	N.J.	N.J./U.S.
1958 <sup>(3)</sup> .....	....	...	...	101.2	13.1	12.9%
1959 .....	....	...	...	115.1	14.4	12.5
1960 .....	....	...	...	121.4	15.1	12.4
1961 .....	....	...	...	128.9	15.7	12.2
1962 .....	....	...	...	147.7	17.4	11.8
1963 .....	....	...	...	158.1	19.0	12.0
1964 <sup>(3)</sup> .....	136.4	12.8	9.4%	172.9	21.4	12.4
1965 .....	143.3	13.3	9.3	197.5	22.7	11.5
1966 .....	151.7	13.6	9.0	225.3	23.6	10.5
1967 .....	149.5	12.9	8.6	240.0	24.8	10.3
1968 .....	155.7	13.5	8.7	265.0	26.4	10.0
1969 .....	158.4	13.2	8.3	293.4	28.2	9.6
1970 .....	147.3	12.6	8.6	291.9	27.4	9.4
1971 .....	143.9	11.6	8.1	290.4	25.2	8.7
1972 .....	149.8	10.6	7.1	326.0	24.6	7.5
1973 .....	158.8	9.4	5.9	363.4	24.8	6.8
1974 .....	157.4	8.8	5.6	361.2	23.8	6.6
1975 .....	133.6	7.3	5.5	312.7	20.5	6.6
1976 .....	143.2	6.7	4.7	351.2	22.3	6.3

NOTES:

- (1) U.S. SIC 303 + 306 was derived from U.S. SIC 302, 3, 6, "Other Rubber Products" minus U.S. SIC 302, "Rubber Footwear."
- (2) N.J. SIC 303 + 306 is actually N.J. SIC 301-306. SIC 301, "Tires and Inner Tubes," is not present in New Jersey. N.J. SIC 302 is small, and New Jersey employment data are not available. In 1972, N.J. SIC 302 employed between 500 and 999 workers.
- (3) 1958 and 1964 are the earliest years for which comparable data are available.

SOURCES:

*Employment and Earnings, United States, 1909-75*  
*Employment and Earnings, States and Areas 1939-1975*  
*Employment and Earnings, Vol. 24, No. 3, March 1977*

contracted. From a peak of 13,600 in 1966, the number of jobholders in Fabricated Rubber Products has fallen to 6,700 in 1976.

Figure 11.1 contains data on national and New Jersey employment in Fabricated Rubber Products. By expressing New Jersey's employment as a share of the national total it can be seen that with the exception of the periods 1967-1968 and 1969-1970, Fabricated Rubber Products in New Jersey has under-performed relative to the nation. This under-performance is manifested in the decline of New Jersey's share of industry employment from 9.4% in 1964 to 4.7% in 1976.

The employment data on Miscellaneous Plastics Products in Figure 11.1 indicate that in both the State and the nation, Miscellaneous Plastics Products experienced uninterrupted employment growth from 1958 through 1969. At the national level, the number of jobholders in the industry grew by 292,200 over that period, while in New Jersey the expansion accounted for 15,100 of that number.

The business cycle contraction of 1970 reduced industry employment, and it was not until 1972 that 1969's national employment level was surpassed. In New Jersey, however, the decline that began in 1970 eliminated 3,600 Miscel-

laneous Plastics Products jobs before it was modestly reversed in 1973. As in the case of Fabricated Rubber Products, New Jersey's share of national industry employment has tended downward.

The Fabricated Rubber Products and Miscellaneous Plastics Products industries both utilize raw materials derived from petroleum and natural gas. The oil shortages and price increases of 1974, therefore, adversely affected these industries on the input-side. Feedstocks such as ethylene, propylene and butadiene, for example, essential for the manufacture of plastics materials and resins, were in short supply.

The 1974 oil-related developments had, also, a major impact on the demand for the goods produced by the Fabricated Rubber Products and Miscellaneous Plastics Products industries. Automobile manufacture is an important source of demand for both of these industries, and automobile production fell sharply after mid-year 1974. The general slowing of economic activity combined with these specific supply-and demand-side factors to produce a national employment decline of 23,800 in Fabricated Rubber Products and 48,500 in Miscellaneous Plastic Products.

The national economic recovery that began in the third quarter of 1975 has been reflected in both the Fabricated Rubber Products and the Miscellaneous Plastics Products industries. Between 1975 and 1976, national employment rose 7.2% in Rubber and 12.3% in Plastics. In New Jersey, however, Fabricated Rubber Products employment has declined in the face of the national level upturn. At the State level, Miscellaneous Plastics Products payrolls expanded by 8.8% to 22,300 between 1975 and 1976, leaving 1976 industry employment 5,900 below its 1969 peak.

In summary, New Jersey has experienced absolute and relative employment decline in the case of an industry growing slowly at the national level, Fabricated Rubber Products. In the case of Miscellaneous Plastics Products, national employment has expanded briskly, both from a long-term and a short-term perspective. In New

Jersey, employment has risen from its 1975 level, but stands slightly below the level it achieved in 1965. As with Fabricated Rubber Products, the State's share of national industry employment has continued to decline.

### **Inter-regional Shifts in Industry Employment**

In order to put these New Jersey developments in a broader geographic perspective, it is useful to consider the employment performances of these industries in other areas of the country.

In recent years, attention has been drawn to a redistribution of manufacturing activity away from the "older industrial areas" of the nation and toward the "Sunbelt" states. The older industrial areas are commonly defined as the New England, Middle Atlantic, and East North Central Census divisions. The Sunbelt can be approximated by the South.

The data in Figure 11.2 indicate that the Fabricated Rubber Products and Miscellaneous Plastics Products industries have altered their relative locational patterns in favor of the South. Between 1967 and 1971, the South's share of Fabricated Rubber Products employment rose from 13.8% to 16.9%. This relative, and absolute, increase took place over a period in which the industry experienced a decline in employment at the national level. In the case of Miscellaneous Plastics Products, the South's share rose from 13.0% to 18.5% over the period 1967 to 1972. This increase was also both relative and absolute.

### **Elements of the Cost Structures**

Figure 11.1 has documented the absolute and relative decline of the Fabricated Rubber Products and Miscellaneous Plastics Products industries in New Jersey. The purpose of this section of the study is to examine certain factors that can be expected to bear on these developments.

A conventional, if not universal, assumption regarding the firm is that it seeks to maximize its profit. In the context of industrial location analysis, this assumption implies that production

**FIGURE 11.2**  
**GEOGRAPHIC DISTRIBUTION OF EMPLOYMENT, FABRICATED RUBBER PRODUCTS**  
**(SIC 3069), AND MISCELLANEOUS PLASTICS PRODUCTS (SIC 3079), PERCENTAGES,**  
**1963, 1967, 1971 AND 1972**

	RUBBER			PLASTICS		
	1963	1967	1971*	1963	1967	1972
Northeast .....	33.9%	32.7%	28.8%	38.4%	36.8%	31.7%
New England .....	16.0	15.3	13.7	13.2	12.0	9.3
Middle Atlantic .....	17.9	17.4	15.1	27.1	24.8	22.3
New York .....	4.4	4.0	3.2	11.5	9.9	8.5
New Jersey .....	8.2	8.1	7.2	10.1	8.8	7.7
Pennsylvania .....	5.2	5.3	4.8	5.5	6.0	6.1
North Central .....	46.0	45.1	43.0	38.4	40.2	37.6
East North Central .....	43.1	41.7	39.2	33.4	34.8	31.3
West North Central .....	2.9	3.5	3.8	5.1	5.8	6.3
South .....	11.3	13.8	16.9	12.3	13.0	18.5
South Atlantic .....	7.2	7.6	10.6	6.9	7.0	9.9
East South Central .....	2.5	6.2**	4.2	2.8	2.7	4.3
West South Central .....	1.7		2.1**	2.6	3.3	4.3
West .....	8.9	8.3	11.3**	9.1	9.6	12.2
Total U.S. (Thousands) .....	100%	100%	100%	100%	100%	100%
	132.2	141.6	129.7	166.3	251.6	346.9

NOTES:

\* Due to definitional change, SIC 3069 in 1972 would not be comparable with prior years.

\*\* Interpolated.

SOURCES: *Census of Manufactures*, 1963, 1967, and 1972.  
*Annual Survey of Manufactures*, 1971.

East North Central: Ohio, Indiana, Illinois, Michigan, Wisconsin

West North Central: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas

South Atlantic: Delaware, Maryland, D.C., Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida

East South Central: Kentucky, Tennessee, Alabama, Mississippi

West South Central: Arkansas, Louisiana, Oklahoma, Texas

will take place at that geographic site where total revenue can be expected to exceed total cost by the greatest amount. It is convenient and appropriate to conceive of firms in New Jersey's Fabricated Rubber Products and Miscellaneous Plastics Products industries as producing goods that are traded in national markets, and, therefore, as selling their products at prices that must conform to the national "market price."

Profit maximization requires that the firm locate where its unit cost is minimized. The "cost structure" of a firm or industry disaggregates its total costs into the costs associated with the various inputs (interpreted to include transportation as an input) used to produce and sell some level of output. In order to gain further insight into the experiences of the Fabricated Rubber Products and Miscellaneous Plastics

Products industries in New Jersey, we will examine elements of the cost structure.

*LABOR*—Outlays for labor are typically a major portion of the cost structure and in 1971 and 1972, respectively, they were approximately 30% of total costs in Fabricated Rubber Products and approximately 25% in Miscellaneous Plastics Products at the national level.

Payroll per employee is a convenient measure of labor cost and Figures 11.3 and 11.4 contain data on this measure for Fabricated Rubber Products and Miscellaneous Plastics Products.

In Figure 11.4, New Jersey's Miscellaneous Plastics Products industry can be compared with individual states (data limitations prevent this in the case of Fabricated Rubber Products). Minnesota, North Carolina, Tennessee, and Texas were selected for Figure 11.4 after being

FIGURE 11.3  
 FABRICATED RUBBER PRODUCTS (SIC 3069), PAYROLL  
 PER EMPLOYEE, VALUE ADDED PER EMPLOYEE,  
 AND UNIT LABOR COST, 1963, 1967, AND 1971

	WNC	SA	ESC	US	MA	NJ
<b>Payroll Per Employee</b>						
1963 . . . . .	\$5,424	\$4,525	\$4,432	\$5,753	\$5,577	\$5,785
1967 . . . . .	6,041	5,472	D	6,518	6,389	6,522
1971 . . . . .	8,160	6,442	6,722	8,201	8,357	8,452
<b>Value Added Per Employee</b>						
1963 . . . . .	\$11,786	\$9,309	\$9,060	\$10,792	\$10,485	\$10,276
1967 . . . . .	15,204	11,287	D	12,292	12,101	12,339
1971 . . . . .	22,060	14,761	17,759	15,884	14,179	14,548
<b>Unit Labor Cost</b>						
1963 . . . . .	\$.460	\$.486	\$.489	\$.533	\$.532	\$.563
1967 . . . . .	.397	.485	D	.530	.528	.529
1971 . . . . .	.370	.436	.379	.516	.589	.581

NOTES:

WNC=West North Central Division  
 SA=South Atlantic Division  
 ESC=East South Central Division  
 MA=Middle Atlantic Division (New York, New Jersey, and Pennsylvania)  
 D=Disclosure restricted by Bureau of the Census

Unit Labor Cost=(Payroll Per Employee)/(Value Added Per Employee)

SOURCES:

*Census of Manufactures, 1963 and 1967.*  
*Annual Survey of Manufactures, 1971.*

identified as the states with the most rapid 1967-1972 employment growth in their particular Census regions or divisions. California, while it exceeded the *national* Miscellaneous Plastics Products growth rate during the period, was selected because it was more representative of the industry in the West region than the fastest growing state, Oregon.

Ohio and Massachusetts were included in Figure 11.4 in order to afford some comparability with a recent analysis of the Miscellaneous Plastics Products industry undertaken by The Fantus Company.\* Relying on proprietary information, The Fantus Company deemed Texas, Massachusetts and Ohio to be states with which New Jersey "competes" for the location of firms in this industry.

The data in Figure 11.3 indicate that when compared with the Census divisions that increased their share of Fabricated Rubber Products employment between 1967 and 1971, New Jersey is found to have had higher payroll per employee costs. In 1963, payroll per employee in New Jersey was 0.5% higher than the national average in Fabricated Rubber Products. By 1967, rough equality had been achieved, but in 1971, New Jersey exceeded the U.S. average by 3%. Between 1967 and 1971, the rate of increase in the State's Fabricated Rubber Products payroll per employee (29.6%) was exceeded only by that of the industry in the Middle Atlantic division (New York, New Jersey and Pennsylvania) as a whole (30.8%).

\* *A Research Program to Strengthen New Jersey's Competitive Position for Business and Industry, The Fantus Company, New York, New York, 1976.*

FIGURE 11.4  
MISCELLANEOUS PLASTICS PRODUCTS (SIC 3079)  
PAYROLL PER EMPLOYEE, VALUE ADDED PER EMPLOYEE  
AND UNIT LABOR COST, 1963, 1967, AND 1972

	MINN*	NC*	TENN*	TEX*(F)	CAL(R)	US	MA	NJ	OHIO(F)	MASS(F)
<b>Payroll Per Employee</b>										
1963 . . . .	\$5,201	D	D	\$4,788	\$5,161	\$5,036	\$5,013	\$5,277	\$5,562	\$4,654
1967 . . . .	5,737	4,613	5,130	5,686	6,023	5,708	6,801	5,878	6,190	5,329
1972 . . . .	7,769	6,759	7,101	7,519	7,781	7,616	7,671	8,098	8,221	7,185
1973 . . . .	8,125	7,128	7,405	7,289	7,928	7,864	7,916	7,982	8,641	7,553
<b>Value Added Per Employee</b>										
1963 . . . .	\$10,192	D	D	\$10,438	\$10,261	\$9,987	\$9,281	\$10,006	\$11,482	\$8,479
1967 . . . .	12,263	10,742	16,044	13,529	12,771	11,795	11,116	11,629	12,315	10,839
1972 . . . .	16,385	16,759	25,899	21,255	17,216	17,314	16,083	17,263	18,963	15,863
1973 . . . .	18,444	19,021	24,798	27,304	18,398	18,489	17,645	20,069	19,333	21,064
<b>Unit Labor Cost</b>										
1963 . . . .	\$.510	D	D	\$.459	\$.503	\$.504	\$.540	\$.527	\$.484	\$.552
1967 . . . .	.468	.429	.320	.420	.472	.484	.612	.505	.503	.492
1972 . . . .	.474	.403	.274	.354	.452	.440	.477	.469	.434	.453
1973 . . . .	.441	.375	.299	.267	.431	.425	.449	.398	.447	.359

NOTES:

MINN=Minnesota  
 NC=North Carolina  
 TENN=Tennessee  
 TEX=Texas  
 CAL=California  
 MA=Middle Atlantic Division (New York, New Jersey, and Pennsylvania)  
 MASS=Massachusetts  
 D=Disclosure restricted by Bureau of the Census  
 Unit Labor Cost=(Payroll Per Employee)/(Value Added Per Employee)

\*=State with highest growth rate in its region.  
 (R)=State with second highest growth rate in region, but deemed more representative.  
 (F)=State appears in Fantus examination of the industry.

SOURCES:

*Census of Manufactures, 1963, 1967, and 1972.*  
*Annual Survey of Manufactures, 1973.*

Data on payroll per employee in the Miscellaneous Plastics Products industry appear in Figure 11.4. Comparisons between New Jersey and the 1967-1972 rapid-growth states generally reveal New Jersey to have higher payroll per employee. In 1967, for example, New Jersey's payroll per employee, \$5,878, exceeded every high growth state except California. New Jersey did, however, compare favorably with the average of the Middle Atlantic states.

By 1972, payroll per employee in New Jersey had risen to \$8,098. This 37.8% increase over 1967, while less than North Carolina's 46.5% rise, was large enough to place payroll per employee in New Jersey above that of all of the rapid-growth states, and 6.3% above the national

average (\$7,616) for the industry. Between 1972 and 1973, however, payroll per employee *declined* in New Jersey by some \$116 to \$7,982. Only Texas, among the high-growth-rate states, also experienced a decline in payroll per employee.

Changes in the absolute and relative levels of payroll per employee take on greater significance when viewed in conjunction with changes in labor productivity. Value added per employee is commonly used as a proxy for labor productivity, and Figures 11.3 and 11.4 contain such data for Fabricated Rubber Products and Miscellaneous Plastics Products respectively.

The value added per employee figures in Figure 11.3 indicate that in 1971, the latest year

for which comparable data on the Fabricated Rubber Products industry are available, New Jersey lagged the growth-regions in terms of labor productivity. While exceeding the average for the Middle Atlantic states, New Jersey compared unfavorably with the other areas depicted. In 1967, the State did experience relatively high labor productivity, up from the low, relative to the national, value added per employee of 1963.

In the case of the Miscellaneous Plastics Products industry, New Jersey's labor productivity position is, in some ways, more encouraging. Between 1972 and 1973, value added per employee in the State rose some 16.3% to \$20,069. Texas and Massachusetts, among the states shown in Figure 11.4, also experienced rapid productivity increases. The productivity improvement in New Jersey put the State 8.5% above the national average.

The assumption that firms seek to maximize profit implies that manufacturers base their locational decisions on the net effects of wage and productivity levels. Unit labor cost is a measure that reflects both wages and productivity, and

can be approximated by the ratio of payroll per employee to value added per employee, data available in Figures 11.3 and 11.4.

In the case of Fabricated Rubber Products, the higher-than-national-average unit labor cost in both New Jersey and the Middle Atlantic states is apparent. New Jersey's relatively high unit labor cost is largely attributable to low labor productivity. While payroll per employee in the State exceeds the national average by 3%, value added per employee falls short of the national figure by 8%.

Unit labor cost in New Jersey in Miscellaneous Plastics Products fell sharply between 1972 and 1973 (see Figure 11.4), moving the State below the national average. While New Jersey still exceeds the unit labor cost levels in such high-growth states as North Carolina, Tennessee and Texas, comparisons with California and Minnesota are favorable. The finding for 1973 that New Jersey's unit labor cost is below that of Ohio, yet higher than Massachusetts is consistent with the analysis of The Fantus Company cited above.

FIGURE 11.5

CAPITAL EXPENDITURES PER DOLLAR OF VALUE ADDED, FABRICATED RUBBER PRODUCTS (SIC 3069) AND MISCELLANEOUS PLASTICS PRODUCTS (SIC 3079), NEW JERSEY AND UNITED STATES, 1963-1973

	RUBBER			PLASTICS		
	N.J.	U.S.	N.J./U.S.	N.J.	U.S.	N.J./U.S.
1963 .....	\$.0417	\$.0455	0.92	\$.1154	\$.0948	1.22
1964 .....	.0461	.0484	0.95	.1285	.0983	1.31
1965 .....	.0342	.0592	0.58	.0898	.1133	0.79
1966 .....	.0641	.0569	1.13	.2041	.1307	1.56
1967 .....	.0543	.0773	0.70	.1000	.1121	0.89
1968 .....	N.A.	.0761	...	N.A.	.0932	...
1969 .....	.0479	.0618	0.78	.0919	.0993	0.93
1970 .....	.0421	.0651	0.65	.1223	.1028	1.19
1971 .....	.0791	.0463	1.71	.1058	.0891	0.84
1972 .....	....	....	...	.1324	.1089	1.22
1973 .....	....	....	...	.1087	.1069	1.02

NOTES:

N.A.=Data not available.

SOURCES:

*Census of Manufactures*, 1963, 1967, and 1972.

*Annual Survey of Manufactures*, 1964, 1965, 1966, 1968, 1969, 1970, 1971, and 1973.

*CAPITAL EXPENDITURES*—Labor productivity is an important determinant of unit labor costs and arises from the skills and habits of workers, the physical capital made available by the firm, the level of technology and the efficiency with which the production process is organized and coordinated. Of these important variables the only one for which a useful proxy is available is the capital stock.

Although an imperfect indicator, data on capital expenditures are available and are indicative of *changes* in the capital stock.

Figure 11.5 presents data on capital expenditures per dollar of value added. The lower-than-national level of labor productivity in the New Jersey Fabricated Rubber Products industry is consistent with the capital expenditure data reported in Figure 11.5. Excluding 1971, the ratio of New Jersey to national expenditures (i.e., NJ/US) averaged 0.82 for the seven years for which data are available. The inclusion of 1971 raises the average to 0.93, which still suggests that the industry has been “under investing” in New Jersey.

The data underlying Figure 11.5 indicate that the NJ/US ratio of 1.71 for 1971 reflects a sharp rise in the ratio of New Jersey capital expenditures to U.S. capital expenditures rather than a relative decline in value added (i.e., output). In seeking to explain this rise in capital expenditures in this industry in New Jersey, pollution abatement outlays come readily to mind as a possible cause. It is, however, not possible to determine the level of pollution abatement outlays in the Fabricated Rubber Products industry in New Jersey. As a result, we are without an explanation for this unusual increase in capital expenditures in 1971 by an industry that is declining both relatively and absolutely in the State.

The data in Figure 11.5 for the Miscellaneous Plastics Products industry present a contrasting picture. Over the period covered by Figure 11.5, the New Jersey-U.S. ratio averaged 1.10. In seeking to understand the significance of this seeming “over investment,” it is helpful to examine capital expenditures on a per-employee basis. Figure 11.6 contains, for the Miscel-

FIGURE 11.6  
VALUE ADDED PER EMPLOYEE AND CAPITAL EXPENDITURES PER EMPLOYEE,  
MISCELLANEOUS PLASTICS PRODUCTS (SIC 3079),  
NEW JERSEY AND UNITED STATES, 1963-1973

	Value Added Per Employee			Capital Expenditures Per Employee		
	N.J.	U.S.	N.J./U.S.	N.J.	U.S.	N.J./U.S.
1963 .....	\$10,006	\$9,987	1.002	\$1,155	\$947	1.22
1964 .....	9,675	10,365	0.93	1,243	1,019	1.22
1965 .....	10,458	10,784	0.97	939	1,222	0.77
1966 .....	11,355	11,229	1.01	2,318	1,468	1.58
1967 .....	11,629	11,795	0.99	1,163	1,322	0.88
1968 .....	N.A.	12,965	...	N.A.	1,208	...
1969 .....	13,038	13,287	0.98	1,198	1,319	0.91
1970 .....	13,296	14,094	0.94	1,626	1,449	1.12
1971 .....	14,694	15,720	0.93	1,555	1,256	1.24
1972 .....	17,263	17,314	0.997	2,286	1,885	1.21
1973 .....	20,069	18,489	1.09	2,182	1,976	1.10

NOTES:

N.A.—Data not available.

SOURCES:

*Census of Manufactures, 1963, 1967, and 1972.*

*Annual Survey of Manufactures, 1964, 1965, 1966, 1968, 1969, 1970, 1971, and 1973.*

laneous Plastics Products industry, data on capital expenditures per employee and value added per employee.

The NJ/US capital expenditures per employee ratios reported in Figure 11.6 averaged 112.5 for the years shown. This indicates that in New Jersey, the industry invested more per employee than it did at the national level. The data on value added per employee in Figure 11.6, however, suggest that this higher rate of investment per employee did not result in higher labor productivity. This inference rests on the fact that when the ratios of NJ to US value added per employee are averaged, they yield 0.98. Lower skills, or other human capital-related factors may account for this lower productivity, as might managerial deficiencies. The age or "vintage" of the capital stock in the Miscellaneous Plastics Products industry may also explain some of this lower value added per employee. We do not know the age structure of the industry's capital stock in New Jersey, nor do we know how superior new additions to the stock might be to those put in place in earlier years. It is, therefore, possible that in spite of the higher rate of investment in New Jersey, the industry is operating with older, less efficient, capital.

*MATERIALS*—In addition to outlays for labor, purchases of materials are a significant portion of the cost structure. At the national level, (State data are not available), materials accounted for approximately 40% and 42% of total costs in Fabricated Rubber Products and Miscellaneous Plastics Products during 1971 and 1972.

Examination of the specific mix of materials purchased by the Fabricated Rubber Products industry, SIC 3069, reveals that the largest single component consisted of goods supplied by the Synthetic Rubber industry, SIC 2822. A similar examination in the case of SIC 3079, Miscellaneous Plastics Products, identified SIC 2821, Plastics Materials and Resins, as the largest single supplying industry.

The cost and availability of material inputs can, sometimes, depend upon proximity to and personal contact with suppliers. It is appropriate, therefore, to examine the degree of geographic association between SIC 3069 and SIC 2822, and SIC 3079 and SIC 2821.

As a result of disclosure restrictions, comparable data on the location of Fabricated Rubber Products and Synthetic Rubber are not available. SIC 2911, Petroleum Refining, is, however, the major source of materials for SIC 2822, Synthetic Rubber. Based on data at the Census division level, it is possible to compare the locational patterns of Petroleum Refining and Fabricated Rubber Products in 1963, 1967, and 1971, via coefficients of geographic association.

The coefficient of geographic association (CGA) is a measure of the degree of geographic association between a pair of economic phenomena. The coefficient is bounded by 1.00 and 0.00, with a value of 0.00 indicating no geographic relationship. The coefficient can be calculated from the equation

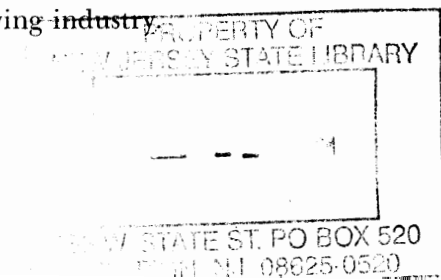
$$CGA = 1.00 - .50 \left( \left| \frac{W_j}{E_m^T} - \frac{E_n^j}{E_n^T} \right| \right)$$

where:

- j denotes the Census geographic divisions
- m, n denote industries
- T denotes the national total, and
- E denotes employment.

The CGA's for Fabricated Rubber Products and Petroleum Refining in 1963, 1967, and 1971 are 0.49, 0.50, and 0.53 respectively. These coefficients do not suggest a strong geographic affinity between these two industries.

In the case of Miscellaneous Plastics Products, data limitations are not as severe. For 1967, Miscellaneous Plastics Products and Plastics Materials and Resins evidenced a CGA of 0.76. Plastics Materials and Resins exhibited, in turn, a coefficient of 0.78 with its major supplying industry, SIC 2818, Organic Chemicals. For 1963, 1967, and 1972, Miscellaneous Plastics



Products was found to have a CGA of 0.62 vis-à-vis Organic Chemicals.

The CGA for Miscellaneous Plastics Products has an important implication for the State's Plastics Materials and Resins industry. In 1972, 5,300 persons were employed in Plastics Materials and Resins in New Jersey. At the national level, the Plastics Materials and Resins industry sells over 30% of its output to the Miscellaneous Plastics Products industry. If this same relationship applies in New Jersey, the rate of growth of the Miscellaneous Plastics Products industry will directly affect the size of the State's Plastics Materials and Resins industry.

**FUELS AND ENERGY**—The price and availability of fuels and energy have assumed greater importance in recent years. In some industries, traditional energy and fuels cost patterns have undergone rapid change. In addition, some industries and geographic areas have experienced supply short-falls.

The first thorough industry level, geographically disaggregated examination of fuel and energy outlays was undertaken for the *1974 Annual Survey of Manufactures*. Regrettably, at this writing, the full *Survey* for 1974 is not available and it is not possible to properly interpret energy and fuel expenditures on the part of the Fabricated Rubber Products and Miscellaneous Plastics Products industries in New Jersey.

**TRANSPORTATION**—Transportation costs are often cited as an important influence on the location of manufacturing activity. The manufacturer may incur the costs of transporting the materials to the factory, as well as the costs of shipping the final product to the purchaser. The structure of transport rate schedules and the relative values and volumes of the raw materials versus the final product will be major determinants of the location of the manufacturing plant.

Both the Fabricated Rubber Products industry and the Miscellaneous Plastics Products industry manufacture a variety of goods with differing value-volume relationships to their raw material

inputs. This diversity within these industries cautions against broad generalizations as to locational tendencies at the industry level. Under-scoring this wariness is the paucity of data on the transportation costs experienced by industries. One source of indirect data on the transportation costs in the manufacturing sector is the *Census of Transportation*. In order to gain some insight into transportation costs of the Fabricated Rubber Products and Miscellaneous Plastics Products industries, we turn to these data.

By 1972, shipments of the Fabricated Rubber Products industry had become more heavily concentrated in the under-300-mile categories. While in 1967, 39.4% of shipments moved up to 399 miles, in 1972, 39.2% of tons shipped was accounted for by distances 299 miles and under. At the same time, shipments under 200 miles in 1972 were lower in the Middle Atlantic states relative to the industry as a whole, and relative to 1967. Conversely, shipments 1,000 miles and beyond rose relative to 1967 and relative to the industry at the national level. These data, which do not lend themselves to completely unambiguous interpretation, seem to reflect a particularly sharp loss of sales in the 300- to 1,000-mile range.

The data in Figure 11.7 for the Miscellaneous Plastics Products industry indicate that in 1967 the distance distribution for the Middle Atlantic states was not vastly different from that of the industry as a whole. When the Middle Atlantic shipment pattern for 1967 is compared with that of 1972, it can be seen that the under-200-mile and 600-mile-and-over categories became more important. In contrasting the Middle Atlantic-United States ratios for 1967 and 1972 only, the extreme categories of under-200-miles and over-1,000-miles can be seen to have increased in relative importance from the perspective of the Middle Atlantic states. As with the Fabricated Rubber Products industry, the middle-range market seems to have deteriorated for manufacturers in New York, New Jersey and Pennsylvania.

**FIGURE 11.7**  
**SHIPMENT DISTANCES, FABRICATED RUBBER PRODUCTS (SIC 3069) AND**  
**MISCELLANEOUS PLASTICS PRODUCTS (SIC 3079), 1967 AND 1972**

	Tons Shipped (Thous.)	Fabricated Rubber Products Distance in Miles				
		Under 200	200- 399	400- 599	600- 999	1,000 and Over
1967						
MA	386	25.4%	14.0%	20.2%	28.0%	12.4%
US	2,144	40.3%	18.7%	13.1%	14.1%	13.9%
MA/US	0.18	0.63	0.75	1.54	1.99	0.89
1972*						
MA	171	17.0%	22.2%	12.2%	29.8%	17.0%
US	1,900	38.6%	10.3%	18.2%	21.6%	11.3%
MA/US	0.09	0.44	2.16	0.67	1.38	1.50

	Tons Shipped (Thous.)	Miscellaneous Plastics Products Distance in Miles				
		Under 200	200- 399	400- 599	600- 999	1,000 and Over
1967						
MA	992	37.6%	15.9%	14.3%	17.3%	14.8%
US	4,313	36.5%	17.3%	14.0%	18.4%	14.0%
MA/US	0.23	1.03	0.92	1.02	0.94	1.06
1972						
MA	1,853	40.9%	11.7%	10.1%	20.5%	16.6%
US	8,056	35.0%	12.1%	16.3%	22.8%	13.9%
MA/US	0.23	1.17	0.97	0.62	0.90	1.19

NOTES:

\*=Not strictly comparable with 1967, due to definitional change.

MA=Middle Atlantic Division (New York, New Jersey, and Pennsylvania).

SOURCE: *Census of Transportation, 1967 and 1972.*

Many firms in both of these industries manufacture goods that evidence a significantly lower value-per-pound than their material inputs. The increased importance of the markets 1,000 miles and beyond implies, particularly in the case of the Miscellaneous Plastics Products industry, that manufacturers may be induced by their transportation cost burden to relocate to closer proximity to those markets, so as to avoid the costs of "shipping a lot of air."

#### Intra-state Shifts in Economic Activity

In recent years, New Jersey has experienced a redistribution of economic activity within the State away from its older industrial areas. Illustrative of this is the case of SIC 30, Rubber and Miscellaneous Plastics Products.

Figure 11.8 contains data on this major group for selected cities and counties in New Jersey. From these data, it can be concluded that when

FIGURE 11.8  
CITY AND COUNTY SIC 30 COVERED EMPLOYMENT,  
SELECTED CITIES AND COUNTIES, 1965, 1969, 1974

City	County	SIC 30 Covered Employment, City as a Percentage of County		
		1965	1969	1974
Camden	Camden	72.0%	60.2%	51.3%
Elizabeth	Union	11.7	6.1	3.1
Hackensack	Bergen	...	7.5	2.5
Jersey City	Hudson	27.0	24.1	21.4
Newark	Essex	58.8	43.2	32.0
Passaic	Passaic	60.0	49.1	17.3
Paterson	Passaic	7.0	12.6	21.5
Trenton	Mercer	51.8	38.4	27.0

		SIC 30 Covered Employment					
		Dec. 1965		Dec. 1969		Dec. 1974	
(Camden)	Camden	( 353)	490	( 469)	779	( 361)	704
(Elizabeth)	Union	( 391)	3,354	( 304)	4,997	( 106)	3,449
(Hackensack)	Bergen	( 0)	1,852	( 234)	3,109	( 59)	2,394
(Jersey City)	Hudson	( 458)	1,695	( 348)	1,445	( 180)	842
(Newark)	Essex	(2,277)	3,873	(1,643)	3,807	( 840)	2,629
(Passaic)	Passaic	(4,671)	7,780*	(4,472)	8,911*	( 741)	4,283*
(Paterson)	Passaic	( 546)	7,780	(1,124)	8,911	( 919)	4,283
(Trenton)	Mercer	(2,461)	4,755	(1,651)	4,304	(1,100)	4,069
State		11,157 23,799		10,145 27,352		4,306 18,370	
		34,815		40,064		29,938	

NOTE:

\*=Excluded from the total to avoid double counting.

SOURCE: 1974 Covered Employment Trends in New Jersey, New Jersey Department of Labor and Industry, 1975.

employment in these industries increased in the State, as it did on balance from 1965 to 1969, growth tended to take place in other than the older industrial cities. In the period 1969 to 1974, employment in Rubber and Miscellaneous Plastics Products experienced a net decline of approximately 1,100 jobs. The decrease of employment in the cities and counties shown in Figure 11.8 more than accounts for this reduction and suggests that the industry grew elsewhere in the State. This pattern has a parallel in terms of states and regions at the national level.

### Conclusion and Policy Considerations

Fabricated Rubber Products, SIC 3069, has been found to be declining in absolute terms in

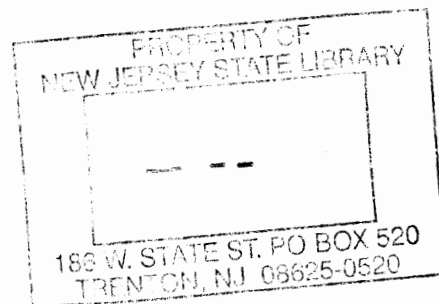
New Jersey since 1968. This declining trend is also apparent when employment in New Jersey is expressed as a share of the national total. National employment, itself, in recent years, has largely fluctuated below its 1969 peak and is expected to grow only slowly in the future. In New Jersey, the industry has experienced unit labor costs above the national average, and it is highly probable that Fabricated Rubber Products employment will continue to decline in the State. These facts suggest that in New Jersey it would be inadvisable to devote incentives or other policy resources to this industry.

Miscellaneous Plastics Products, SIC 3079, has also been found to have declined absolutely and relative to the national industry. Unit labor costs in this industry in New Jersey have ex-

ceeded the national average, and this condition may arise from lower productivity in the industry in the State. Paradoxically, capital expenditures in the industry in New Jersey are higher relative to the national average. Miscellaneous Plastics Products is, however, a candidate for further examination and for policy action in the State. Such steps are warranted on two grounds. First, the Miscellaneous Plastics Products industry is expected to experience rapid growth at the national level. Such expanding industries are the most likely candidates for employment gains in New Jersey. Second, the State's Plastics Materials and Resins industry, SIC 2821, may sell 30% of its output to the State's Miscellaneous Plastics Products industry. A decline

in SIC 3079 would likely be reflected in the Plastics Materials and Resins industry. In 1972, 5,300 persons were employed in SIC 2821 in New Jersey.

In order to develop a deeper understanding of the source of the Miscellaneous Plastics Products industry's difficulties in New Jersey, it is necessary to go beyond the published data that are available for analysis. The Office of State Economic Planning is initiating direct working relationships with Miscellaneous Plastics Products firms and their industry representatives. It is hoped that from the resulting discussions the reasons for the disappointing performance of this industry in New Jersey will emerge.



## XII

# ECONOMIC STABILITY AND THE INCOME TAX\*

### I. Introduction

After a prolonged and agonizing debate, the New Jersey Legislature resolved the biggest financial crisis in the State's history by enacting a State income tax. The new tax, which is linked to property tax relief and to business tax reforms, resolved the school crisis, averted a decline in credit rating, and removed a serious obstacle to New Jersey's industrial growth.

In the past, uncertainties associated with the fiscal crisis made many businesses extremely wary about investing in New Jersey. The income tax removed some of the uncertainty and relieved some of the pressure to increase local business property taxes. It also led to the repeal of the Retail Gross Receipts Tax and the Unincorporated Business Tax.

Some recent restructuring of business taxes has been accomplished, including the phase-out of the Business Personal Property Tax and repeal of the Sales and Use Tax on machinery and equipment. Even though the task of providing job-creating incentives is not yet fully accomplished, it is not unrealistic to claim that the initial steps already taken are exerting a favorable influence. It would appear that the business climate in New Jersey has improved significantly. Business no longer fears that insufficient State and local tax revenues will lead to higher

business taxes. In part, this has been assured by the spending ceilings the Legislature imposed as a condition for passing the income tax bills.

These new developments parallel other State and federal efforts to strengthen the economic recovery in New Jersey. Based on these developments, the Economic Policy Council has forecast a steady improvement for the New Jersey economy in 1977.

It should be clearly stated from the beginning that New Jersey citizens bear the cost of this tax reform. A tax on income was certainly not a cause for elation, especially in a year when the growth in real incomes was minimal. In subsequent years when disposable incomes rise significantly, the tax burden will not be felt as severely. The benefits of property tax relief and streamlined business taxes will become more apparent to the public when new jobs result from renewed business confidence and industrial development.

Unfortunately, normal economic growth in New Jersey might once again be interrupted. The danger stems from the July 1978 expiration date of the income tax. The temporary nature of the tax jeopardizes the State's fiscal stability and business confidence. A renewed fiscal crisis can only do harm to business and it cannot benefit the public in the long run. The prospect

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\* Prepared by Dr. Adam Broner, Director, Dr. Laurence H. Falk and George R. Nagle, staff economists of the Office of Economic Policy.

of a declining economy is painful to everyone: to the unemployed, to those threatened with unemployment, to property owners, and to the business community.

The objective of this paper is to make clear that the State's economic recovery is at stake as well as the opportunity of regaining some of the jobs and income losses suffered during the last several years. If we destroy that opportunity, it will be very difficult, if not impossible, to find new sources of sustained growth in the future.

The remainder of this paper is devoted to an evaluation of alternatives to an income tax. Those alternatives are examined from the viewpoint of their impact on business, industry, and employment. Consideration is also given to income distribution effects of alternative tax policies.

## II. Examination of the Alternatives

### *Assumptions*

In what follows we make two assumptions. First, we expect that any alternative solution will satisfy the New Jersey Constitution and the April 1973 State Supreme Court decision on school financing. Second, we assume that the constitutional provision will be met, as is now the case, through increased State aid to deprived school districts—not by a reduction in State aid per pupil in wealthier school districts. Requiring hard-pressed local districts to provide their own funds to meet the State's educational standards would only compound the present inequities in property taxation; requiring wealthier districts to lower school spending to the level of poor districts as the approach to equalization is unrealistic.

### *Alternatives to a Personal Income Tax*

If the foregoing assumptions are correct, the State must have access to new funds for supplementary aid to less affluent school districts. These funds would need to come from one of

four broadly defined sources. First, the State could increase business taxes. Corporate Income, Net Worth, payroll, and value-added taxes are some examples. As a second alternative, a State property tax on top of local property taxes could be levied on all property in the State at an invariant percentage of equalized value or at a standard rate for each property class. The third option is to impose further sales or excise taxes. Our present 5% tax could be increased and extended to non-taxed items, or additional excise taxes could be applied to such items as gasoline, tobacco, and alcohol. Finally, school aid might be financed from spending reductions elsewhere.

Some combination of the alternatives examined could be used to yield the needed revenue. However, an infinite number of such combinations could be proposed. Thus, for simplicity we consider each alternative separately, as if the entire revenue loss must be made up by the specific alternative.

### A. Business Taxes

Allowing the income tax to expire after fiscal year 1978 would create a revenue gap in the neighborhood of \$900 million.\* This gap could be filled by increasing business taxes; three possible levies are considered below:

1. *Corporate Income Tax*—An additional \$900 million business tax would require tripling the corporate income tax rate to roughly 21-22% and reinstatement of the Retail Gross Receipts and the Unincorporated Business taxes. These new taxes can have a devastating effect on many businesses. When added to other State locational disadvantages—high labor, energy, and environmental costs—they could be the “straw that broke the camel's back.” Although studies\*\* often discount the influences of State and local levies, taxes of this magnitude would significantly reduce profits and cause many businesses to relocate in other states. The effect on New Jersey's economy would be felt in terms of perma-

\* We adopted the \$900 million figure as the probable fiscal year 1978 revenue which will be needed for the school finance program and tax reform made possible by the income tax.

\*\* For example, see Grieson, Hamnovitch, and Morgenstern, *The Effect of Business Taxation on the Location of Industry: An Econometric and Theoretical Investigation*, Department of Economics, Columbia University, 1974.

nently lost jobs, rising unemployment, falling personal incomes, and a lack of new investment. Since the corporate tax base would clearly decline under these conditions, future rate increases would be necessary.

Business location experts often point to the quality of the public infrastructure as a prime location attribute. A deteriorating economic base would exacerbate a shift in expenditures from the State's infrastructure (e.g., improving the transportation system) to basic human needs (e.g., welfare). Our deteriorating infrastructure would become an economic liability.

2. *Payroll Tax*—A tax imposed on the payrolls of business and industry has been recommended and may again be proposed to deal with the State's school finance problem. A payroll tax almost certainly would make the cost of labor in New Jersey relatively more expensive. Thus, a possible reaction by employers would be to use *less labor* and more machines in the production process.\* In the case of multi-state corporations, which constitute a large proportion of New Jersey industry, this might lead to shifts in production and, thereby, employment to other states. Even if a New Jersey producer supplying the national market is able to pass on the payroll tax in the form of increased prices, this still might result in reduced output and employment in New Jersey. Needless to say, this would have an inflationary impact. The tax would affect particularly employers whose payrolls are a large proportion of their costs or whose profits are small compared to labor costs.

The payroll tax would aggravate an unhealthy long-term tendency for manufacturing activity to decline in New Jersey relative to the nation.

3. *Value-added Tax*—A business value-added tax\*\* is a broad-based levy capable of raising large sums of revenue at a relatively low rate. Although the value-added tax is not a newcomer to the field of public finance, only one state,

Michigan, has imposed such a levy. The value-added tax has an advantage in that it treats factors of production equally, thus the tax base is proportional to the firm's economic size. However, an important disadvantage of the tax is that it is not related to the firm's ability to pay. A value-added tax is independent of profitability and must be paid even when losses are incurred.

With little prior experience we cannot say much about the economic effects of a value-added tax. But one effect is clear: There would be a massive redistribution of the tax burden from one type of business to another. Such a fundamental change deserves careful study in light of the Michigan experience, and since the Michigan law has only been in effect for a little over a year, there is not yet available sufficient data to permit proper evaluation.

Whichever form additional business taxes might take, there can only be harm in shifting the school finance burden to New Jersey's business and industry. The personal income tax is an elastic revenue source which does *not* penalize business activity in the State. In fact, the reduction in local property taxes made possible by the income tax may result in lower tax rates for businesses as well. The revenue potential of the income tax also made it possible for the repeal or phase-out of several business taxes on capital and investment which had created disincentives to locate and produce in New Jersey.

It should be emphasized that, despite common belief, additional business taxes, which aggravate cost disadvantages of operating in New Jersey, are not beneficial to the State's citizens. In a deteriorating business environment, everyone suffers.

## B. Statewide Property Tax

A statewide property tax would be levied on businesses as well as other property owners. The

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\* Assuming that the tax would be levied on employers. A payroll tax levied on employees would be essentially an income tax.

\*\* Value-added is the dollar value contributed by the business firm to the output of goods and services. It may be computed by subtracting inter-firm purchases from gross receipts, or by summing the firm's payments to payroll, interest, rent, and profits.

tax would be in addition to existing local property taxes. With an equalized property value of \$100 billion, a rate of \$0.50 per \$100 would be needed to satisfy the Supreme Court decision.\* Without reiterating the evils of property taxation, it is clear this tax adversely affects incentives to invest and save; it has a bearing on choices among types of consumption expenditures, business inputs, and spatial location. Moreover, for several reasons, any measure of property value is a crude measure of ability to pay. Property is an asset which may or may not relate to net income. Property may be owned outright or encumbered in certain ways (mortgages, leases, liens, etc.). Different property owners with equivalent assessed property values may be paying very different amounts on mortgages.

1. *Impact on Industry*—An increased property tax on New Jersey business and industry will have undesirable economic consequences. A property tax is like a fixed cost of doing business. It must be paid regardless of corporate sales, or profits.

Business and industry already bear a heavy property tax burden in New Jersey. About 12% of industrial and commercial net income after payment of federal income tax in 1973, and 18% in 1975, went to local property taxes. So the property tax would be a burdensome tax to business if the tax base were net income. But the actual situation makes it far more painful: The property tax base is land and capital, not income.

Unfortunately, income streams of firms fluctuate widely. If in normal years business property taxes represent 12% or 18% of (after federal tax) income, in other years of severely depressed business conditions, the *fixed* nature of property tax liabilities might represent a 100% (or higher) tax. This can present a crucial cash-flow problem for business and industry, and cash-flow squeezes have been a frequent cause of bankruptcy even for large business and industrial enterprises.

An additional statewide tax will only compound the financial difficulties of manufacturing in a high cost environment. Firms operating at the margin between profit and loss will find it advantageous to shut their doors for a lower cost location. The loss to the State would include not only industrial ratables but also jobs, which are scarce in New Jersey.

*Property Assessment*—The assessment problem is even more troublesome. In compliance with State law, the assessed value of industrial or commercial property should be equal to its market value. This poses no problem for the assessor when the business establishment is newly built or sold. In either case the total cost to the new owner represents market value as set through arms-length negotiation. But after a few years, the assessor has little information on which to establish value.

After some time has elapsed, the market value of a facility is the amount for which it could be sold, a price that would reflect the buyer's view of its income-producing potential. But there are few sales to reveal true value, and the assessor's problem is virtually insurmountable. Original price tells little; book depreciation can be almost meaningless. A business which appeared to be enormously profitable a few years ago may now be on the verge of bankruptcy. Its product may now be obsolete; moreover, yesterday's booming market may have become today's recession. As a result, assessments on properties of equal value can vary widely within a single municipality.\*\*

Let us give an often duplicated example of the type of inequity that results: Two gas stations may be identical in structure, equipment, and amount of land and, accordingly, are assessed and taxed equally. But one will produce twice as much income and thus have a true market value twice as high as the other. Since neither station is sold, the inequity may remain for many years, a situation which may result in business failure for the over-assessed station. Industrial property is similarly sensitive to assess-

\* Here, we are referring to a \$500 million school fund. It should be recognized that some business taxes which have now been repealed would have to be reinstated in order to replace lost revenues.

\*\* See New Jersey Tax Policy Committee, *Report 2, The Property Tax*, 1972, pp. 57-65 and 113-148 for documentation.

FIGURE 12.1  
1976 EFFECTIVE PROPERTY TAX RATES  
IN SELECTED MUNICIPALITIES

	Percent		Percent
Englewood-Cliffs	1.83	Paterson	3.84
Linden	1.89	New Brunswick	3.93
South Amboy	2.03	Trenton	5.83
Flemington	2.55	Newark	6.20
Edison	2.67	Atlantic City	6.59

SOURCE: *Annual Report 1976*, New Jersey Department of the Treasury, Division of Taxation.

ment error, and extra heavily burdened plants can be unwittingly forced to close—perhaps relocate out-of-state—if the tax is too high.

*Variation in Rates.*—Since our larger cities generally operate with higher effective property tax rates than smaller municipalities, there is a disincentive to urban investment in real property. Moreover, the prospect of higher absolute tax rates may discourage urban renewal relative to investment in other assets. Real estate investors generally require high rates of return because of risk and illiquidity; high property taxes further increase the gross receipts required to make the investment attractive. Figure 12.1 indicates the existing variation in tax rates for typical industrial municipalities.

There have been previous legislative proposals to amend the State's constitution to permit "higher" property tax rates on commercial and industrial real estate. To tax industrial or commercial enterprises at a higher rate would fail any test of equity, benefits received, or ability to pay. Given our lagging economic growth and abnormally high unemployment rates, there is little need for an additional tax on a business

locating in New Jersey. Aside from its direct economic disincentives, this tax could create an unfavorable perception of the State as a place to locate.

2. *Impact on Households*—Much of the argument against raising property taxes on New Jersey businesses can be extended to households. The effect of increased property taxes on homeowners and tenants cannot be ignored. In general, the property tax is regressive in relation to current income.\* Low income families spend a larger percentage of their income on housing. Senior citizens have a higher tax liability due to their relative heavy concentration of assets in housing at a time when current income, a common measure of ability to pay, is sharply reduced. The latest available study of property tax distribution by income class clearly demonstrates the inverse relationship between property tax and income (Figure 12.2).

The problem of accurate assessments in business properties also exists to a lesser degree in residential properties. In general, real estate selling at a higher price tends to be assessed at a lower percentage of its sales price than lower

FIGURE 12.2  
EFFECTIVE PROPERTY TAX RATES, BY INCOME CLASSES

Income Class	Under \$3,000	\$3,000- \$5,000	\$5,000- \$7,500	\$7,500- \$10,000	\$10,000- \$15,000	\$15,000- \$25,000	\$25,000 and Over
Effective Tax Rate (Percent of Income)	14.6	10.0	9.1	7.7	7.0	5.8	3.3

SOURCE: New Jersey Tax Policy Committee, *Report 1, The Revenue Gap and Tax Burden*, 1972, p. 25.

\* Studies clearly show the property tax to be regressive in relation to *current income*. However, there is some evidence that when measured relative to *permanent income*, which is the income an individual expects to receive over a long period of time, the property tax may be distributed more evenly on income classes. See for example, Henry Aaron, *Who Pays the Property Tax*, Brookings Institute, 1975.

priced properties. There is also evidence of considerable inequality in assessing residential properties of equal value within a municipality.\*

In cases of newly constructed homes, the result of increased property taxes is uncertain. For example, to the extent that the increase cannot be shifted to builders and landowners, the buyers will have higher monthly payments limiting the amount of new houses being purchased (demand). In the case where the increase is absorbed by builders, it will reduce their net income and lead to limitations in the construction of new homes (supply).

### C. Sales and Excise Taxes

To illustrate the magnitude of Sales and Use Tax or excise tax increases required to replace the income tax, we use only the Sales and Use Tax as currently constituted. Since the Sales and Use Tax yields about \$180 million for each percentage point levied, the existing levy would need to be doubled—increased from 5% to 10%—to bring in the \$900 million.

1. *The Effect on Consumers*—Replacing the income tax with additional Sales and Use Tax would shift the impact from income to consumption and, as a result, from higher income to lower income classes. A 10% Sales and Use Tax would fall on various income classes approximately as follows:

FIGURE 12.3  
SALES AND USE TAX  
EFFECTIVE TAX RATES,  
BY INCOME CLASSES

Income Class	Effective Rate
Under \$3,000	3.2%
\$3,000 Under \$5,000	4.8%
\$5,000 Under \$7,500	3.6%
\$7,500 Under \$10,000	4.2%
\$10,000 Under \$15,000	4.2%
\$15,000 Under \$25,000	4.0%
\$25,000 and Over	2.0%

NOTE: Assumes spending patterns of any given class is the same today as it was for that class in 1970.

SOURCE: Computed from New Jersey Tax Policy Committee, *Report 1, The Revenue Gap and Tax Burden*, 1972, p. 22.

\* See New Jersey Tax Policy Committee, *Report 2, loc. cit.*

\*\* Indeed, the present tax incorporates several, for example, the exclusion of incomes below \$3,000, personal exemptions and a higher rate for taxable incomes above \$20,000. Moreover, the New Jersey income tax is levied on gross income and thus does not provide tax shelters to the wealthy.

As can be seen in Figure 12.3, the tax is approximately proportional in the middle income range and regressive in the extremes. Contrast this to an income tax which can incorporate elements to achieve any desired degree of progressivity.\*\* If the State's objective is to tax the poor at a lower rate than the rich, an income tax is a more appropriate vehicle.

2. *The Effect on Business*—While the final incidence of the increased sales tax is not fully predictable, it is virtually certain that prices (including taxes) would rise. But this is not the only effect; because consumers would be less willing and able to pay the higher prices in New Jersey, their purchases of taxed commodities would fall or shift to other states having lower sales taxes. As a result of the lost sales, some marginal firms can be expected to fail and others to relocate out-of-state. The State, already plagued by an inordinately higher unemployment rate, would suffer the loss of additional jobs.

### D. Spending Reductions Elsewhere

In principle, at least, there is always the possibility of raising the \$900 million by reducing spending elsewhere. This would mean either cutting back or eliminating other programs, or administering existing programs more efficiently. Without attempting to pass judgment on any particular program, we think that the necessary magnitude of savings is entirely unrealistic. New Jersey's budget expenditures have grown at minimal rates and actually declined in inflation-adjusted terms during the last few years. The Garden State ranks near the bottom in State taxes per \$1,000 personal income, number of State employees per 10,000 population, and expenditures for higher education. This suggests that any possible savings from more efficient management might justifiably be devoted to increased, rather than reduced services.

### E. A Combination Approach

Our review of possible revenue sources does not reveal any alternative which is superior to

an income tax. It can be inferred that no combination of the alternatives can be preferred to an income tax. However, this does not mean that the existing income tax cannot be improved.

### III. Opposition to the Income Tax

#### *The Senior Citizens' Case*

Senior citizens with low and moderate incomes are one group of people who benefit directly from a State income tax coupled with property tax relief. This is because in most cases they are not required to pay income taxes, while at the same time they do receive property tax relief. The following example will clarify this assertion.

Assume that over a working lifetime an average wage or salary earner was able to save \$30,000. Such a sum safely invested may bring an annual income of, say, \$1,500-\$2,000. Social security payments to a husband and wife at full retirement age might reach \$300 per month, that is, \$3,600 annually. Total income will amount to approximately \$5,500-\$6,000.

Assume further that the senior citizen owns a house assessed at \$30,000 for which all mortgage, interest and principal has been paid. Unfortunately, property taxes, depending on the location of the house, might subtract a sizeable amount (usually more than \$1,000) from the senior citizen's meager income. Add to this the unavoidable energy bill, which at current prices approaches \$1,000 annually. Moreover, following past experience of appreciation in the value of houses and ever-increasing property tax rates, there is a certain prospect of further increases in his property tax liabilities.

No wonder one often hears that senior citizens have to leave their houses for which they worked all their lives and which were intended to provide a free and quiet shelter at retirement age.

A shift of the tax burden from property to income can only benefit senior citizens. For under the above assumptions, which should be typical for many senior citizens, they will pay neither federal nor State income tax. Moreover, exemption of most pension income means that few senior citizens will pay any State income tax.

The New Jersey income tax does not relieve senior citizens from all property taxes but it nevertheless provides for a halt to skyrocketing increases and for a \$240 tax rebate on the average which can be higher in special circumstances (i.e., additional rebates for the disabled, blind, etc.). This rebate is in addition to the existing \$160 senior citizen deduction.

It is therefore hard to comprehend why some senior citizens' associations so *energetically* opposed the New Jersey income tax when it was being considered by the Legislature.

#### *The Connecticut Tax Haven Argument*

Opponents of the income tax frequently point out that Connecticut might be a desired place for relocation from New Jersey because it does not have an income tax. These individuals are either short-sighted or ill-advised because Connecticut does not offer a tax haven for either businesses or individuals. Table IV provides an item-by-item tax comparison for the two states. Connecticut's 10% corporate income tax is considerably higher than New Jersey's. The motor fuels and sales taxes are higher and Connecticut does not exempt clothing or manufacturing equipment from the sales tax base. Although Connecticut does not have a personal income tax, it does tax net capital gains at the rate of 7%.

### IV. Conclusions

The preceding review of possible alternatives to an income tax allows us to conclude the following:

1. We can find no alternative to an income tax that is preferable from the point of view of the long-run interest of the State economy.
2. Even those taxes that can be levied entirely on businesses would have negative repercussions on the State population. The citizens of the State would ultimately bear the negative consequences of a deteriorating economy which would result from additional business taxes.

FIGURE 12.4  
COMPARATIVE STATE TAX STRUCTURES

	New Jersey	Connecticut
<b>Business Taxes</b>		
Corporate Net Income . . . .	7.5%	10%
Net Worth . . . . .	2 Mills per Dollar	None
<b>Business Personal Property</b> . . . . .		
	New acquisitions are exempt (old property taxed at 1.3% of 50% of original cost)	Assessed at 70% of true value and collected at local property rates
<b>Unincorporated Business Tax</b> . . . . .		
	Repealed	None
<b>Motor Fuels</b> . . . . .	\$.08 per Gallon	\$.11 per Gallon
<b>Sales Tax</b> . . . . .	5%	7%
Clothing . . . . .	Exempt	Taxable (children's clothing is exempt)
Food—off-premise consumption . . . . .	Exempt	Exempt, with exceptions
Manufacturing equipment . . . . .	Repealed	Taxable (at 3.5%)
<b>Personal Income Tax</b> . . . . .	2%-2.5% on Net Income	None
<b>Capital Gains</b> . . . . .	None	7% on Net Capital Gain

SOURCE: *Monthly Tax Features*, Volume 21, Number 1, January 1977.

3. Any tax other than an income tax levied on the population (e.g., sales or property tax) would fail to diminish the financial burden and would be less equitable. This does not mean that the particular form of the income tax enacted in 1976 is the most equitable. There could be designed other more or less progressive income taxes that would satisfy particular segments of the population.
4. It is also apparent that any combination of the examined alternative taxes would be inferior to an income tax.
5. Although improvements in the existing income tax might seem desirable, the broader concern about economic stability and well-being of the State's population should caution against a complete revision and, even more, against a repeal of the income tax in the near future. It is quite likely that such a move would be more harmful than beneficial not only to the business community but, in the final analysis, also to the entire population of New Jersey.

# XIII

## HOUSING FINANCE AND STRUCTURAL REFORMS\*

Stability and high rates of residential construction activity have been continuing and important goals of national and state economic policy. The provision of adequate housing is the obvious and main motivation for such goals. The benefits of construction industry employment and of the multiplier impacts on economic activity of such employment provide additional incentive to achieve these goals. Frequently, indeed more often than not, these goals have been missed by large margins. For example, in 1968 Congress, through the newly created Housing and Urban Development Agency, set a long-term objective of 26 million housing units over a 10-year period, or an average annual rate of 2.6 million units.\*\* As shown in Figure 13.1, for the 8-year period 1969 to 1976, the average annual rate has been 1.7 million units. Also, the construction industry has suffered extreme instability, with three major periods of very low activity—1966, 1969-70, and 1974-1975. As shown in Figure 13.1 the situation in New Jersey follows very much the national pattern; beginning in 1974, in fact, New Jersey housing has deteriorated relative to the national norm.

An important element of the general housing dilemma is that there are so many specific facets

to the issue. One problem is that residential construction as carried out in the U.S. is a labor-intensive activity, with the implication that opportunities for productivity gains are limited. The cost of newly constructed homes thus follows the path of labor and material costs, and tends to outpace general inflation (see Figure 13.2).† A second problem, relating to the distribution of income, is that certain groups in the economy, for example, young married couples and low-income families, find it particularly difficult to enter the housing market at any level. Also, older, retired people find themselves pushed out of housing units that previously they could afford. A third problem concerns the geographic distribution of new residential construction and renovation of existing units between urban centers and suburban developments.

Still another aspect of the housing problem concerns the provision of an adequate flow of mortgage financing at appropriate interest rates. Inflationary conditions and high capital-market interest rates have caused mortgage rates to double in the last 10 to 15 years (see Figure 13.4 for the increase since 1970). In periods of peak tight money conditions, funds flow out of thrift institutions and, in the extreme, mortgage

\* Prepared by Dr. Dwight M. Jaffee, Member, Economic Policy Council.

\*\* See *First Annual Report on National Housing Goals, Message from the President of the United States*, January 23, 1968.

† Land costs are involved too, of course, though they are more dependent on scarcity, location of transportation, schools, etc.

FIGURE 13.1  
HOUSING STARTS/PERMITS

	United States <sup>a</sup>	New Jersey <sup>b</sup>	% New Jersey
			U.S.
1969	1.50	37.89	2.53
1970	1.47	39.90	2.71
1971	2.08	58.04	2.79
1972	2.38	65.54	2.75
1973	2.06	52.15	2.53
1974	1.35	25.88	1.92
1975	1.17	23.22	1.99
1976	1.55	.....	.....
Annual Average=1.70			

<sup>a</sup> SOURCE: Economic Report of the President, 1977,  
In millions of starts

<sup>b</sup> SOURCE: New Jersey Residential Building Permits,  
In thousands of permits

markets are disrupted to the point that funds are not available without regard to interest rates. Even in normal periods, low-income families and newly-married couples have limited access to mortgage markets, and red-lining activities—when lenders refuse to lend mortgage funds in specified areas—aid and abet urban decay.

With such a wealth of problems, a variety of solutions have been offered and tried. The bulk of the resources have been directed to a frontal attack; namely, subsidizing the cost of housing services. Generally these solutions have had poor cost-benefit ratios. Simply put, large amounts of

dollars have been spent, and the problems persist. Of course, there may be room for improving these cost-benefit ratios since one has no difficulty in finding flaws in the details of how specific programs were carried out. However, in the main, one is struck that this is the nature of the beast, and the direct subsidy approval to housing problems is likely to be very expensive.

Attention has been focused increasingly on an alternative strategy that involves not explicit subsidies but structural reforms in the operation of the relevant markets. Examples of structural reform include programs for standardizing build-

FIGURE 13.2  
THE COST OF HOUSING

	Purchase Price New Home \$ thousands	CPI Home Ownership 1967=100		CPI Rental 1967=100		CPI Total 1967=100
		U.S.	N.J.	U.S.	N.J.	
		1969	25.6	116.0	113.6	
1970	23.5	128.5	130.0	110.1	111.5	116.3
1971	25.2	133.7	140.1	115.2	119.2	121.3
1972	27.5	140.1	148.6	119.2	125.7	125.3
1973	32.7	146.7	157.1	124.3	133.0	133.1
1974	36.0	163.2	174.7	130.2	140.7	147.7
1975	39.3	181.7	187.8	137.2	149.8	161.2
1976	.....	191.7	195.3	144.7	159.1	.....
% Change 1969-1976		165%	172%	137%	150%	

ing codes, programs for encouraging greater winter-period construction, and various changes in mortgage market operation. One appeal of structural reform is that it involves little direct expenditure of public funds. The starting point for this approach is that the results of residential construction activity may have been so poor because the relevant markets have not functioned properly. If this is the case, large-scale subsidy programs may spar with the symptoms of the condition, while the source of the problem goes untouched. It is no doubt wishful thinking to hope that structural reforms will eliminate housing problems, but increasingly there is the view that however much they succeed, the cost-benefit ratio of structural reforms will be highly favorable.

The institutions relating to housing finance are a prime example of the possible gains to be achieved through structural reform and are the focus of our discussion here.\* The current structure of mortgage markets is to a predominant degree the result of public policy. For example, the pre-eminence of long-term, fixed-payment, amortizing mortgage contracts begins with Federal policy during the 1930s' depression. The key role of thrift institutions as mortgage originators and holders follows from a series of taxation and capital market policies. Since the current structure is so largely a creature of public policy, it is likely that it can be changed or re-directed by public policy. A definite gain will be achieved to the extent that the original initiatives were misdirected, or to the extent that basic conditions have changed, making current institutions outmoded. The following sections give four examples of proposed structural changes in mortgage and related financial markets.

### Alternative Mortgage Contracts\*\*

The long-term, fixed monthly payment, fixed interest rate, conventional mortgage contract commonly used in the U.S. served well during

the low inflation years of the 1950's and 1960's. A perverse feature of the contract, however, has been revealed during the high interest rate and high inflation episodes of the late 1960's and the 1970's. Because the conventional mortgage contract sets the monthly payment in fixed dollar amounts, the *real* cost of the monthly payment declines over time in an inflationary environment. To offset this decline in the real payment, the initial nominal value of the monthly payment is set higher in periods of anticipated inflations. For example, if mortgage interest rates double (say from 5% to 10%) due to anticipated inflation, then the monthly payment on a mortgage will rise almost in proportion on high loan-to-value mortgages. This effect is illustrated in Figure 13.3. Figure 13.3a shows the fixed monthly payment *in nominal terms* on a conventional mortgage. Figure 13.3b shows the declining monthly payment *in real terms* on a conventional mortgage.

The feature of high initial monthly payments and declining real payments over time is perverse for young couples and families trying to purchase their first home. Such home buyers anticipate rising income levels as they progress through their careers, and thus mortgage contracts with rising nominal monthly payments and even rising real monthly payments fit better the time-path of their anticipated income. Conventional mortgages currently have such high initial monthly payments that these home buyers cannot afford them, and the declining real payment feature of conventional mortgages does these home buyers no good.

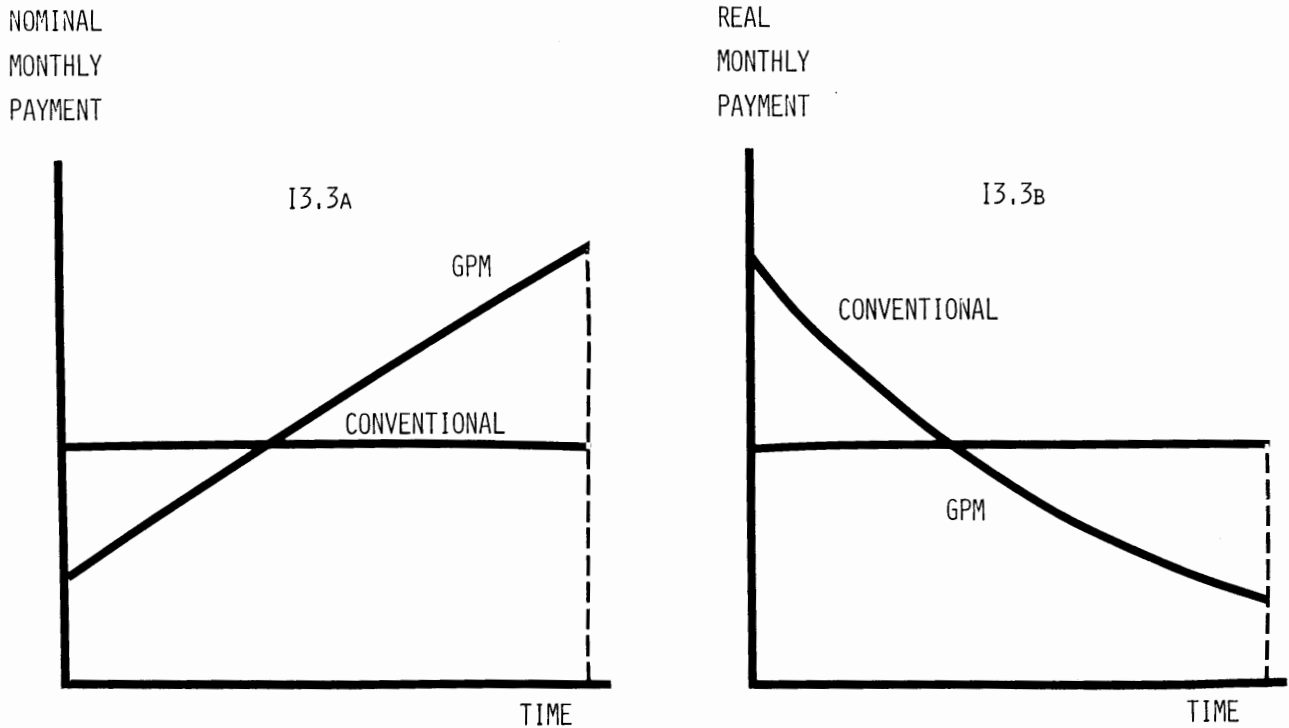
*Graduated payment mortgages* (GPM's) have been proposed as a solution to the problem of the young home buyer. GPM's start with a lower monthly payment than conventional mortgages, and thus young families can afford the payment in the early years of the mortgage.†

\* A more general and theoretical discussion along these lines is available in Dwight M. Jaffee, "Credit for Financing Housing Investment: Risk Factors and Capital Markets," in *Housing in the Seventies: Working Papers*, U.S. Department of Housing and Urban Development, 1976.

\*\* For an extended discussion of this topic, see F. Modigliani and D. Lessard, *New Mortgage Designs for Stable Housing in an Inflationary Environment*, Conference Series No. 14, Federal Reserve Bank of Boston, January 1975.

† For numerical examples of GPM's see the appendix to this chapter.

FIGURE 13.3



Over time the monthly payment in nominal terms on a GPM is programmed to rise, in step with inflation rates and the rising income of young families. If the rate of graduation equals the inflation rate, then the real cost of the monthly payments is constant: The time path of monthly nominal and real payments for a GPM mortgage is illustrated in Figure 13.3. In Figure 13.3a the nominal monthly payment begins lower than the payment on a conventional mortgage, but since the GPM payment rises over time, eventually the payment exceeds that of a conventional payment. In Figure 13.3b the real payment on a GPM mortgage also starts below the corresponding payment on a conventional mortgage; but since the real payment on a conventional mortgage is declining, eventually the constant real payment on the GPM exceeds the declining real payment on the conventional mortgage.

It has been estimated that perhaps as many as 25% of the young families contemplating

purchasing a home would be able to proceed with a GPM mortgage, whereas they are not able to proceed with a conventional mortgage.\* Until recently, GPM mortgages have not been encouraged by State and federal law, and in many cases there have been outright prohibitions. The Department of Housing and Urban Development is currently carrying out pilot experiments with GPM mortgages, and the initial results appear encouraging. Of course, there are technical features of the GPM that would have to be worked out carefully with lending institutions to insure the contract meets their requirements. One problem, for example, is that the loan-to-value ratio on a GPM declines less than for a conventional mortgage in the early years, and lenders are rightly concerned about this feature. On the other hand, the collateral value of a house is itself rising in inflationary periods, and thus the loan-to-value ratio on a GPM in inflationary periods need be no higher

\* See Dwight M. Jaffee and James Kearl, "Macroeconomic Simulations of Alternative Mortgage Instruments," in Modigliani and Lessard, *op cit.*

than the loan-to-value ratio value on a conventional mortgage in non-inflationary periods.

Another mortgage innovation is the variable-rate mortgage (VRM) on which the interest rate is allowed to vary over time according to changes in some pegging interest rate. (In contrast, the mortgage rate on GPM's is fixed just as on a conventional mortgage.) VRM's have been introduced by state-chartered institutions in California with great success, and it is perhaps no coincidence that California is currently leading the nation in its building boom. VRM's are not allowed currently on the Federal level, because Congress was reluctant to approve Federal Home Loan Bank Board initiatives. Congress was concerned that interest rates could rise unexpectedly, surprising home buyers badly. Also, Congress was concerned that conventional mortgages would then cease to be available.

In my view, Congress has simply misunderstood the situation. VRM's would be and should be offered in conjunction with other mortgage alternatives. The market for life insurance contracts provides an instructive example. Life insurance companies today provide a wide range of life insurance options ranging from "whole life" with its implicit savings plan to "term" insurance and "renewable term." All of these alternatives exist together, and individuals purchase the type of policy best suited to their need. The mortgage market should be allowed to provide a corresponding set of mortgage contract alternatives.

Congressional concern over sharply rising interest rates seems also exaggerated. The California plans, for example, have in place a variety of safeguards to insure that borrowers accurately understand the contract, and that increases in the mortgage are carefully regulated. Also, VRM mortgages are a two-way street, and borrowers may indeed receive the good news of mortgage rate decreases in the future.

The Congressional hesitation over VRM's in part stems also from a comparison of conventional mortgage contracts at 5% interest rates with VRM contracts at current mortgage rates.

Of course, consumers would prefer 5% rates to 10% rates, and borrowers who obtained such mortgages 15 years ago are now delighted. Today, however, this option is simply not relevant. The choice today is between high rate conventional mortgages that tie the borrower into 9 or 10% interest rates for the next 20 years, and high rate VRM's with perhaps equal chances of the rate rising or falling in the future. Not all borrowers would freely opt for VRM's, but for many borrowers, and for many lenders, VRM's provide a more satisfactory lending instrument.

### Usury Ceilings

Usury ceilings for mortgage interest rates have been in force in most states, including New Jersey, supposedly as a means of protecting borrowers from unscrupulous lenders. Figure 13.4 shows a comparison of the New Jersey usury ceiling series with national mortgage rates on a monthly basis since 1968. As shown in Figure 13.4, at times the New Jersey usury ceiling has been nearly one full percentage point below national mortgage rates, while at other times the usury ceiling has been even a bit above national rates. Care must be taken in comparing New Jersey and national mortgage rates, however, since mortgage rates do vary, sometimes significantly, on a regional basis. The bottom rows of Figure 13.4, for example, show a comparison since mid-1975 between actual New Jersey mortgage rates (based on a sample of the New Jersey Department of Banking) and national mortgage rates. As can be seen from the data, New Jersey mortgage interest rates, in fact, do not appear to differ from national averages in an important way.

Historically, usury ceilings were to protect naive borrowers from unscrupulous lenders. It would seem today, with the benefits of excellent communication and advertising, that the risk of naive and uninformed borrowers being hurt by unscrupulous lenders is small. Today, usury ceilings are more directly an attempt to keep market interest rates on mortgages low. The idea is that if the market wants to charge 9½%, but the ceiling is put at 9%, then lenders will

FIGURE 13.4  
MONTHLY COMPARISON OF NEW JERSEY USURY RATE LIMIT  
WITH CONVENTIONAL HOME LOAN MORTGAGE NATIONAL AVERAGES  
JANUARY 1970-MAY 1977

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1970												
(1)	7.50	7.50	7.50	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
(2)	8.16	8.23	8.29	8.24	8.28	8.31	8.32	8.35	8.31	8.33	8.26	8.20
(3)	8.13	8.23	8.26	8.19	8.18	8.19	8.21	8.25	8.27	8.20	8.18	8.12
1971												
(1)	8.00	8.00	8.00	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
(2)	8.03	7.74	7.52	7.37	7.36	7.38	7.51	7.60	7.67	7.68	7.65	7.62
(3)	7.94	7.67	7.47	7.34	7.33	7.38	7.50	7.58	7.63	7.62	7.56	7.51
1972												
(1)	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
(2)	7.62	7.45	7.38	7.38	7.40	7.41	7.43	7.45	7.43	7.48	7.50	7.51
(3)	7.45	7.35	7.31	7.30	7.33	7.36	7.37	7.39	7.42	7.43	7.44	7.45
1973												
(1)	7.50	7.50	7.50	7.50	7.50	7.50	8.00	8.00	8.00	8.00	8.00	8.75
(2)	7.52	7.52	7.51	7.53	7.55	7.62	7.69	7.77	7.98	8.12	8.22	8.31
(3)	7.53	7.55	7.54	7.55	7.62	7.64	7.70	7.87	8.10	8.35	8.42	8.46
1974												
(1)	8.75	8.75	8.75	8.75	8.75	9.00	9.00	9.00	9.00	9.50	9.50	9.50
(2)	8.33	8.40	8.43	8.47	8.55	8.65	8.75	8.87	8.97	8.95	9.04	9.13
(3)	8.47	8.53	8.47	8.43	8.49	8.66	8.82	8.95	9.15	9.31	9.37	9.39
1975												
(1)	9.50	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25
(2)	9.09	8.88	8.79	8.71	8.63	8.73	8.66	8.63	8.70	8.75	8.74	8.74
(3)	9.32	9.19	9.07	8.92	8.85	8.73	8.89	8.95	8.93	8.97	9.09	9.09
(4)	...	...	...	...	...	...	8.92	8.94	9.01	9.07	9.13	9.11
1976												
(1)	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.00
(2)	8.71	8.67	8.67	8.67	8.75	8.69	8.76	8.79	8.85	8.85	8.84	8.87
(3)	9.07	9.03	8.92	8.85	8.84	8.82	8.85	8.91	8.94	8.94	8.91	8.80
(4)	9.04	9.02	8.89	8.78	8.76	8.74	8.79	8.86	8.86	8.81	8.78	8.72
1977												
(1)	9.00	9.00	9.00	9.00	9.00							
(2)	8.82	8.77	8.75	8.73	8.74							
(3)	8.84	8.80	8.76	8.74	8.75							
(4)	8.65	8.57	8.55	8.54	8.57							

(1)=N.J. usury rate limit

(2)=U.S. contract interest rate, major lenders, new homes

(3)=U.S. contract interest rate, major lenders, existing homes

(4)=Actual New Jersey Interest Rates from Department of Banking sample.

SOURCE: *The Journal of the Federal Home Loan Bank Board*; also, *Federal Reserve Bulletin*; and New Jersey Department of Banking and Federal Home Loan Bank.

have to make do with 9%, to the obvious benefit of borrowers.

Unfortunately, or maybe fortunately, market processes do not operate in this direct way. If the national mortgage rate is  $9\frac{1}{2}\%$  and New Jersey imposes a 9% ceiling, then it is unlikely to be the case that  $9\frac{1}{2}\%$  loans will be made in New Jersey alone for 9%. Lenders, instead, will proceed with two options. One option is to continue lending in New Jersey, but only for high down-payment loans on which the market rate is below 9% in any case. To illustrate this possibility, Figure 13.5 shows the range of recent mortgage interest rates in New Jersey. It can be seen that lenders do grant various interest rates; higher rates are usually associated with low down-payment loans. Consumer borrowers who want low down-payment loans, however, will hardly be grateful for usury ceilings if the primary effect of usury ceilings is to cause lenders to cease offering such loans. The second option for lenders in low ceiling rate periods is to move their lending operations out of state. Again, consumer borrowers can hardly be said to have benefited from usury ceilings if the ceilings cause lending to cease in New Jersey.

Still another argument for usury ceilings is that they serve to publicize the actual level of the mortgage rate. Publicity is useful if borrowers think mortgage interest rates are higher than they really are, and thus do not proceed to look for new houses. For this argument to have credence, it must be the case that lending institutions tend not to advertise the low level of mortgage rates. This would seem peculiar, but it is a possibility. Usury ceilings would seem, even in this case, a harsh method to publicize low interest rates. Rather, if private lenders do not have sufficient incentive to advertise their own mortgage interest rates, then an obvious solution is for some state body to publish the actual data on a continuing basis. For example, the data presented in Figure 13.5 could be periodically released.

In summary, the case for usury ceilings is very weak, and it would seem that consumer bor-

rowers are more often hurt than helped by the ceilings. Some states, reacting to this situation, have become more flexible in adjusting their usury ceilings in line with market conditions. Some states, in fact, have adopted a formula whereby usury ceilings automatically adjust to changes in market interest rates. While such changes are a step in the right direction, the level of the ceiling is also a matter of question. If ceilings are set just at the level at which market rates are expected to be, then there is the risk that borrowers on low down-payment contracts may have no access to the market at all. Consequently, it would seem prudent to place the ceilings at least  $\frac{1}{2}$  a percentage point or a whole percentage point above the going market rate. In this way, borrowers would be protected against unscrupulous lenders, but without significantly limiting the market's ability to provide funds on a low down-payment basis. Finally, as noted above, there may be a case for the state to augment private advertising by publishing, on a timely and continuing basis, the average level and the array of mortgage rates.

### **Red-Lining Mortgage Areas**

Red-lining is a process whereby mortgage lenders arbitrarily refuse to lend in certain areas—typically decaying urban centers—regardless of the mortgage interest rate or the financial condition of the borrower. An obvious concern with red-lining activities is that they lead to a self-fulfilling prophecy for decaying areas. If an area is thought likely to decay, mortgage lending stops in the area, and thus decay is almost certain to occur. There is also the possibility that red-lining activities give the appearance of lending discrimination, since borrowers in such areas tend to be low-income and racial minority families.

It must be emphasized that, from the lender's standpoint, red-lining activity may be rational, non-discriminatory, and absolutely necessary. Depository institutions, such as savings and loan associations, are required to be prudent in the use of their depositors' funds. Were such an institution to lend widely in decaying areas, and

FIGURE 13.5  
MONTHLY RESIDENTIAL MORTGAGE COMMITMENTS  
AMONG SAMPLE OF 39 STATE CHARTERED FINANCIAL INSTITUTIONS

Month (1977)	Interest Rate (%)	24 Savings and Loans		6 Savings Banks		9 Commercial Banks		39 Institutions Sampled	
		Total Commitments	% of Total	Total Commitments	% of Total	Total Commitments	% of Total	Total Commitments	% of Total
January	Total .....	517	100.0	496	100.0	33	100.0	1,046	100.0
	9 .....	198	38.3	35	7.1	4	12.1	237	22.7
	8¾ .....	152	29.4	128	25.8	11	33.3	291	27.8
	8½ or less .....	167	32.3	333	67.1	18	54.6	518	49.5
	Weighted Average.	8.76%		8.54%		8.64%		8.65%	
February	Total .....	657	100.0	464	100.0	37	100.0	1,158	100.0
	9 .....	162	24.6	4	.8	3	8.1	169	14.6
	8¾ .....	191	29.1	91	19.6	7	18.9	289	25.0
	8½ or less .....	304	46.3	203	79.6	23	73.0	700	60.4
	Weighted Average.	8.67%		8.40%		8.58%		8.57%	
March	Total .....	984	100.0	682	100.0	47	100.0	1,713	100.0
	9 .....	277	28.2	3	.4	3	6.4	283	16.5
	8¾ .....	274	27.8	147	21.6	7	14.9	428	25.0
	8½ .....	299	30.4	236	34.6	20	42.5	555	32.4
	8¼ .....	78	7.9	165	24.2	6	12.8	249	14.5
	8 .....	37	3.8	131	19.2	8	17.0	176	10.3
	7¾ or less .....	19	1.9	0	0.0	3	6.4	22	1.3
	Weighted Average.	8.71%		8.41%		8.41%		8.55%	
April . . . .	Total .....	1,050	100.0	740	100.0	71	100.0	1,861	100.0
	9 .....	275	26.2	10	1.4	12	16.9	297	16.0
	8¾ .....	283	27.0	186	25.1	8	11.3	477	25.6
	8½ .....	283	27.0	244	33.0	31	43.7	558	30.0
	8¼ .....	118	11.2	214	28.9	13	18.3	345	18.5
	8 .....	71	6.8	58	7.8	7	9.9	136	7.3
	7¾ or less .....	20	1.8	28	3.8	0	0.0	48	2.6
	Weighted Average.	8.63%		8.43%		8.52%		8.54%	

SOURCE: New Jersey Department of Banking and Federal Home Loan Bank.

suffer losses due to loan defaults, regulatory agencies would likely stop the loans; and if not, then deposits would leave the institution for other institutions offering higher deposit rates. Thus lenders are being candid when they argue that red-lining is essential for the well-being of their institution.

There has recently been action on both the federal and the New Jersey State level to prohibit discrimination in mortgage lending and to require the release of information concerning the geographic distribution of mortgage lending. It is recognized that the non-discrimination provisions are unlikely by themselves to achieve important effects, since discrimination would not cover cases in which the loan denial is based on a reasonable analysis of the lending risks. It is hoped, however, that the release of the geographic distribution of lending will put some pressure on institutions to lend more in all areas from which their deposits are coming.

An alternative approach to the problem is suggested by the possibility of group action. Individual lenders do face high risks in decaying areas, since the small number of loans made by any single lender is unlikely to stem the tide of decay in a neighborhood. And for a single lender to concentrate a large proportion of its loans in a single neighborhood that may decay in any case would clearly not be prudent use of depositors' funds. Groups of lenders, however, could consolidate their funds and focus the lending of such funds in special areas. Individual institutions would face only modest risk, since they would have only a share of the lending in each neighborhood. But the fund in total could be large enough to improve significantly the chances of turning a neighborhood around. Currently a variety of programs are moving in this direction, including existing programs of the New Jersey Mortgage Finance Agency. Opportunities no doubt exist for cooperation between private lenders as well.

### **Tax Costs and Senior Citizens**

Many senior citizens have looked forward to, and have finally achieved, the happy point at which their mortgage loan was fully paid and the family home owned outright. With likely increases in food and medical expenses, these individuals hoped that home-owner costs would be at least one controlled element. It thus comes as a shock for them to find that inflation has increased the appraised value of their home, and also the level of property tax rates, to the point that property taxes on their home themselves become a severe burden. In some cases senior citizens have had to sell their homes because they could not afford the property taxes due each year. There is also the possibility of borrowing against the home—that is, taking out a new mortgage loan. However, this is not convenient since the necessary amounts needed each year are small relative to the value of the home, and interest costs can be high.

An alternative possibility is a tax deferral scheme under which senior citizens would be allowed to defer their property taxes until the property is sold or becomes part of their estate. The mechanism of such a scheme involves the state borrowing funds through its normal tax-free bond privileges, and then lending such funds to the senior citizens who transfer the funds to the local community to pay the property taxes. The interest rate on the state loans to the senior citizens could be set at relatively low levels and it could still cover the state's administrative and interest costs. Limits would be imposed with respect to the proportion of home equity that could be borrowed. However, these constraints would not seriously bother senior citizens who have accumulated a large equity through inflation-induced capital gains on their home. Age limitations also could be set to limit the magnitude of state borrowing. There would be no budgetary impact on state finances, since the interest rate paid by the borrowers would cover the state's cost.

## **Conclusions**

The discussion in this paper has focused attention on a range of examples where structural reform in mortgage lending can achieve substantial benefits for consumers and housing construction with basically no cost of state or federal funds. Structural reforms thus stand in direct contrast to direct subsidy programs and their

invariably high cost-to-benefit ratios. It is certainly too optimistic to hope that structural reforms by themselves can solve the housing program in general; but structural reforms may make significant progress on at least some of the problems; and the price is right. There may be no free lunch in economic policy, but structural reforms should provide at least a free appetizer, and that is the place to start.

TECHNICAL APPENDIX TO CHAPTER XIII\*

GRADUATED MORTGAGE PLAN:  
ONE POSSIBLE APPROACH

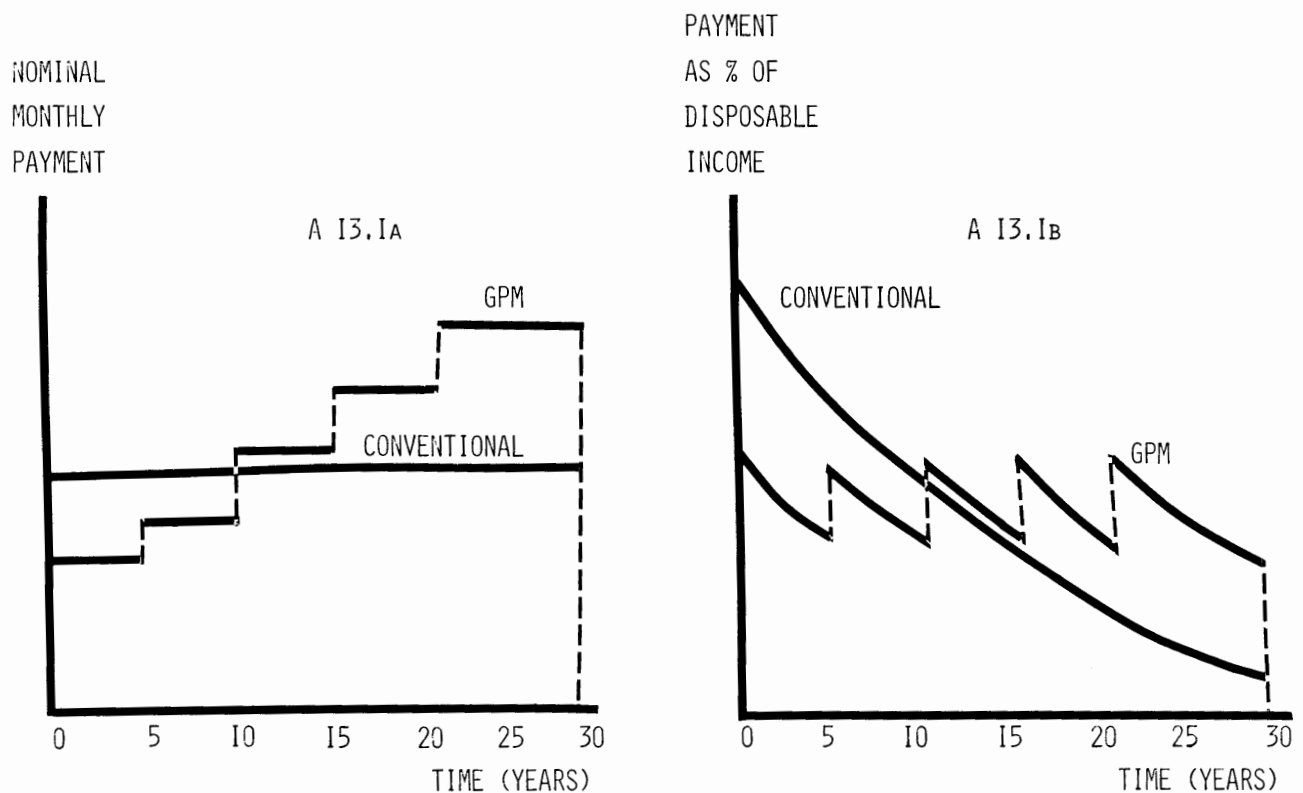
The preceding chapter presents two alternative policy proposals either of which could be used to help alleviate the problem of the young home owner and, consequently, increase new housing starts in the State. This appendix is confined to an illustration of one possible variant of one of the two plans: graduated payment mortgages (GPM).

Our GPM example (one of many feasible approaches) would require *no outlay of State funds*. However, it would require State and

federal approval, and, more importantly, acceptance by lenders.

Figure 13.3 in the chapter text depicts the GPM approach in general. In our example, monthly payments remain constant over given periods of the total mortgage life. Figure A13.1 below illustrates the example for a 30-year mortgage. The procedure described in this appendix can be modified to closely approximate Figure 13.3 in the chapter text (by having payments change yearly, for example).\*\*

FIGURE A 13.1



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

\*\* The possibility of income increases commonly occur on a yearly basis, hence yearly increments are probably more appropriate than the more easily illustrated changes used here.

GPM payments as depicted in Figure A13.1 are set in such a way that the present value of the stream of monthly payments, over the life of the mortgage, is equal to the present value of monthly payments under conventional financing, in both instances using the mortgage interest rate as the discount rate. To make this more easily understood we can alternately describe the procedure as establishing GPM payments at levels that will assure that the lender is indifferent between granting a GPM loan and a conventional loan.\* In either event the lender receives his desired rate of return—the market rate of interest—on all outstanding funds.

Figure A13.2 provides actual monthly payments that would be made by the housebuyer, per \$1,000 mortgage amount and at various market rates of interest, under both conventional and GPM loans. Steps in the payment schedule have been established to approximate the home buyer's expected increases in "disposable" income over a twenty-year period.\*\*

A conventional mortgage at  $i\%$  interest is paid out monthly over  $12n$  months and the present value of the payments (discounted at  $i\%$ ) must equal the value of the initial mortgage ( $M$ ). Hence,

$$M = \alpha \left\{ \frac{[(1+i/12)^{12n} - 1]}{i/12(1+i/12)^{12n}} \right\}, \quad (\text{A-1})$$

where the expression in braces is the familiar discount factor for a constant stream of payments over a  $12n$  month period at  $i\%$  interest, and  $\alpha$  is the conventional monthly payment. Designating the factor in braces in (A-1) as  $C_1^{12n}$  and dividing both sides by  $M$  yields the expression for the conventional monthly payment per dollar of initial loan discounted to present.†

$$1 = \alpha' C_1^{12n} \quad (\text{A-2})$$

The sum of conventional monthly payments  $\alpha'$  discounted to the present must equal the sum of the GPM payments also discounted to present.

$$1 = \alpha' C_1^{12n} = aC_1^{60}x + bC_{61}^{120}x + cC_{121}^{180}x + dC_{181}^{240}x + C_{240}^{12n}x, \quad (\text{A-3})$$

where  $x$  is the payment in the final period (the last 10 years in the case of a 30 year loan and the last five years of a 25 year loan);  $a$ ,  $b$ ,  $c$ , and  $d$  are discount factors accounting for the homebuyer's lower expected income in periods preceding the final period ( $a=1.055^{-20}$ ,  $b=1.055^{-15}$ , and  $c=1.055^{-10}$  and  $d=1.055^{-5}$ );  $C_1^{60}$  is the constant stream discount factor for the first five years;  $C_{61}^{120} = C_1^{120} - C_1^{60}$  is the factor for the next five years,  $C_{121}^{180} = C_1^{180} - C_1^{120}$ ; etc.

Equation (A-3) can be solved for the final payment per dollar of initial loan

$$x = 1 / (aC_1^{60} + bC_{61}^{120} + cC_{121}^{180} + dC_{181}^{240} + C_{240}^{12n}) \quad (\text{A-4})$$

and GPM payments for the individual five year periods (as illustrated in Figure A13.2 can be computed as: first 5 years,  $ax$ ; 2nd 5 years,  $bx$ ; 3rd,  $cx$ ; and 4th,  $dx$ . Figure A13.2 shows the result of such calculations multiplied by 1,000 to coincide with the usual mortgage table of monthly payments per \$1,000 of mortgage amount. Figure A13.3 which illustrates total monthly payments (excluding taxes) for several total mortgage amounts at  $8\frac{1}{2}$  percent interest, can be extracted from Figure A13.2 by multiplying appropriate figures by the total mortgage amount being examined and dividing by 1,000.‡

Taking one example of Figure A13.2, a \$30,000-30 year mortgage would entail monthly payments of \$230.67, exclusive of taxes and

\* This is strictly true only: (1) if the market interest rate is constant over the mortgage period, and (2) if the possibility of payment default and capital loss to the lender is ignored. The lender can self-insure possible losses by charging a small interest premium.

\*\* This example assumes that money income will rise in the future as it did during the period 1949-1969. Median income in New Jersey in 1949 for males in the 25-34 year age bracket was \$3,026; 20 years later in 1969 it was \$10,449 in the 40-44 bracket, \$10,131 for 45-49 year olds, and \$9,493 for ages 50-54. A very rough estimate of the 20-year total increase in income taxes for the 25-34 year-old man was deducted from the \$10,131 figure to crudely arrive at "disposable" income in 1969 and a compound rate of growth was computed from the net figure. (The implication of this approach is that other taxes will increase proportionately to income, thus their relative burden over time need not be especially accounted for. Given New Jersey's new budget caps, this seems a reasonable assumption.)

† And the conventional loan payment per dollar of initial loan amount is  $\alpha' = 1/C_1^{12n}$ .

‡ Slight differences result from computer rounding.

FIGURE A13.2  
MONTHLY HOME PAYMENTS (\$ PER \$1,000 MORTGAGE)  
CONVENTIONAL VS. GRADUATED PAYMENT PLAN

Mortgage Term (years) Payment Plan Payment Period	Interest Rate (%)								
	6.5	7	7.5	8	8.5	9	9.5	10	10.5
25 Years									
Conventional									
Entire 25 Year Period	6.75	7.07	7.39	7.72	8.05	8.39	8.74	9.09	9.44
Graduated									
First 5 Years	4.37	4.63	4.90	5.18	5.47	5.77	6.08	6.39	6.72
Second 5 Years	5.71	6.05	6.40	6.77	7.15	7.54	7.94	8.35	8.78
Third 5 Years	7.45	7.90	8.36	8.84	9.34	9.84	10.37	10.91	11.46
Fourth 5 Years	9.75	10.33	10.94	11.56	12.21	12.87	13.56	14.26	14.98
Fifth 5 Years	12.74	13.50	14.30	15.11	15.96	16.83	17.72	18.64	19.59
30 Years									
Conventional									
Entire 30 Year Period	6.32	6.65	6.99	7.34	7.69	8.05	8.41	8.78	9.15
Graduated									
First 5 Years	3.87	4.14	4.42	4.71	5.01	5.31	5.63	5.96	6.30
Second 5 Years	5.06	5.41	5.77	6.15	6.54	6.94	7.36	7.79	8.23
Third 5 Years	6.60	7.06	7.53	8.03	8.54	9.06	9.61	10.17	10.74
Fourth 5 Years	8.63	9.23	9.85	10.50	11.16	11.85	12.56	13.30	14.05
Remaining 10 Years	11.29	12.07	12.88	13.72	14.59	15.49	16.42	17.38	18.36

FIGURE A13.3  
MONTHLY MORTGAGE PAYMENT EXAMPLES  
(EXCLUDING TAXES AND INSURANCE)  
8½% INTEREST

Mortgage Term (years) Payment Plan Payment Period	Mortgage Amount (\$)		
	10,000	30,000	50,000
25 Years			
Conventional			
Entire 25 Year Period	80.52	241.57	402.61
Graduated			
First 5 Years	54.74	164.21	273.69
Second 5 Years	71.49	214.48	357.47
Third 5 Years	93.36	280.08	466.78
Fourth 5 Years	122.08	366.25	610.41
Fifth 5 Years	159.58	478.75	797.92
30 Years			
Conventional			
Entire 30 Year Period	76.89	230.67	384.46
Graduated			
First 5 Years	50.05	150.16	250.26
Second 5 Years	65.37	196.12	326.87
Third 5 Years	85.37	256.10	426.83
Fourth 5 Years	111.63	334.90	558.17
Remaining 10 Years	145.93	437.78	729.63

insurance. Taxes and insurance can easily increase total monthly payments to the neighborhood of \$350.00—a sizeable sum indeed; in fact, an unmanageable amount for many young New Jersey couples.

Under the GPM plan outlined here the initial mortgage payment would drop to \$150.16; the

total payment would also drop by the approximately \$80 difference. Payments would rise in subsequent periods, but they should be no more difficult to meet because of expected income increases. In fact, they would be much *easier* to meet in the case of a young house-buying couple with children when the woman expects to take a job a few years in the future.

## XIV

# INDUSTRIAL LAND GRANTS FOR URBAN REVITALIZATION\*

In recent years, New Jersey's cities have experienced many profound and extremely troublesome socioeconomic changes. Since World War II, there has been a mass exodus of middle-class population as well as commercial establishments and industrial firms from the State's center cities to the suburbs. The net result has been harmful not only to the cities but to the State overall.

To a large extent the middle-class white population of the cities has been replaced through an in-migration of poor black and Spanish-speaking people. And it is among these new city dwellers that New Jersey has experienced its worst unemployment problems.

Downtown areas of the cities have been largely replaced by suburban shopping centers as market places. At the same time new industrial plants have located in the suburbs, and fully depreciated plants have not been replaced in the cities.

These movements have exacerbated the unemployment problem in the State adding to rising welfare and unemployment compensation costs. Mass transportation in New Jersey, as elsewhere, exists almost exclusively within and between cities. The poor of the cities, frequently without their own transportation, cannot travel to suburban industrial locations in their search for

work. In the meantime, the loss of commerce and industry in the center city has resulted in fewer and fewer jobs and the loss of income has resulted in more and more business failures; so when young persons from minority group families reach working age they find no jobs available to them.

A vicious cycle has developed. Non-working city residents have been made dependent upon the welfare system, and a generation of inexperienced and unskilled people is being created from today's youth. Crime rates have increased dramatically in cities providing further reason for migration to the suburbs—for those who can afford it.

Cities have become major owners of land and buildings as taxes have risen and landlords have found it financially desirable to allow property to deteriorate, take whatever rent they can and then abandon their holdings. As ratables are lost, tax rates rise, and only the poor are left to pay for local services.

Industrial workers travel long distances by automobile from suburban home to suburban plant, choking highways with traffic and worsening the State's air pollution problem. Construction of additional highways and the paving of parking areas for shopping centers and indus-

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

trial plants have added to precipitation runoff and increased the threat of flood damage both to suburbs and cities. Moreover, widely scattered construction in the State has resulted in reduction of open spaces with attendant aesthetic losses to the population.

Many federal, state and local programs have been enacted to address the above-described problems. Results have been mixed, but it appears that at least some of the existing programs have helped stem the tide. Nevertheless, it appears that the decline of the cities continues; it seems certain that the trend has not been reversed.

It is the purpose of this chapter to recommend new legislation which can help revitalize New Jersey's urban areas or, at least help stop their decline, by encouraging new industry to locate in the cities. The specific device recommended is land grants to industry.

In this chapter we compare the "efficiency" of a land-grant proposal with other inducement programs now being used by the State; we stress the efficiency of this proposal vs. property-tax abatement, since the latter is already being used specifically to encourage industry to locate in "blighted" urban areas.

### The Land-Grant Proposal

It is recommended that legislation be adopted authorizing the donation of land to firms that agree to locate in New Jersey's blighted cities. Donations could be made by either state or local agencies (or development authorities); the land involved could be either land acquired by cities because of tax default or purchased by the cities or the State. The public purposes to be served by such legislation are the reduction of unemployment and the amelioration of other State problems (described above) that have been the result of urban decline.

Empirical evidence exists that indicates that financial inducements to industry are effective, i.e., they do increase investment and employment. A 1973 study of industrial inducements, undertaken by the Rutgers Bureau of Economic Research for the Office of Economic Policy and the Department of Labor and Industry, provides statistical evidence that state industrial revenue bond programs and loan programs effectively increase investment in the granting state. Moreover, the calculated benefits to the state far exceed the costs.\* In our *7th Annual Report* (1974) additional evidence was presented indicating that Pennsylvania's low-interest loan program not only increased employment in Pennsylvania, but it also apparently caused a loss of jobs in New Jersey.\*\*

No studies exist to document the effectiveness of land grants to industry; New Jersey would be an innovator if it adopted the program. Nevertheless, *we strongly believe, based on the above-mentioned evidence that a program of land-grants would achieve its purpose particularly if it is combined with already existing industrial-inducement programs.* Moreover, as we demonstrate in the following sections, land grants are "efficient" inducements—more efficient than a property-tax abatement program now in use.

### The "Efficiency" Criterion

Our measure of "efficiency" for an industrial inducement is defined as its dollar value to the firm relative to its dollar cost to the granting municipality (or state).† The higher the ratio the more efficient is the inducement.

Efficiency ratios vary among different possible inducement programs for several reasons.

Firstly, financial subsidies to firms frequently affect taxes paid by the firm; a donation by a state or local government can increase a firm's taxable income or lower its tax deductible ex-

\* Laurence H. Falk, Daryl Hellman, Peter D. Loeb and Gregory H. Wassall, *An Inducement Program for New Jersey: Empirical Findings and Recommendations*, New Brunswick, N.J., 1973.

\*\* Laurence H. Falk, "Industrial Inducements: An Analysis of the Effect of the Pennsylvania Loan Program on New Jersey," *7th Annual Report*, Economic Policy Council and Office of Economic Policy, Trenton, August, 1974.

† This efficiency criterion was first used by William J. Stober and Laurence H. Falk in "Property Tax Exemption: An Inefficient Subsidy to Industry." *National Tax Journal*, Dec. 1976, pp. 386-94.

penses and thus increase its tax liability. For example if a state reduces corporate income tax to be paid today by a corporation by \$1, the net benefit to the firm is only 52¢ since expenses, hence taxable income, are reduced by \$1 and taxes increased by 48¢\*. Thus the efficiency ratio for a one-time cut in state corporation income tax (e.g., an investment tax credit granted by the State) would be:

$$\frac{\text{Benefit to Firm}}{\text{Cost to State}} = \frac{\$0.52}{1} = .52$$

Secondly, inducements are frequently offered in the form of some yearly benefit spread over a number of years in the future. For example, some states offer a 10-year property tax exemption to new industry. The tax reduction granted by the state increases the firm's federal income tax liability and its state income tax liability as well, so each dollar granted by the state is worth only \$1 minus \$1 x (marginal federal plus state income tax rate) to the firm *at the time it is received*. In New Jersey the net benefit to the firm is 48.1 cents.\*\* The efficiency ratio is even less than .481 because the firm views the benefit of 48.1 cents to be received in the future as less than the benefit of 48.1 cents received in the present. Earnings could be realized during the next 10 years on money received today, hence a given sum to be received (or saved) 10 years in the future is worth less to the firm than the same sum received today.

Finally, the State or local government also values a \$1 future cost less than it values \$1 today, but a state or local government will discount a future cost by a rate lower than the rate a firm uses to discount a future benefit. The firm's discount rate is its cost of capital (the rate of return a profit-maximizing firm would require on an extra dollar invested today), but a state

or local government's discount rate is *its* cost of capital, the rate of interest on federal tax exempt state or municipal bonds.

With the above three reasons for efficiency variation in mind we now compare efficiency ratios of our land-grant proposal to that of an existing New Jersey property tax abatement program.

### Land Grant Efficiency

A donation of land by a state or local government saves the recipient firm the value (to the firm) of the land received.† But the value of the land to the donor may be zero. A municipality that receives land through tax default may view the property as having a zero (or even negative) value, since vacated property requires city services but yields no taxes. In this event the efficiency ratio of a land grant can be viewed as *infinite*. The benefit to the firm is some positive amount; the cost to the municipality is zero (or negative).‡

It may also be desirable for the state (or a municipality) to buy unused industrial land in a city and donate it to a firm willing to locate in the city. For example, we know of an industrial tract that is for sale in one of New Jersey's larger cities; asking price is in the \$200,000-\$300,000 range. If the State or local government were to buy this land at market value and donate it (to a firm agreeing to locate on it and employ workers for a given number of years), the firm would realize a saving, the present-value amount of which would vary depending on the firm's alternative form of finance in the absence of the grant. For example, if in the absence of the donation the firm contemplating a new plant would be forced to use internal funds to finance its land purchase, the

\* The marginal federal income tax rate is 48% for corporations having taxable income in excess of \$50,000.

\*\* See appendix for calculation.

† A grant of land by a governmental unit for the purpose of industrial inducement does not effect the firm's income tax liability. (See Sec. 118, Internal Revenue Code, 1954 and Commerce Clearing House, *Standard Federal Tax Reports*, ¶1183 [p. 14.357] 1975.)

‡ An infinite efficiency ratio is also the case for New Jersey's industrial development bonds and low interest bank loans for industrial development. In either of these programs the firm receives significant interest savings with only administrative costs accruing to the State. The federal government, through its income-tax exemption for interest proceeds of the industrial development bonds or loans, bears the full subsidy cost.

FIGURE 14.1  
**LAND GRANT**  
**NET BENEFIT TO FIRM PER DOLLAR**  
**ASSUMING 20-YEAR MORTGAGE ALTERNATIVE**

Alternative Mortgage Interest Rate	Cost of Capital to Firm (%)								
	6	7	8	9	10	11	12	13	14
5	.714	.656	.604	.559	.519	.483	.451	.422	.396
6	.747	.686	.632	.584	.542	.504	.470	.440	.413
7	.782	.718	.661	.610	.566	.526	.491	.459	.431
8	.819	.751	.691	.638	.591	.550	.512	.479	.449
9	.857	.786	.723	.667	.618	.574	.535	.500	.469
10	.897	.822	.756	.697	.646	.600	.559	.523	.490
11	.938	.859	.790	.729	.675	.627	.584	.546	.511

SOURCE: Computed from Equation (A-1 in Technical Appendix.

savings realized through the grant would be the market value of the land. If this value were \$250,000 the efficiency ratio would be:

$$\frac{\text{Benefit to Firm}}{\text{Cost to State or Municipality}} = \frac{\$250,000}{\$250,000} = 1$$

But normally a firm's alternative to a land grant would not be internal funds. Usually a firm will borrow to make its land purchases. Then its costs are spread over time in the form of yearly payments of principle and interest. Because the interest payments are tax-deductible and because the firm discounts future payments at its cost of capital the benefit to the firm is reduced, and the efficiency ratio of land grants will fall below unity. Figure 14.1 shows efficiency ratios at various alternative 20-year mortgage interest rates and various costs of capital.

We have used a wide range of interest rates and, accordingly, a wide range of costs of capital in Figure 14.1 to assure that the actual rates for a prospective land grant recipient are included. The lower range of alternative interest rates (from 5 to 8 percent) encompasses the actual borrowing rate for a firm using New Jersey Economic Development Authority (EDA) bank loans. The higher range (from 8 to 11 percent) encompasses industrial loan interest costs when EDA financing is not used. Cost of capital to a firm is a weighted average of the cost of debt

and equity funds. The cost of debt is the interest rate on borrowed funds; the cost of equity must be higher than the interest rate because it is riskier than debt (debt must be repaid before equity payments can be made). Thus the firm's cost of capital must exceed the alternative loan interest rate.

A realistic efficiency ratio example from Figure 14.1 might use an EDA loan cost of 7% and a cost of capital of 11%. For these parameters the ratio is .526; for every 52.6 cents of net benefits to the firm the State or local cost is \$1. It will be shown in the following sections that this is very efficient compared to property tax abatement.

#### Property Tax Abatement

Under New Jersey law\* urban renewal associations can grant property tax abatements for up to 20 years to firms willing to locate in blighted urban areas. Like land grants, property tax abatement entails direct cost to the granting government. From an economic standpoint there is no difference in giving up \$1 (or \$250,000) in property taxes in a given year or \$1 (or \$250,000) in land grants. However, property tax abatement is less efficient because: (1) for every dollar granted by the State the firm receives only 48.1 cents, and (2) the exemption is spread over time and the firm discounts its

\* N.J.S.A. 40:55C-40 *et seq.*

**FIGURE 14.2**  
**PROPERTY TAX ABATEMENT**  
**NET BENEFIT TO FIRM PER PRESENT-VALUE DOLLAR**  
**GRANTED ASSUMING 20-YEAR ABATEMENT PERIOD**

State or Local Bond Rate of Interest	Cost of Capital to Firm (%)								
	6	7	8	9	10	11	12	13	14
4	.406	.375	.342	.323	.301	.282	.264	.249	.234
5	.443	.409	.379	.352	.329	.307	.288	.271	.256
6	.481	.444	.412	.383	.357	.334	.313	.295	.278
7	.521	.481	.446	.414	.387	.362	.339	.319	.301
8	.562	.519	.481	.447	.417	.390	.366	.344	.324

SOURCE: Computed from Equation (A-4) in Technical Appendix.

future savings at a rate higher than that used by the State to discount its future costs. Figure 14.2 shows the (low) efficiency ratios for 20 year property tax abatement at various state or local bond rates of interest and various firm costs of capital.

Again using 11% as a reasonable cost of capital, and now using 6% as a realistic bond rate of interest for an issue repaid over 20 years,\* we find an efficiency ratio of only .334—far below the .526 that was found for the land grant. Now for every dollar given up by the State (or its subdivisions) the net gain to the firm is only 33.4 cents vs. 52.6 cents for the land grant alternative.

#### A Comparison of Efficiencies

Figure 14.3 compares land grant efficiency, at various alternative loan interest rates and costs of capital, to property tax abatement efficiency, using a 6% bond rate of interest and assuming a 20-year loan alternative as well as a 20-year abatement period.

If the firm's cost of capital is 11% and its alternative loan interest cost is 7%, a land grant is 1.575 times as efficient as property tax abatement having the same cost to the granting state or municipality. In other words, the firm views a land grant of a given value as being worth 1.575 times as much as property tax abatement having the same present value to the granting governmental unit.

**FIGURE 14.3**  
**RATIO OF LAND-GRANT EFFICIENCY**  
**TO PROPERTY TAX-ABATEMENT EFFICIENCY**  
**AT 6% BOND INTEREST RATE**

Alternative Loan Interest Rate (%)	Corporation Cost of Capital								
	6	7	8	9	10	11	12	13	14
5	1.484	1.477	1.466	1.460	1.454	1.446	1.441	1.431	1.424
6	1.553	1.545	1.534	1.525	1.518	1.509	1.502	1.492	1.486
7	1.626	1.617	1.604	1.593	1.585	1.575	1.569	1.556	1.550
8	1.703	1.691	1.677	1.666	1.655	1.647	1.636	1.624	1.615
9	1.782	1.770	1.755	1.742	1.731	1.719	1.709	1.695	1.687
10	1.865	1.851	1.835	1.820	1.810	1.796	1.786	1.773	1.763
11	1.950	1.935	1.917	1.903	1.891	1.877	1.866	1.851	1.838

SOURCE: Computed from Tables 14.1 and 14.2.

\* Based on a January, 1977 Jersey City bond issue.

Figure 14.3 shows that a land grant is more efficient than property tax abatement for any feasible combination of corporation cost of capital and alternative loan interest rate, if the bond interest rate is 6%. Additional tables could be constructed from Figures 14.1 and 14.2 which would show that land grants remain more efficient than property tax abatement for any realistic bond rate of interest.

Accordingly, it is reasonable to conclude that, for a given cost, more industry could be induced to locate in New Jersey cities through land grants than through property tax abatement. This is not to imply that we would recommend elimination of the existing abatement program; instead we believe that a program of land grants would be a useful and effective supplement to the State's existing industrial inducement programs.

#### **A Course of Action**

We recommend that a State or local program of land grants to industry be used as a device for attracting industry into New Jersey's cities. We expect that the grants would effectively reduce unemployment in the cities and provide other benefits including crime reduction, reduction of welfare costs and improvement of the State economy in general.

Appropriate safeguards should be included in the law. For example, if cities are authorized by legislation to seek out potential industrial recipients and to make the grants (and we see no reason why this should not be the case), a State agency should be charged making certain that, at a minimum, the following criteria are met:

1. Each grant is necessary to increase employment and income in the donor city.

2. Each recipient firm is committed to remaining in the city.
3. Each recipient firm has reasonable prospects for long term success (e.g., it is well managed and has a good credit rating).
4. No local official has a financial interest in any recipient firm.

We further strongly recommend that the State develop and maintain a current inventory of potential industrial sites in the cities. In particular, the inventory should include property taken through tax foreclosure or otherwise acquired by the cities. EDA and Labor and Industry, as well as other departments and agencies, should find the inventory to be useful input for their development planning processes.

We make no specific recommendations about how the grants should be administered. It is possible that a new local or State authority should be established, or perhaps the grants should be handled by an existing authority or governmental agency. Such decisions are more appropriately considered by the State and local agencies that are experienced in industrial development activities.

Whatever the approach, State or local, we believe that inducements should be applied as needed in descending order by efficiency ratios. EDA mortgages and land grants, where the land has zero value to the city, should be applied first because of their infinite efficiency ratios. Land grants that entail State or local purchase of urban property and investment tax credits (which have similar efficiency ratios) should then be applied as needed. Less efficient inducements, such as property tax abatement, should be used only when the other approaches are inadequate and when they promise sufficient potential benefit to the cities and the State.

## TECHNICAL APPENDIX TO CHAPTER XIV

### Corporate Income Tax

The marginal federal income tax rate for a firm having taxable income exceeding \$50,000 is 48%. New Jersey's Corporation Income Tax rate is 7.5%.

The federal government allows deductions of state taxes in computing taxable income. Hence the overall marginal income tax rate to a New Jersey corporation is:

$$.07 + .48(.075) = .519$$

and a \$1 subsidy that reduces an expense or otherwise increases taxable income by \$1 is worth only \$1 — .519 (\$1) = \$.481 to the recipient New Jersey firm.

### Efficiency Ratios

1. *Land Grants.* The saving ( $B_f$ ) realized by a firm receiving a land grant is the alternative cost avoided. If the firm's alternative is borrowing funds to buy land,  $B_f$  is the present value of the avoided payments of principle and interest less the present value of the taxes that would have been saved through interest deductions. Thus, the efficiency ratio for land grants ( $B_f/C_S$ ) is:

$$\frac{B_f}{C_S} = \frac{\sum_{t=1}^n (X_C - TiU_{t-1})(1+k)^{-t}}{1} \quad (\text{A-1})$$

where  $C_S$  is the cost to the state or locality,  $X_C$  is the annual repayment per dollar lent at the

market rate of interest  $i$ ,\*  $T$  is the overall marginal corporate income tax rate (.519 in New Jersey),  $U_{t-1}$  is the yearly unpaid balance upon which interest is computed and  $k$  is the corporation cost of capital.

2. *Property Tax Abatement.* The present value net saving ( $B_f$ ) to a firm receiving a constant yearly property tax abatement amount ( $A$ ) is:

$$B_f = (1-T) \sum_{t=1}^n A(1+k)^{-t} \quad (\text{A-2})$$

where  $T$  is the overall marginal corporate income tax rate (.519 in New Jersey),  $k$  is the corporate cost of capital,  $n$  is the number of years for which abatement is allowed and  $t$  is 1, 2, 3, . . .  $n$ .

The present value cost ( $C_S$ ) to the state or locality for the same yearly abatement amount is

$$C_S = \sum_{t=1}^n A(1+s)^{-t} \quad (\text{A-3})$$

where  $s$  is the state or local bond rate of interest. Dividing equation (A-1) by equation (A-2) and factoring  $A$  out of the summations of the numerator and denominator yields the property tax abatement efficiency ratio:

$$\frac{B_f}{C_S} = \frac{(1-T) \sum_{t=1}^n (1+k)^{-t}}{\sum_{t=1}^n (1+s)^{-t}} \quad (\text{A-4})$$

\* The mortgage amount (\$1) must equal the stream of yearly payments ( $X_C$ ) discounted at the rate  $i$ , or

$$\$1 = X_C \sum_{t=1}^n (1+i)^{-t} \quad \text{and the yearly payment} \quad X_C = 1 / \sum_{t=1}^n (1+i)^{-t} = \frac{i(1+i)^n}{(1+i)^n - 1}$$

the familiar capital recovery factor for interest rate  $i$ .

# XV

## APPENDIX

### STATISTICAL TABLES

TABLE 1  
POPULATION AND EMPLOYMENT, NEW JERSEY, 1956-1976

Year	Resident Population	Work/Labor Force* In Thousands	Total Employment	Unemployment		Insured
				Number (000)	Rate (Percent)	Unemploy- ment Rate (Percent)
1956 ...	5,516,100	2,406.6	2,263.2	138.6	5.8	4.6
1957 ...	5,631,700	2,448.1	2,290.0	156.8	6.4	5.3
1958 ...	5,739,800	2,472.6	2,248.1	222.5	9.0	7.6
1959 ...	5,960,000	2,483.1	2,303.2	175.5	7.1	5.5
1960 ...	6,070,780	2,507.4	2,337.2	168.5	6.7	5.7
1961 ...	6,222,160	2,543.5	2,355.9	185.5	7.3	6.0
1962 ...	6,370,650	2,575.1	2,415.0	159.0	6.2	5.2
1963 ...	6,503,190	2,618.4	2,447.9	168.8	6.4	5.4
1964 ...	6,614,560	2,655.5	2,489.6	162.1	6.1	4.8
1965 ...	6,720,300	2,724.5	2,582.2	140.0	5.1	3.9
1966 ...	6,821,050	2,790.3	2,665.3	122.6	4.4	3.2
1967 ...	6,917,450	2,803.0	2,701.0	102.0	3.6	3.4
1968 ...	7,012,750	2,829.0	2,730.0	99.0	3.5	3.3
1969 ...	7,103,310	2,898.0	2,805.0	93.0	3.2	3.3
1970 ...	7,192,805	2,973.0	2,837.0	136.0	4.6	4.4
1971 ...	7,261,440	3,000.0	2,829.0	171.0	5.7	5.4
1972 ...	7,322,685	3,107.0	2,926.0	181.0	5.8	5.1
1973 ...	7,368,675(R)	3,176.0	2,997.0	179.0	5.6	4.7
1974 ...	7,397,190(R)	3,210.0	3,007.0	203.0	6.3	5.7
1975 ...	7,414,700(R)	3,251.0	2,918.0	333.0	10.2	7.8
1976 ...	7,431,750(P)	3,307.0	2,962.0	345.0	10.4	6.4

\* For data prior to 1970, persons involved in labor-management disputes are included in total workforce and excluded from employment and unemployment. After 1969, 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 1976 benchmarks. Annual average work/labor force and employment data from 1963 on are based on monthly data.

Annual averages for 1962 and prior years are based on bi-monthly data.

All population data as of July 1; estimates for July 1, 1976 are provisional.

Annual averages may not add due to rounding.

(R)—Revised.

(P)—Provisional.

Source: N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 2  
WAGE AND SALARY WORKERS IN NONAGRICULTURAL ESTABLISHMENTS, MAJOR INDUSTRY DIVISIONS,  
NEW JERSEY, 1947-1976  
(In thousands)

Year	Total Non-Agricultural Payroll Employment	Manufacturing	Mining	Contract Construction*	Transportation and Public Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate*	Services and Miscellaneous*	Government
1947	1,622.6	782.6	4.0	65.4	142.2	249.7	63.1	158.8	156.8
1948	1,657.1	786.3	4.1	74.6	141.0	260.5	67.0	163.7	159.9
1949	1,595.6	721.8	4.0	72.5	134.0	264.5	66.5	166.2	166.1
1950	1,657.1	756.4	4.3	81.2	135.4	273.7	68.3	166.8	171.0
1951	1,768.1	821.2	4.5	95.4	143.9	285.8	69.8	169.8	177.7
1952	1,804.0	832.9	4.6	91.9	146.7	295.6	70.7	174.0	187.6
1953	1,850.2	856.2	4.7	90.3	147.8	303.4	73.6	180.6	193.6
1954	1,820.8	802.1	4.3	93.6	146.1	312.4	76.1	186.0	200.2
1955	1,865.3	811.1	4.0	98.7	148.4	322.5	78.8	195.4	206.4
1956	1,933.5	834.8	4.3	100.7	153.8	336.6	81.8	208.4	213.1
1957	1,968.3	835.0	4.4	96.2	154.3	349.1	85.4	222.7	221.2
1958	1,911.3	775.4	3.7	88.6	148.2	351.2	86.7	230.5	227.0
1959	1,970.5	801.3	3.6	95.7	147.0	360.5	87.3	241.6	233.5
1960	2,017.1	808.6	3.5	98.1	149.5	374.6	88.6	252.0	242.2
1961	2,033.7	791.1	3.4	99.4	150.1	380.7	91.2	264.2	253.6
1962	2,096.1	812.8	3.4	100.7	150.8	393.3	93.4	278.9	262.8
1963	2,129.3	809.1	3.5	100.2	151.9	405.5	95.5	291.5	272.1
1964	2,168.5	806.2	3.6	105.7	153.4	420.2	97.8	301.6	280.0
1965	2,256.4	836.7	3.5	109.3	157.0	439.0	99.9	315.6	295.4
1966	2,358.4	878.2	3.0	109.8	162.2	460.0	102.4	330.8	312.0
1967	2,420.9	881.9	2.8	111.0	166.3	472.1	106.0	351.6	329.2
1968	2,485.4	886.2	3.1	114.3	166.3	489.7	109.7	372.6	344.4
1969	2,570.9	893.6	3.3	116.8	176.2	515.1	112.6	393.2	360.1
1970	2,608.6	863.0	3.2	119.2	182.2	538.2	117.7	410.4	374.8
1971	2,611.8	822.2	3.0	116.3	181.1	558.4	121.7	421.2	388.0
1972	2,672.5(R)	823.3(R)	3.2	121.6(R)	181.2	577.3(R)	124.6(R)	436.0(R)	405.3
1973	2,759.7(R)	842.6(R)	3.3	126.8(R)	186.4(R)	596.9(R)	131.0(R)	455.7(R)	417.1
1974	2,783.0(R)	825.9(R)	3.2(R)	118.7(R)	185.8(R)	603.5(R)	136.5(R)	469.5(R)	439.9(R)
1975	2,700.2(R)	747.4(R)	2.8	99.2(R)	174.3(R)	599.3(R)	135.2(R)	472.1(R)	470.0(R)
1976	2,743.4	753.2	2.7	94.6	175.9	618.3	138.2	490.1	470.4

Series have been adjusted to March 1976 benchmarks. (R)—Revised.  
SOURCE: N.J. Department of Labor and Industry, Division of Planning and Research.  
\* Not precisely comparable with pre-1972 data.

TABLE 3  
WAGE AND SALARY WORKERS IN MANUFACTURING, DURABLE GOODS, NEW JERSEY, 1947-1976  
(In thousands)

Year	Total Durable Goods	Lumber and Wood Products*	Furniture and Fixtures*	Stone, Clay and Glass Products	Primary Metal Industries*	Ordnance and Fabricated Metals*	Machinery, Except Electrical*	Electrical Machinery*	Transportation Equipment	Instruments and Related Products*	Miscellaneous Manufacturing Industries
1947	403.0	6.9	7.7	31.0	45.8	45.7	56.0	108.9	47.4	18.2	35.5
1948	397.2	7.0	8.2	31.4	44.2	44.3	53.8	106.7	45.9	18.8	36.9
1949	346.1	6.5	7.6	29.0	37.6	40.7	48.8	87.3	37.5	17.9	33.2
1950	372.3	6.8	8.9	31.7	40.5	44.2	49.9	97.2	40.1	17.8	35.3
1951	427.9	7.1	9.1	35.3	46.5	48.3	60.0	115.1	47.5	22.4	36.6
1952	446.6	6.4	8.5	33.4	45.3	50.5	61.7	121.7	60.2	24.7	34.3
1953	470.4	6.3	8.6	33.8	46.2	57.2	64.0	132.5	62.7	26.5	32.6
1954	431.3	6.4	8.2	32.5	42.6	54.6	60.6	116.7	56.5	24.9	28.3
1955	435.5	6.4	8.5	34.1	43.9	55.7	59.1	117.5	57.1	25.3	27.8
1956	455.9	6.4	9.1	34.3	47.3	55.5	65.8	124.3	57.4	27.9	27.9
1957	457.3	6.3	9.2	33.9	46.9	56.7	65.5	125.6	55.9	29.4	27.9
1958	411.9	5.6	8.7	31.9	40.9	50.9	57.0	115.0	48.7	27.4	25.8
1959	430.5	5.9	9.2	33.1	41.7	53.7	57.8	121.4	50.5	30.2	27.0
1960	436.5	5.7	9.8	33.7	42.6	54.2	61.0	122.3	48.5	31.7	26.8
1961	421.3	5.6	9.0	34.4	40.7	53.6	57.3	119.5	41.7	31.9	27.6
1962	436.1	5.8	9.7	34.6	40.1	55.6	60.3	125.2	42.5	32.4	29.9
1963	425.7	5.7	8.9	34.9	38.6	55.2	60.1	121.7	39.0	32.9	28.7
1964	418.6	5.6	9.0	35.6	37.9	56.7	61.4	115.1	35.6	31.0	30.7
1965	438.1	5.6	9.4	36.9	39.8	60.2	65.4	118.4	36.8	32.7	32.9
1966	462.5	5.2	10.5	39.3	40.4	63.8	70.8	129.9	36.4	34.3	31.9
1967	463.9	5.0	11.0	39.1	38.6	65.4	75.0	131.2	32.0	36.5	30.0
1968	460.8	5.3	10.2	38.8	38.5	67.0	75.8	128.1	31.7	35.8	29.7
1969	463.8	5.2	11.0	40.9	39.4	69.2	76.2	125.6	31.4	34.7	30.2
1970	435.4	4.9	10.5	39.6	37.2	66.4	72.8	116.9	26.3	33.2	27.5
1971	406.7	4.5	10.6	39.0	33.4	62.4	66.3	106.9	25.3	32.4	25.8
1972	405.8(R)	5.1(R)	10.8(R)	39.9(R)	31.8(R)	63.5(R)	65.8(R)	102.9(R)	25.7	35.0(R)	25.2(R)
1973	420.5(R)	5.3(R)	10.6(R)	40.8(R)	32.0(R)	66.2(R)	72.1(R)	108.1(R)	25.3	34.4(R)	25.9(R)
1974	413.2(R)	5.0(R)	10.3(R)	40.5(R)	31.2(R)	64.4(R)	76.1(R)	105.1(R)	21.1(R)	33.9(R)	25.6(R)
1975	362.5(R)	4.6(R)	8.9(R)	36.0(R)	26.1(R)	58.1(R)	68.1(R)	88.1(R)	19.3(R)	31.0(R)	22.4(R)
1976	360.4	5.0	8.7	36.4	23.9	59.6	66.5	86.3	20.1	30.5	23.6

Series have been adjusted to March 1976 benchmarks. (R)—Revised.  
SOURCE: N.J. Department of Labor and Industry, Division of Planning and Research.  
\* Not precisely comparable with pre-1972 data.

TABLE 4  
WAGE AND SALARY WORKERS IN MANUFACTURING, NONDURABLE GOODS, NEW JERSEY, 1947-1976  
(In thousands)

Year	Total Nondurable Goods	Food and Kindred Products	Tobacco Manufactures	Textile Mill Products	Apparel and Related Products	Paper Allied Products	Printing, Publishing and Allied Industries	Chemicals and Allied Products*	Petroleum Refining and Related Industries	Rubber and Miscellaneous Plastic Products*	Leather and Leather Products
1947	379.6	56.9	5.5	61.1	78.9	21.7	18.6	80.1	15.6	29.5	11.7
1948	389.1	57.1	5.1	64.7	85.6	22.2	19.9	77.6	16.2	28.4	12.3
1949	375.7	55.9	4.9	57.8	88.9	21.8	21.4	71.9	16.3	24.7	12.1
1950	384.1	56.5	4.6	58.2	89.0	23.5	22.8	73.7	16.5	26.4	12.9
1951	393.3	59.8	4.4	53.7	89.8	24.8	23.4	79.1	17.3	28.4	12.6
1952	386.3	61.3	4.4	50.1	88.7	24.2	23.5	78.5	16.3	27.3	12.1
1953	385.8	60.9	4.3	48.3	85.0	26.5	24.8	79.2	16.4	28.4	12.0
1954	370.8	62.2	4.0	41.9	79.7	26.0	25.9	78.0	15.2	26.7	11.2
1955	375.6	61.7	3.4	42.7	79.6	26.3	27.1	80.8	14.5	27.5	11.9
1956	378.9	63.5	2.6	41.6	79.7	27.2	28.1	81.8	14.3	28.3	11.8
1957	377.7	62.9	2.0	38.6	79.2	28.3	30.5	83.3	13.8	27.7	11.4
1958	363.5	62.9	1.9	33.0	76.7	28.0	30.3	80.8	12.3	26.6	11.1
1959	370.8	62.3	1.8	33.2	79.2	28.3	31.5	82.4	11.7	29.3	11.1
1960	372.1	62.9	1.7	31.4	77.7	28.0	32.3	86.4	11.5	29.2	11.0
1961	369.8	63.9	1.6	29.1	76.4	28.1	32.6	87.0	11.1	29.2	10.8
1962	376.7	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	9.6	34.2	11.2
1965	398.6	66.4	1.4	28.5	77.3	31.3	37.5	98.9	9.8	36.0	11.5
1966	415.7	67.2	.8	29.6	80.3	33.0	39.6	105.5	10.3	37.2	12.2
1967	418.1	65.3	.6	29.1	78.5	33.7	41.5	110.9	9.5	37.7	11.3
1968	424.6	64.5	.3	30.5	78.7	34.3	42.2	113.3	9.6	39.9	11.5
1969	429.9	63.2	.3	30.8	77.2	35.0	43.3	118.2	9.8	41.4	10.6
1970	427.6	63.5	.3	29.6	72.3	35.3	44.8	122.3	10.6	40.0	9.6
1971	415.5	61.7	.3	29.4	68.9	35.9	43.7	119.5	10.1	36.8	9.4
1972	417.5(R)	59.8(R)	.3	30.5(R)	68.9	35.9	46.0(R)	119.4(R)	10.6(R)	37.2(R)	8.9
1973	422.1(R)	58.7(R)	.2	31.3(R)	68.7	36.8(R)	46.9(R)	124.1(R)	10.9(R)	35.5(R)	9.0
1974	412.7(R)	56.7(R)	.2	28.8(R)	63.1(R)	35.4(R)	47.8(R)	126.6(R)	11.8(R)	34.0(R)	8.4
1975	384.9(R)	53.6(R)	.2	24.5(R)	57.9(R)	32.1(R)	46.4(R)	120.9(R)	12.1(R)	29.3(R)	7.9(R)
1976	392.8	53.7	.3	24.1	60.6	33.1	47.0	121.8	11.9	31.8	8.6

Series have been adjusted to March 1976 benchmarks. (R)—Revised.  
SOURCE: N.J. Department of Labor and Industry, Division of Planning and Research.  
\* Not precisely comparable with pre-1972 data.

TABLE 5  
 EMPLOYMENT, HOURS, AND EARNINGS OF PRODUCTION  
 WORKERS ON MANUFACTURING PAYROLLS,  
 NEW JERSEY, 1947-1976

<i>Year</i>	<i>Employment (thousands)</i>	<i>Average Weekly Hours</i>	<i>Average Weekly Earnings (dollars)</i>	<i>Average Hourly Earnings (dollars)</i>
1947 .....	n.a.	40.7	52.26	1.28
1948 .....	n.a.	40.5	56.37	1.39
1949 .....	n.a.	39.4	56.97	1.45
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 .....	567.6	40.9	163.19	3.99
1973 .....	582.3	41.3	174.70	4.23
1974 .....	560.7	40.9	186.50	4.57
1975 .....	491.2	40.5	199.99	4.93
1976(P) .....	500.0	41.4	220.67	5.33

FOOTNOTE

n.a.—not available.

(P)—Preliminary estimates.

Series have been adjusted to March 1975 benchmarks.

SOURCE: N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 6  
 CONSUMER PRICE INDEXES\*  
 FOR URBAN WAGE EARNERS AND CLERICAL WORKERS  
 (1967 = 100.0)

<i>Year</i>	<i>United States</i>	<i>New York SCA<sup>a</sup></i>	<i>Philadelphia SMSA<sup>b</sup></i>
1947 .....	66.9	67.0	66.4
1948 .....	72.1	71.5	71.7
1949 .....	71.4	70.7	70.9
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

FOOTNOTES

<sup>a</sup> Standard Consolidated Area: New York-Northeastern New Jersey including Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, and Union counties.

<sup>b</sup> Standard Metropolitan Statistical Area, including Camden, Burlington, and Gloucester counties.

\* Annual averages.

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

Prepared by N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 7  
PERSONAL INCOME, NEW JERSEY AND UNITED STATES,  
1948-1976

Year	Total Personal Income		Per Capita Personal Income			
	New Jersey (millions of current dollars)	United States	New Jersey (current dollars)	United States	New Jersey <sup>a</sup> (1967 dollars)	United States <sup>b</sup>
1948 . . . .	8,063	208,876	1,689	1,430	2,359	1,983
1949 . . . .	8,131	205,793	1,663	1,384	2,349	1,938
1950 . . . .	8,541	226,214	1,753	1,496	2,460	2,075
1951 . . . .	10,151	253,232	2,028	1,652	2,627	2,123
1952 . . . .	10,934	269,769	2,134	1,733	2,715	2,180
1953 . . . .	11,750	285,456	2,247	1,804	2,844	2,252
1954 . . . .	11,957	287,607	2,231	1,785	2,799	2,217
1955 . . . .	12,688	308,266	2,306	1,876	2,904	2,339
1956 . . . .	13,719	330,479	2,443	1,975	3,035	2,426
1957 . . . .	14,550	348,460	2,536	2,045	3,052	2,426
1958 . . . .	14,883	359,958	2,527	2,067	2,968	2,387
1959 . . . .	15,976	383,765	2,656	2,167	3,081	2,482
1960 . . . .	16,645	399,947	2,727	2,222	3,104	2,505
1961 . . . .	17,461	415,984	2,787	2,274	3,140	2,538
1962 . . . .	18,619	442,078	2,920	2,381	3,253	2,628
1963 . . . .	19,573	465,234	2,997	2,469	3,274	2,692
1964 . . . .	20,819	497,268	3,126	2,603	3,361	2,802
1965 . . . .	22,486	538,690	3,323	2,785	3,516	2,947
1966 . . . .	24,254	586,736	3,540	3,001	3,635	3,087
1967 . . . .	26,175	629,204	3,778	3,188	3,778	3,188
1968 . . . .	28,589	688,978	4,081	3,457	3,903	3,318
1969 . . . .	31,158	751,425	4,391	3,733	3,970	3,400
1970 . . . .	33,817	808,223	4,701	3,966	3,970	3,410
1971 . . . .	36,325	864,989	4,979	4,195	3,993	3,458
1972 . . . .	38,975	944,585	5,304	4,537	4,105	3,621
1973 . . . .	41,888	1,059,535	5,718	5,049	4,156	3,793
1974 . . . .	45,711	1,159,478	6,243	5,486	4,075	3,714
1975 . . . .	49,135	1,257,535	6,716	5,903	4,060	3,662
1976 (P) . .	53,327	1,382,457	7,269	6,441	4,169	3,778

FOOTNOTES

<sup>a</sup> The average of the Consumer Price Indexes 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.

<sup>b</sup> The Consumer Price Index for the United States was used to express United States per capita personal income in constant 1967 dollars.

(P) Preliminary estimates.

SOURCES: U.S. Department of Commerce; U.S. Department of Labor, Bureau of Labor Statistics. Prepared by N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 8  
PRODUCTION AND TRADE, NEW JERSEY, 1948-1976

Year	Electric Power Sales				Value of New Dwelling Units Authorized (\$000)	Construction Contracts Awarded‡ (\$000)	Retail Store Sales* (\$00',000)	Registration of New Vehicles	
	Total (kilowatt hours in thousands)	Large Industrial and Commercial Users	Small Industrial and Commercial Users	Highway Gasoline Consumption (000 gal.)				Passenger Cars (number)	Commercial Vehicles (number)
1948	6,887,131	3,736,931	1,359,854	.....	n.a.	406,476	n.a.	116,847	25,504
1949	7,026,664	3,578,396	1,483,196	1,068,493	n.a.	408,007	n.a.	165,179	23,544
1950	8,023,122	4,161,454	1,630,075	1,184,769	n.a.	747,771	n.a.	210,436	27,229
1951	8,944,201	4,648,835	1,806,808	1,272,802	n.a.	676,458	n.a.	178,862	25,002
1952	9,578,722	4,837,880	1,969,215	1,352,498	n.a.	690,770	n.a.	149,168	19,335
1953	10,435,872	5,191,330	2,180,598	1,429,005	n.a.	793,889	n.a.	208,313	23,048
1954	10,931,039	5,214,694	2,348,391	1,571,234	n.a.	886,947	n.a.	207,242	20,601
1955	12,184,077	5,874,199	2,584,701	1,678,675	n.a.	1,010,459	n.a.	258,079	22,262
1956	13,224,653	6,323,544	2,807,035	1,739,307	n.a.	1,106,452	n.a.	219,297	21,903
1957	14,196,487	6,642,234	3,097,755	1,741,173	n.a.	1,048,449	n.a.	219,865	20,320
1958	14,949,906	6,829,115	3,322,774	1,788,806	n.a.	1,143,484	n.a.	183,770	17,616
1959	16,632,611	7,683,942	3,719,151	1,902,985	n.a.	1,303,736	n.a.	219,305	20,374
1960	17,569,054	8,125,141	3,967,306	1,939,472	497,534	1,256,532	n.a.	266,299	22,532
1961	19,248,349	8,730,727	4,471,379	1,961,542	553,029	1,307,832	n.a.	250,432	24,606
1962	20,630,556	9,506,486	4,848,024	2,005,449	549,825	1,392,618	n.a.	285,955	24,713
1963	22,077,818	10,108,217	5,309,982	2,095,302	608,660	1,534,448	8,992	318,127	26,804
1964	23,848,214	10,773,759	5,872,988	2,161,239	704,809	1,622,048	9,768	325,293	28,417
1965	25,964,004	11,712,402	6,433,961	2,277,979	727,586	1,555,689	10,396	378,768	30,980
1966	28,512,856	12,814,406	7,043,455	2,295,753	588,874	1,651,494	10,711	352,573	31,072
1967	30,146,448	13,147,596	7,620,829	2,360,627	572,646	1,906,577	10,947	302,680	27,471
1968	32,616,153	13,863,329	8,394,581	2,496,057	597,980	2,380,846	12,030	356,762	30,724
1969	35,637,643	15,042,515	9,214,088	2,584,111	562,616	2,205,705	12,582	356,583	34,616
1970	38,156,144	15,394,352	10,185,005	2,736,672	599,034	2,740,746	14,274	348,304	36,027
1971	39,919,508	15,564,483	11,056,580	2,843,883	876,144	2,409,797	15,359	370,004	35,255†
1972	42,318,122	16,192,817	12,143,135	3,114,393	1,062,430	2,948,735	16,399	443,628	50,545
1973	45,540,943	17,018,962	13,233,603	3,180,680	1,030,506	2,513,229	17,874	453,334	53,735
1974	43,995,014	16,390,080	12,904,974	3,097,073	588,291	2,353,822	18,024	351,103	51,663
1975	43,477,908	14,927,694	13,509,510	3,209,825	574,101(R)	1,950,095(R)	19,636	298,926	31,493
1976	45,605,101	15,759,346	14,289,144	3,337,914(P)	703,188(P)	2,106,560(P)	21,291	384,407	45,731

FOOTNOTES

\* Figures starting with 1968 are based on a new sample design and improved processing techniques developed as a result of the 1967 Census of Business by the U.S. Department of Commerce. The new series began September 1967 and subsequent figures are not comparable with earlier data.

† Years 1948-70 compiled by N.J. Auto List. Years 1972-74 are from the N.J. Division of Motor Vehicles.

‡ Beginning with January 1967, construction contracts awarded were adjusted to reflect more complete coverage of one family house construction.

(P)—Preliminary estimates. (R)—Revised. n.a.—not available.

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

Prepared by N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 9  
BUSINESS ACTIVITY, NEW JERSEY, 1948-1976

Year	Business Telephones Net Gains	Business Failures (number)	Liabilities of Business Failures (\$000)	New Incorporations (number)	Apparent Consumption of Distilled Spirits (000 gal.)	New Jersey Turnpike	
						Toll Revenue (\$000)	Number of Vehicles (000)
1948	19,106	219	15,286	5,510	6,852	n.a.	n.a.
1949	10,014	366	16,246	5,411	6,688	n.a.	n.a.
1950	20,134	346	10,926	6,009	8,243	n.a.	n.a.
1951	29,806	307	11,961	5,581	8,216	n.a.	n.a.
1952	29,044	319	18,627	6,146	7,824	16,241	17,948
1953	26,613	360	25,856	6,651	8,443	19,193	22,005
1954	24,664	385	20,086	7,276	8,536	20,756	24,555
1955	31,659	456	29,753	8,386	9,045	21,123	25,888
1956	37,452	582	33,919	8,839	10,253	24,124	31,588
1957	29,856	565	39,604	8,097	9,331	29,025	39,270
1958	21,892	778	43,475	8,757	9,961	30,162	41,615
1959	35,051	639	27,619	10,436	10,702	33,321	46,199
1960	38,543	714	49,071	10,172	11,391	35,588	49,083
1961	28,825	717	53,282	9,650	11,743	37,197	51,738
1962	39,383	591	58,468	9,984	12,378	39,246	54,901
1963	29,716	509	256,075	9,716	12,810	40,781	56,677
1964	36,771	442	49,261	10,023	13,483	44,153	60,708
1965	47,251	512	96,334	10,439	14,383	46,128	64,958
1966	54,650	442	61,191	9,656	14,687	48,617	69,850
1967	48,620	414	64,215	10,220	15,064	51,239	73,529
1968	53,293	423	42,692	12,038	15,971	55,350	78,205
1969	73,211	343	53,141	13,168	16,572	57,646	80,618
1970	58,787	463	142,196	13,958	16,289	63,946	89,655
1971	45,401	428	102,738	15,563	16,440	70,136	98,553
1972	66,989	453	173,428	16,462	17,060	75,948	107,933
1973	87,064	491	201,463	16,312	16,690	79,000	110,422
1974	55,327	643	110,411	15,410	16,527	75,241	106,628
1975	31,164	768	243,209	16,022	16,155	84,402	105,633
1976	53,040	660	174,457	18,270	15,902	91,095	109,234

FOOTNOTES

n.a.—not available.

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

Prepared by N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 10  
FINANCE, NEW JERSEY, 1948-1976

Year	Total Deposits (millions of dollars)	Bank Debits <sup>b</sup>		Savings in All Insured Savings and Loan Associations	Savings in All Mutual Savings Banks (thousands of dollars)	Ordinary Life Insurance Sales
		Total Assets	Five SMSA Areas <sup>a</sup>			
1948	.....	.....	.....	355,258	516,590	589,851
1949	5,164	5,603	.....	422,501	535,518	604,291
1950	.....	.....	.....	506,037	588,388	725,712
1951	.....	.....	.....	604,436	650,368	805,489
1952	.....	.....	.....	724,481	739,695	890,944
1953	.....	.....	.....	862,041	824,835	1,058,691
1954	6,218	6,767	.....	1,083,298	924,330	1,108,900
1955	.....	.....	.....	1,290,953	995,780	1,360,300
1956	.....	.....	.....	1,460,342	1,103,782	1,599,600
1957	.....	.....	.....	1,651,719	1,162,688	2,201,044
1958	.....	.....	.....	1,889,145	1,256,831	2,189,707
1959	8,115	8,890	.....	2,147,322	1,292,154	2,235,092
1960	.....	.....	.....	2,414,376	1,327,447	2,171,994
1961	.....	.....	.....	2,729,116	1,384,518	2,180,095
1962	.....	.....	.....	3,052,389	1,547,302	2,163,371
1963	.....	.....	.....	3,418,173	1,692,707	2,381,986
1964	11,470	12,758	79,920	3,801,004	1,833,533	2,748,766
1965	.....	.....	90,719	4,171,487	1,992,759	3,122,622
1966	.....	.....	104,426	4,261,895	2,122,482	3,258,043
1967	.....	.....	110,364	4,634,388	2,317,453	3,582,284
1968	.....	.....	127,373	5,059,085	2,480,412	3,977,629
1969	16,314	18,516	146,857	5,361,151	2,585,228	4,418,209
1970	18,109	20,469	184,356	5,936,761	2,967,846	4,948,757
1971	20,690	23,325	171,916	7,648,154	3,545,904	5,407,376
1972	21,432	24,280	195,584	8,908,940	4,146,721	5,825,622
1973	24,944	28,278	283,522	9,971,596	4,462,416	6,309,246
1974	25,722	29,499	349,222	10,875,906	4,818,111	7,127,150
1975	27,431	31,263	322,396	12,548,102	5,531,417	7,162,260
1976	.....	.....	383,108	.....	6,289,923	.....

FOOTNOTES

<sup>a</sup> Standard Metropolitan Statistical Areas: Newark; Paterson-Clifton-Passaic; Atlantic City; Trenton and Jersey City.

<sup>b</sup> Annual monthly average.

SOURCES: Bank Debits: Federal Reserve System. Savings in all Mutual Savings Banks; Savings Banks' Association of New Jersey.

Prepared by N.J. Department of Labor and Industry, Division of Planning and Research.

TABLE 11  
AGRICULTURE, NEW JERSEY, 1950-1976

Year	Number of Workers on Farms (thousands)	Cash Receipts from Farm Marketings		
		Total	(thousands of dollars) 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	339,887	113,234	226,653
1975	21	331,484(R)	108,891(R)	222,593(R)
1976 (P)	22	345,224	116,550	228,674

FOOTNOTE

(P)—Preliminary estimates. (R)—Revised.

SOURCES: U.S. Department of Agriculture; N.J. Department of Agriculture.

Prepared by N.J. Department of Agriculture.

TABLE 12  
COUNTY POPULATION ESTIMATES\*

County	1971	1972	1973	1974	1975†	1976‡
Atlantic .....	176,885	178,225	180,525	180,905	179,725	178,850
Bergen .....	904,315	907,565	908,965	909,795	910,485	910,865
Burlington .....	330,060	328,195	324,220	323,670	326,470	331,745
Camden .....	464,115	470,625	473,125	478,240	483,080	484,305
Cape May .....	60,075	61,140	62,350	63,350	63,625	63,590
Cumberland .....	124,050	126,145	127,450	128,405	129,085	129,795
Essex .....	935,245	935,735	935,795	930,640	927,420	924,830
Gloucester .....	175,760	178,040	180,205	182,475	183,810	185,300
Hudson .....	611,005	612,345	610,070	608,465	607,180	606,190
Hunterdon .....	71,145	72,230	73,140	73,855	74,455	74,525
Mercer .....	308,735	312,660	316,060	319,445	320,345	321,050
Middlesex .....	592,240	598,320	603,345	606,860	609,715	612,370
Monmouth .....	469,680	472,850	476,035	479,940	480,270	482,190
Morris .....	391,385	396,100	400,200	403,270	405,190	406,665
Ocean .....	218,110	234,520	250,820	257,055	258,940	261,750
Passaic .....	465,260	467,635	469,675	469,800	470,935	471,175
Salem .....	61,110	62,165	62,805	63,365	63,515	63,815
Somerset .....	201,070	202,910	204,165	205,595	206,470	207,315
Sussex .....	79,595	81,535	83,360	85,115	86,405	87,390
Union .....	546,960	548,565	550,165	549,905	550,280	550,515
Warren .....	74,640	75,180	76,200	77,040	77,300	77,520
Total .....	7,261,440	7,322,685	7,368,675	7,397,190	7,414,700	7,431,750

FOOTNOTES

\* Estimated populations as of July 1 of each year.

† Revised estimates.

‡ Provisional estimates.

SOURCE: N.J. Department of Labor and Industry, Division of Planning and Research.





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